Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix A:

Pertinent Correspondence

U.S. Army Corps of Engineers
New York District

New York State Department of Environmental Conservation
Division of Water
Bureau of Flood Protection and Dam Safety, 4th Floor
625 Broadway, Albany, New York 12233-3504
Phone: (518) 402-8185 • **FAX:** (518) 402-9029
Website: www.dec.ny.gov

Joe Martens
Commissioner

February 12, 2014

Anthony Ciorra, P.E.
Chief - Coastal Restoration and Special Project Branch
United States Army Corps of Engineers - New York District
26 Federal Plaza - Room 2119A
New York, New York 10278-0090

Re: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Hurricane and Storm Damage Reduction Project (Long Beach Project)

Dear Mr. Ciorra:

This letter is in response to the United States Army Corps of Engineers (Corps) request for their non-federal sponsor, New York State Department of Environmental Conservation (Department), to provide a letter of support to move the subject project to the next step in obtaining Corps approval of the Hurricane Sandy Limited Reevaluation Report (HSLRR). The Department reaffirms its support of the Long Beach Project, as stated in its June 24, 2013 letter to Mr. Eugene Brickman, and supports the recommendations included in the Hurricane Sandy Limited Reevaluation Report (HSLRR) for the Long Beach Project.

The Department continues to work with the Corps in moving this project forward and is anticipating the finalization of the HSLRR by the Corps in an expedited manor in order to move into construction as soon as possible and provide the much needed protections for these communities which this project will bring. The Department continues to provide the necessary staffing and support to move the Long Beach Project into Design and Construction. If you have any questions, please contact the Project Manager, John Scudder, by telephone at (518) 402-7082 or email at jsscudde@gw.dec.state.ny.us.

Sincerely,

Alan A. Fuchs, P.E.
Director
Bureau of Flood Protection and Dam Safety

ec: E. Brickman, USACE
S. Couch, USACE
J. LaCarruba, City of Long Beach
R. Master, Town of Hempstead
T. Kelly, County of Nassau

ec: P. Scully, NYSDEC Reg.1
S. McCormick, NYSDEC
A. Servidone, NYSDEC
J. Scudder, NYSDEC

New York State Department of Environmental Conservation
Division of Water
Bureau of Flood Protection and Dam Safety, 4th Floor
625 Broadway, Albany, New York 12233-3504
Phone: (518) 402-8185 • **FAX:** (518) 402-9029
Website: www.dec.ny.gov

Joe Martens
Commissioner

June 24, 2013

Eugene Brickman, P.G.
Deputy Chief, Planning Division
United States Army Corps of Engineers
New York District
26 Federal Plaza
New York, New York 10278

Re: Atlantic Coast of Long Island, Jones Inlet to Rockaway Inlet, Long Beach Island, New York, Hurricane and Storm Damage Reduction Project (Long Beach Project)

Dear Mr. Brickman:

It was a pleasure meeting with the United States Army Corps of Engineers (Corps), the City of Long Beach (City), the Town of Hempstead (Town) and Nassau County (County) representatives on March 8, 2013. During the meeting the New York State Department of Environmental Conservation (Department) agreed to support completion of the Limited Reevaluation Report (LRR) for the Long Beach Project, provided that the City, the Town and the County submit resolutions authorizing them to enter into a project cooperation agreement with the Department for Design and Construction of the Long Beach Project and to fulfill their responsibilities as the local sponsors.

With the resolutions (enclosed) that the Department received from the City, Resolution No. 42/13, dated March 19, 2013; from the Town, Resolution No. 312-2013, dated March 19, 2013; and from the County, Resolution No. 84-2013, dated May 20, 2013 authorizing the City, the Town and the County to enter into a project cooperation agreement with the Department for the Design and Construction of the Long Beach Project and with the parties' willingness to provide lands, easements and rights-of-way for the Long Beach Project; to operate and maintain the Long Beach Project; and to provide public access to the constructed Long Beach Project, the Department is in support of completing the LRR.

The Department is looking forward to working with the Corps to finalize the LRR and move the Long Beach Project into Design and Construction. If you have any questions, please contact the Project Manager, Anna Servidone, at (518) 402-8147 or axservid@gw.dec.state.ny.us.

Sincerely,

Alan A. Fuchs, P.E., Director
Bureau of Flood Protection and Dam Safety

Enclosures
cc w/Encls.:
R. Pinzon, USACE
J. LaCarruba, City of Long Beach
R. Masters, Town of Hempstead
K. Arnold, County of Nassau
P. Scully, NYSDEC
S. McCormick, NYSDEC
A. Servidone, NYSDEC

84204

RESOLUTION NO. 84- 2013

A RESOLUTION AUTHORIZING THE COUNTY EXECUTIVE TO ENTER INTO A PROJECT PARTNERSHIP AGREEMENT WITH THE STATE OF NEW YORK TO PROCEED WITH THE DESIGN AND CONSTRUCTION OF THE ATLANTIC COAST OF LONG ISLAND, JONES INLET TO ROCKAWAY INLET, LONG BEACH ISLAND, NEW YORK HURRICANE AND STORM DAMAGE REDUCTION PROJECT (THE "LONG BEACH PROJECT")

O FORM ttorney

STATE OF NEW YORK }
COUNTY OF NASSAU } ss.:

Issued to: *COMPTROLLER/TREASURER*

I, WILLIAM J. MULLER III, *Clerk Of the Legislature of the County of Nassau, do hereby certify that the foregoing is a true and correct copy of the original* ___ *Resolution 84-13* ___ *duly passed by the Nassau County Legislature, Mineola, New York, on* *Monday, May 20, 2013* ___ *and approved by the County Executive on* ___ *Thursday, May 23, 2013 and on file in my office and recorded in the record of proceedings of the Nassau County Legislature and is the whole of said original.*

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of said Nassau County Legislature

This 20 th *day of* June,

in the Year two thousand and 13.

WILLIAM J. MULLER III

Clerk of the Legislature

County of Nassau
Ninth Legislature

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84204

RESOLUTION NO. 84-2013

A RESOLUTION AUTHORIZING THE COUNTY EXECUTIVE TO ENTER INTO A PROJECT PARTNERSHIP AGREEMENT WITH THE STATE OF NEW YORK TO PROCEED WITH THE DESIGN AND CONSTRUCTION OF THE ATLANTIC COAST OF LONG ISLAND, JONES INLET TO ROCKAWAY INLET, LONG BEACH ISLAND, NEW YORK HURRICANE AND STORM DAMAGE REDUCTION PROJECT (THE "LONG BEACH PROJECT")

APPROVED AS TO FORM
Deputy County Attorney

Passed by Nassau County Legislature on
5/20/13 A voice vote was taken with 18
Legislators present.
Voting: aye 18, nay 0, abstained 0, recused 0
Became a resolution on 5/23/13
With the approval of the County Executive

WHEREAS, the County of Nassau supports the selected alternative from the 1995 Feasibility Plan for Long Beach Island Storm Damage Reduction Project (the "Long Beach Project"); and

WHEREAS, this Project requires the approval and support of the County, the City of Long Beach and the Town of Hempstead; and

WHEREAS, the County desires to enter into a Project Partnership Agreement with the New York State Department of Environmental Conservation (NYSDEC) in partnership with the U.S. Army Corps of Engineers (the "Corps") to proceed with the design and construction of the Long Beach Project; and

WHEREAS, the County will provide NYSDEC and the Corps with all access easements and rights-of-way for the construction of the Project, periodic re-nourishment, inspections and, if necessary for the purpose of operating, maintaining, repairing, replacing or rehabilitating the Project or functional portion of the Project with the County's jurisdiction; and

WHEREAS, the County will obtain all necessary real estate title and easements required to ensure adequate public access to the constructed Project within the County's jurisdiction through the preparation of a Public Access Plan; and

WHEREAS, the County will operate and maintain the completed Project or functional of the Project under the County's jurisdiction; and

WHEREAS, the County is committed to supporting this Project and assisting NYSDEC and the Corps in its share of the cost of this effort, if necessary; now, therefore, be it

RESOLVED, that the County Executive is authorized to enter into a Project Partnership Agreement with the NYSDEC for the Long Beach Project; and be it further

RESOLVED, that it is hereby determined, pursuant to the provisions of the State Environmental Quality Review Act, 8 N.Y.E.C.L. section 0101 et seq. and its implementing regulations, Part 617 of 6 N.Y.C.R.R., and Section 1611 of the County Government Law of Nassau County, that this renaming is a "Type II" Action within the meaning of Section 617.5(c) of 6 N.Y.C.R.R. and, accordingly, is of a class of actions which do not have a significant effect on the environment; and no further review is required.

APPROVED

[signature]

County Executive

DATE 5/23/2013

TOWN OF HEMPSTEAD
DEPARTMENT
OF
CONSERVATION & WATERWAYS
LIDO BOULEVARD
P.O. BOX 180
POINT LOOKOUT, N.Y. 11569-0180
(516) 431-9200

FAX 516-431-0088

FACSIMILE (FAX) TRANSMITTAL LETTER

DATE: 4/4/13

COMPANY: NYSDEC

ATTN: Anna Servidone

TOTAL NUMBER OF PAGES SENT (INCLUDING THIS COVER SHEET 2

COMMENTS:

SENT BY: Comm. Ron Masters

CASE NO. 25252 RESOLUTION NO. 312-2013

Adopted: March 19, 2013

Supervisor Murray offered the following resolution and moved its adoption:

RESOLUTION AUTHORIZING THE TOWN OF HEMPSTEAD TO ENTER INTO A COOPERATIVE PROJECT WITH THE FEDERAL GOVERNMENT, THE STATE OF NEW YORK, AND OTHER INVOLVED MUNICIPALITIES FOR THE DESIGN AND CONSTRUCTION OF THE LONG BEACH ISLAND STORM DAMAGE REDUCTION PROJECT

WHEREAS, the Town Board of the Town of Hempstead fully supports the Long Beach Island Storm Damage Reduction Project ("the Project"):

NOW, THEREFORE, BE IT

RESOLVED, that the Town of Hempstead will enter into a project cooperation agreement with the State of New York and any other necessary party for the purpose of proceeding with design and construction of the Project, including the grant of all rights of entry; and, BE IT FURTHER

RESOLVED, that the Town will provide all lands, easements and rights-of-way for the construction of the project, periodic renourishment, inspection, and, if necessary for the purposes of operating, maintaining, repairing, replacing or rehabilitating the Project or a functional portion of the project; and, BE IT FURTHER

RESOLVED, that the Town will operate, maintain, repair and rehabilitate the completed project or functional portion of the project, and provide public access to the entire constructed Project or functional portion of the Project.

The foregoing resolution was seconded by Councilman Santino and adopted upon roll call as follows:

AYES: SIX (6)

NOES: NONE (0)

City of Long Beach
ONE WEST CHESTER STREET
LONG BEACH, NEW YORK 11561
TEL: (516) 431-1011
FAX: (516) 431-5008

JAMES LACARRUBBA
COMMISSIONER OF PUBLIC WORKS

March 22, 2013

Ms. Susan McCormick, P.E.
Chief, Coastal Erosion Management Section
NYSDEC
625 Broadway, 4th Floor
Albany, New York

Re: Resolution authorizing a Project Partnership Agreement with the City of Beach, NYSDEC and U.S. Army Corps of Engineers

Dear Ms. McCormick:

The City of Long Beach is pleased to submit the enclosed City of Long Beach Resolution for the above stated project

Please contact me if you have any questions; I look forward to working with you on this project.

Sincerely,

James LaCarrubba

JL/cm
Enc.

cc: Jack Schnirman, City Manager

March 19, 2013

Item No. 9
Resolution No. 42/13

The following Resolution was moved by Mr. Torres and seconded by Pres. Mandel :

Resolution Authorizing the City Manager to Enter into a Project Partnership Agreement with the State of New York to Proceed with Design and Construction of the Atlantic Coast of Long Island, Jones Inlet to Rockaway Inlet, Long Beach Island, New York Hurricane and Storm Damage Reduction Project (the "Long Beach Project").

WHEREAS, the City of Long Beach supports the selected alternative from the 1995 Feasibility Plan for Long Beach Island Storm Damage Reduction Project (the "Long Beach Project"); and

WHEREAS, this Project requires the approval and support of the City of Long Beach, the Town of Hempstead and County of Nassau; and

WHEREAS, the City of Long Beach desires to enter into a Project Partnership Agreement with New York State Department of Environmental Conservation ("NYSDEC") in partnership with the U.S. Army Corps of Engineers ("Corps") to proceed with the design and construction of the Long Beach Project; and

WHEREAS, the City of Long Beach will provide the NYSDEC and the Corps all access easements and rights-of-way for the construction of the Project, periodic re-nourishment, inspections and if necessary, for the purposes of operating, maintaining, repairing, replacing or rehabilitating the Project or functional portion of the Project within the City limits; and

WHEREAS, the City of Long Beach will obtain all necessary real estate title and easements required to ensure adequate public access to the constructed Project within the City limits through the preparation of a Public Access Plan; and

WHEREAS, the City of Long Beach will operate and maintain the completed Project or functional portion of the Project within the City limits; and

WHEREAS, the City of Long Beach has committed to supporting this Project and assisting the State and the Army Corps in its share of the cost of this effort, if necessary; and

NOW, THEREFORE, be it

RESOLVED, that the City Council, as Lead Agency for the City of Long Beach, hereby adopts this Resolution and determines that this Project Partnership Agreement constitutes a Type II action pursuant to SEQRA; and be it further

RESOLVED, by the City Council of the City of Long Beach, New York that the City Manager be and he hereby is authorized to enter into a Project Partnership Agreement with the NYSDEC for the above said Project.

Resolution No. 42/13

APPROVED:

City Manager

APPROVED AS TO FORM & LEGALITY:

Corporation Counsel

VOTING:

Council Member Adelson - AYE

Council Member Goggin - AYE

Council Member McLaughlin- AYE

Council Member Torres - AYE

President Mandel - AYE

A TRUE COPY
DATED, LONG BEACH, N.Y.
3/21/13

CITY CLERK

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278–0090

REPLY TO
ATTENTION OF

Planning Division

March 14, 2013

Jack Schnirman
City Manager
One West Chester Street
Long Beach, NY 11561

Dear Mr. Schnirman,

On Friday, March 8, 2013, a meeting was held at the City of Long Beach to discuss the path forward for the Atlantic Coast of Long Island, Jones Inlet to Rockaway Inlet, Long Beach Island, New York Hurricane and Storm Damage Reduction Project ("the Long Beach Project"). Representatives from the U.S. Army Corps of Engineers – New York District (USACE), New York State Department of Environmental Conservation (NYSDEC), City of Long Beach, Town of Hempstead, and Nassau County were in attendance.

In 2012, USACE was diligently working on a modified plan that included a beach berm and dune that afforded a level of risk reduction within 20% of the 1995 authorized plan. This plan forward was in accordance with USACE guidance for a Limited Reevaluation Report (LRR).

On October 29, 2012, the City of Long Beach was significantly impacted by Hurricane Sandy and its record setting storm surge and wave heights. Hundreds of structures were either damaged or destroyed. Work on the LRR was put on hold as the District assisted with storm recovery responsibilities.

On January 29, 2013, President Obama signed the Hurricane Sandy Disaster Relief Appropriations Act (P.L. 113-2) to assist state and local governments with recovery. Although final implementation guidance has not yet been received, it is interpreted by the USACE that the Act allows for construction of projects that have been previously authorized, as long as it is the previously authorized plan that is recommended for implementation.

The recommended plan from the 1995 Feasibility Study included 41,000 linear feet of beach fill and generally extended from the eastern end of the barrier island at Point Lookout to Yates Avenue in East Atlantic Village where the plan tapered into the existing shoreline in Atlantic Beach. This plan consisted of:

- a dune with a top elevation of + 15 ft above NGVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H;
- a beach berm extending 110 ft from the seaward toe of the recommended dune at an elevation of +10 ft NGVD, thus gradually sloping approximately between 1V:25H and 1V:35H to match the existing bathymetry;
- a total sand quantity of 8,642,000 cy for the initial beach fill placement, including tolerance, overfill and advanced nourishment;
- planting of 29 acres dune grass and installation of 90,000 linear ft of sand fence;
- 16 dune walkovers and 13 timber ramps for boardwalk access, and 12 vehicle access ramps over the dunes;
- 6 new groins at the eastern end of the island
- rehabilitation of 16 of the existing groins, including the rehabilitation of 640 ft of the existing revetment on the western side of Jones Inlet;
- advanced nourishment to ensure the integrity of the initial beach fill design; and

- periodic nourishment of approximately 2,111,000 cy of beach fill material at 5 year intervals for the 50 year life of the project.

It is the position of the USACE that very minor modifications will be allowed to be made to the 1995 authorized plan and recommended in the LRR because they deal primarily with changes to the project alignment. The recommended plan will include 29,000 linear feet of beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, with an incidental taper to Capri Drive East in East Atlantic Beach. Since the project was authorized for construction in 1996, both the Village of Atlantic Beach and East Atlantic Beach decided to drop out of the project.

The allowable modifications to the 1995 authorized plan will be as follows:

- Remove the 15 ft wide dune maintenance pathway between the front of the boardwalk and the landward slope of the dune and position the dune directly in front of the boardwalk.
- Construct the beach berm with a step to help alleviate scarping at the water line. The beach berm will extend 40 ft at an elevation of +10 ft NGVD, slope 20 ft at 1V:10H to +8 ft NGVD and extend 120 ft at an elevation of +8 ft NGVD to slope into the water.
- The slope of the beach berm into the water will be reduced from 1V:35H to 1V:30H, which better matches the existing beach slope (based upon 2010 surveys).
- The advanced nourishment will not be placed in the City of Long Beach since the shoreline has stabilized since completion of the 1995 authorized plan. The shoreline is still very low leaving the City of Long Beach vulnerable to inundation.
- A bird nesting and foraging area (5,000 ft) for piping plovers and least terns (within the Town of Hempstead) will be created. Beach fill will not be placed in this area if equivalent protection is provided.

Based upon the allowable modifications listed above, the quantity of sand planned for placement is expected to be considerably less than what was recommended in the 1995 authorized plan and is being calculated using the latest available beach surveys. It is anticipated that sand will be placed in the surf zone and there will be some coverage of the existing groins; however the potential impact has been reduced from that of the 1995 authorized plan.

After you carefully review what has been laid out in this letter, please provide a letter to the NYSDEC clearly stating your intentions regarding the Long Beach Project. We look forward to working with the City of Long Beach to finalize the LRR and move the project closer to construction. If you have any questions about the content of this letter or the intended path forward, please do not hesitate to contact the Project Manager, Ronald Pinzon at 917-790-8627 or by email at ronald.r.pinzon@usace.army.mil or the Project Planner, Donald E. Cresitello at 917-790-8608 or by email at donald.e.cresitello@usace.army.mil.

Sincerely,

Eugene Brickman, P.G.
Deputy Chief, Planning Division

Cf:
Fuchs
McCormick
Scully
Masters
Arnold
LaCarrubba

CITY OF LONG BEACH
1 WEST CHESTER STREET
LONG BEACH, NEW YORK 11561
(516) 431-1001
FAX: (516) 431-1389

JACK SCHNIRMAN
CITY MANAGER

December 14, 2012

Department of Environmental Conservation
Peter A. Scully, Regional Director
SUNY @ Stony Brook
50 Circle Road
Stony Brook, New York 11790-3409

Al Fuchs, Director
Division of Water
Bureau of Flood Protection and Dam Safety
625 Broadway
Albany, New York 12233-3504

Dear Sirs:

Enclosed please find for your records a true copy of the Long Beach City Council Resolution No. 141/12, duly passed on December 4, 2012, affirming that the City of Long Beach supports moving forward with a U.S. Army Corps of Engineers Storm Damage Reduction Project for Long Beach for the next phase including development of plans and specifications for construction.

Sincerely,

Jack Schnirman
City Manager

December 4, 2012

Item No. 11
Resolution No. 141/12

The following Resolution was moved by Mr. Fagen and seconded by Pres. Torres :

Resolution Affirming that the City of Long Beach Supports Moving Forward with a U.S. Army Corps of Engineers Storm Damage Reduction Project for Long Beach for the Next Phase Including Development of Plans and Specifications for Construction.

WHEEAS, the City of Long Beach wishes to re-invite the U.S. Army Corps of Engineers to work with us in recovering from Hurricane Sandy; and

WHEREAS, on May 4, 2006, the City of Long Beach unanimously defeated a resolution to authorize participation in the U.S. Army Corps of Engineers Storm Damage Reduction Project for Long Beach, thus declining further participation at that time and ; and

WHEREAS, the City of Long Beach sustained extensive damage as a result of coastal flooding and wave impacts due to Hurricane Sandy, losing five feet in elevation of sand on the beaches and the high tide is now 25 feet from the boardwalk versus 125 feet prior to the storm and the City remains vulnerable to future storms due to substantial beach dune erosion caused by Hurricane Sandy; and

WHEREAS, the City of Long Beach recognizes and is increasingly concerned over the impacts of global climate change and volatility, rising sea levels and the potential for more frequent and/or more intense coastal storms and hurricanes; and

WHEREAS, the City of Long Beach is greatly concerned for increased flood risks and related damages and the associated nature demonstrated vulnerability that threatens the protection of the life and health of the residents of Long Beach from both the Atlantic Ocean and Reynolds Channel; and

WHEREAS, nothing in this resolution commits the City of Long Beach to funding the project at this time or in the future and the City of Long Beach will be required to enter into a mutually agreeable cost-sharing agreement with the New York State Department of Environmental Conservation as the local sponsor in order to construct the project and the City will bring positives to the table while ensuring that the public safety needs of Long Beach are met;

NOW, THEREFORE, be it

RESOLVED, that the City Council of the City of Long Beach, New York hereby affirms their support and re-invites the U.S. Army Corps of Engineers to work in a positive manner towards a Storm Damage Reduction Project for the City of Long Beach moving forward for the development of plans and specifications for construction.

A TRUE COPY
DATED, LONG BEACH, N.Y.
12/14/12
[signature]
CITY CLERK

RECEIVED
BUREAU OF
DEC 20 2012
FLOOD PROTECTION
AND DAM SAFETY

December 4, 2012

Page 2
Item No. 1
Resolution No. 141/12

APPROVED:

Commissioner of Public Works

APPROVED AS TO ADMINISTRATION:

City Manager

APPROVED AS TO FORM & LEGALITY:

Corporation Counsel

VOTING:

Council Member Adelson - AYE

Council Member Fagen - AYE

Council Member Mandel - AYE

Council Member McLaughlin- AYE

President Torres - AYE

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

April 21, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Dear Mr. Stilwell,

This letter is a follow-up to our January 30, 2014 correspondence requesting concurrence on the U.S. Army Corps of Engineers, New York District (District) exception determination under Section 6 of Coastal Barrier Resources Act CBRA (16 U.S.C. § 3505) for the Atlantic Coast of Long Island - Jones Inlet to East Rockaway Inlet - Long Beach Island Coastal Storm Risk Management Project ("the Project"). This Project is within a portion of CBRS unit NY-59: Fire Island complex.

The District's initial letter cited consistency with "(16 U.S.C. § 3505(a)(6)): Maintenance, replacement, reconstruction, or repair, but not the expansion (except with respect to United States Route 1 in the Florida Keys), of publicly owned or publicly operated roads, structures, and facilities" by stating that the project will be managing risk and enhancing the coastal barrier system within the project area by restoring and maintaining the existing beach and the natural littoral transport of sediment which benefits not just the region's stakeholders, but fish and wildlife resources and habitats.

The District will be managing risk and enhancing the coastal barrier system by groin repair and construction on the existing barrier beach. The Project shall minimize the loss of human life by restoring natural processes to avoid further erosion and loss of the Nassau County/Long Beach/Town of Hempstead coastal barrier system. Also, it will reestablish the functionality of these beaches as part of the coastal barriers that contribute to the resiliency of upland communities. Additional loss of the beach could potentially result in the loss of life due to coastal storm damage to private and public infrastructure.

The increased retention of sediment will reduce erosion and help maintain existing public roadways landward of the project, including maintaining access to the Loop Parkway Bridge (a major Coastal Evacuation Route) for the entire barrier island. Without these proposed actions, the habitats and recreational areas would be subject to increased erosion rates. In addition to managing the effects of coastal storms on human life, the Project will also protect and create habitat for migratory birds and other wildlife. Additionally, the Project will not induce further development as the land behind the Project is either parkland or is already fully developed.

As part of the ongoing compliance review for the project, the District has determined that the Project meets the following additional conditions under 16 U.S.C. § 3505 which further provides rationale that the project be excepted:

- Section 6 (a)(5) of CBRA which allows for federal funding for the "Construction, operation, maintenance, and rehabilitation of Coast Guard facilities and access thereto;
- Section 6(a)(2) of CBRA provides an exception to Section 5, Limitations on Federal Expenditures Affecting the System, if the expenditure is for "the maintenance or construction of improvements of existing Federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the placement of dredge material related to such maintenance or construction.

The Project's proposed improvements to the groin field will provide navigation benefits to Jones Inlet by decreasing the frequency of maintenance dredging and affording safer passage through the inlet. The rehabilitation of existing groins, terminal groin extension, and construction of new groins will allow for longer retention of sediment which will decrease shoaling within the navigation channel maintaining critical access to U.S. Coast Guard Station Jones Beach.[1]

Based on the preceding review, the District has concluded that the proposed Project meets the above-referenced exceptions and therefore is consistent with the purposes of CBRA. The District requests that the Service continues its review on the consistency of the proposed Project.

[1] The station's area of responsibility extends from East Rockaway Inlet to Gilgo Beach, including Jones Inlet and the associated back-bay waters of southern Nassau County.

If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

for Nancy Brighton
Acting Chief, Environmental Analysis Branch

cc: USFWS-LIFO

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

January 30, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Hurricane Sandy Limited Reevaluation Report (HSLRR)

Dear Mr. Stilwell,

The U.S. Army Corps of Engineers (USACE), New York District (District), is proposing to implement a cost-effective solution designed to restore the shoreline and provide shoreline protection for the Long Beach Island, a barrier island located between Jones Inlet and East Rockaway Inlet, in Nassau County, New York. The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project (Project), covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach. It has been determined that a section of the Project falls within the Coastal Barrier Resources System (CBRS). Section 5 of the Coastal Barrier Resources Act (CBRA; 16 U.S.C. § 3504) prohibits new Federal expenditures or financial assistance within System units of the CBRS.

The NYD requests an exception under Section 6 of CBRA (16 U.S.C. § 3505). The project falls under exception 16 U.S.C. § 3505(a)(4): The maintenance, replacement, reconstruction, or repair, but not the expansion, of publicly owned or publicly operated roads, structures, or facilities that are essential links in a larger network or system. The Project is also consistent with (16 U.S.C. § 3505(a)(6): Maintenance, replacement, reconstruction, or repair, but not the expansion (except with respect to United States route 1 in the Florida Keys), of publicly owned or publicly operated roads, structures, and facilities. A brief project description is listed below. The District feels this work would be exempt because the proposed work would be the repair and the reconstruction of publicly owned structures damaged during hurricane Sandy. This storm event has left the barrier island system within the study area vulnerable, increasing the potential for overwash and breaching during future storm events. The recommended plan for this Project includes the preferred plan (identified in the 1995 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the EA (USACE 2013). The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project area.

The proposed action is a modification to the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York Storm Damage Reduction Project that received a favorable Record of Decision (ROD) in 1998. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 6,000 linear feet (lf) of project area, a reduction of 4,072,000 cy of fill material needed for initial beach fill and 341,000 cy per yr for renourishments activities, a reduction of five acres (ac) of dune plantings and a reduction of 15,000 lf of sand fence. Specifically, there will be a reduction of 110 ac of filling in the upper beach zone, 39 fewer acres of filling in the intertidal zone, and 35 fewer acres of filling in the sub-tidal zone.

The selected storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 If of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H (1V:H3 on landward slope fronting the boardwalk) that will extend along the entire project area; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 If of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Total sand fill quantity of 4,570,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); 5) planting of 34 acres of dune grass and installation of 75,000 If of sand fence. A comparison of components of the original selected plan and the proposed Project modification are shown in Table 1.

Table 1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Table 1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 linear feet (lf), some within shorebird nesting area	35,000 lf, none within shorebird nesting area	- 6,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cubic yards (cy)	4,570,000 cy	- 4,072,000 cy
Dune plantings	29 acres (ac)	34.0 ac	+5.0 ac
Sand fence	90,000 lf	75,000 lf	- 15,000 lf
Timber dune walkover ADA	13	9	-4
Timber Dune walkovers (from boardwalk to Berm) ADA	5	5	0
Timber Dune walkovers (from boardwalk to Berm) None ADA	0	6	+6
Timber dune non-ADA walkovers	6	23	+17
Timber Vehicle and pedestrian access from boardwalk to Berm	2	2	0
Gravel surface vehicle and pedestrian access way	2	9	+7
Extension of existing walkovers	12	8	-4
Raised timber vehicular access	1	0	-1
5-yr renourishments	2,111,000 cy/year (yr)	1,770,000 cy/yr	- 341,000 cy/yr
Rehab and 100 ft Extension of terminal groin	0	1	+ 1
Additional groins	6	4 (6 proposed, but 2 have been deferred)	0
Rehabilitation of existing groins	15	17	+ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

The NYD believes the proposed project meets the exceptions to CBRA's limitations and we request that the Service review and comment on the consistency of the proposed activity within the designated CBRA. I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729

Sincerely,

Nancy Brighton
Chief, Environmental Analysis Branch

Attachments
cc: USFWS-LIFO

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix B

SECTION 404(B)(1) GUIDELINES EVALUATION

U.S. Army Corps of Engineers
New York District

APPENDIX : SECTION 404(b)(1) GUIDELINES EVALUATION

Introduction

This appendix of the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project presents a Section 404(b)(1) Guideline evaluation for the comprehensive evaluation of improvements to the Long Beach Island (LBI) coastline. The evaluation is based on the regulations found at 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The regulations implement Sections 404(b) and 501(a) of the Clean Water Act, which govern the disposal of dredged and fill material inside the territorial sea baseline (§230.2(b)).

Generic 404 (b)(1) Evaluation

The following Section 404(b)(1) evaluation is presented in a format consistent with typical evaluations in the New York area and addresses all required elements of the evaluation.

Project Description

a. Location: The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project, covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Long Beach Island, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach.

b. General Description: In 1965, the USACE evaluated various storm protection options for the area and presented findings in the Beach Erosion Control and Interim Hurricane Study for the Atlantic Coast of Long Island, New York: Jones Inlet to East Rockaway Inlet (USACE 1965). Local interests did not support the plan and the project was terminated in 1971. Since that time, beach erosion and storm damage have continued in the area. At the request of the local interests following Hurricane Gloria in 1985, the USACE conducted a Reconnaissance Study (completed in 1989), and subsequently a Feasibility Study (completed in February of 1995), to evaluate an array of structural and non-structural measures to provide flood and storm protection for the Long Beach Island area (USACE 1989, 1995, 1998, 1999).

   As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan, as presented in the Final Feasibility Study and Final Environmental Impact Statement (FEIS) for the Project, included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and construction/rehabilitation of numerous dune walkovers and dune access points (USACE 1995, 1998). The December 1998 Record of Decision (ROD) (filed in the Federal Register, January 1999) granted approval of the plan as presented in the 1998 FEIS and was signed on December 23, 1998.

Subsequent to the 1998 release of the FEIS for the Project, the proposed alternative was re-evaluated. The re-evaluation was conducted to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups (USACE 1998, 2002). Furthermore, this re-evaluation allowed incorporation of advancements in engineering evaluation methods. As a result of the projects re-evaluation, several modifications were made to the plan that were selected in 1998 and are presented in the 2013 EA (USACE 2013). The proposed Project modifications are intended to provide a long-term, cost-effective solution for reducing erosion and maintaining the protective dune and beach berm in this area.

The currently proposed Project represents a modification to the original approved Project that has reduced the overall amount of beach fill, dune fill, dune plantings, sand fence, and fill required for renourishment activities. In addition, the proposed project modification also has excluded most Project activities within a 136-acre shorebird foraging/nesting area. Although, the Project has increased the number of proposed boardwalk walkovers and vehicular ramps and now includes a 100-foot extension of groin 58 (i.e., East Groin), these changes are overall insignificant relative to the original approved Project and will have no significant negative environmental impacts.

In the 1995 FEIS, it was determined that offshore, near shore and onshore components of the Project could potentially cause some minor adverse impacts to water quality, aquatic habitats and species (i.e., benthic organisms, fish and their habitat), potential threat to several endangered marine and terrestrial species (i.e., sea turtles, piping plover, sea beach amaranth), cultural resources (i.e., shipwrecks), and socio-economic impacts to recreational activities during construction (i.e., noise and restrictions to construction areas). Similar potential impacts are likely under the currently proposed Project. However, it is the physical extent (i.e., acreage of impacts) that has changed which translates to less overall impacts throughout the Project area relative to the original approved Project. No significant negative impacts, in addition to those described in the 1995 FEIS and highlighted below, are expected from the currently proposed Project modification. No new natural resources or endangered species have been identifying within the project area since the 1995 EIS.

c. Authority and Purpose: In October 1986, the Committee on Public Works and Transportation of the United States House of Representatives authorized the USACE to review the previous report on the Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, to determine the feasibility of providing storm damage protection works for Long Beach Island. Subsequently, a reconnaissance study and report were completed in 1989, a Draft Feasibility Report and Draft Environmental Impact Statement (DEIS) report were circulated in 1994, and a Final Feasibility Report and Final

Environmental Impact Statement (FEIS) report, and circulated in 1998 (USACE 1998). A Record of Decision (ROD) was signed on December 23, 1998 and filed in the Federal Register in January 1999. The 1995 Feasibility Report Recommended Plan was authorized for construction by the 1996 Water Resources Development Act (WRDA).

As a result of the EIS, several alternatives were evaluated and a final plan was selected. The plan included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and sand removal from an offshore borrow area. However, since the 1998 release of the FEIS for the Project the proposed alternative was re-evaluated. The re-evaluation was conducted to incorporate advancements in engineering evaluation methods, to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups. As a result of project re-evaluation and several modifications were made to the plan that was selected in 1998 for this Project.

This re-evaluation EA was conducted with the intent of identifying and evaluating various means of maintaining the beach that are longer-term and less expensive than the current plan and that incorporate concerns addressed by agencies and/or interest groups. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the EA (USACE 2013).

d. General Description of Placement Material: Sand that is compatible to the existing beach that will be pumped in from offshore borrow area.

e. Proposed Discharge Site: The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project, covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Long Beach Island, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach

f. Disposal Method: Use of hydraulic dredging equipment for the initial construction and renourishment efforts.

Factual Determinations

a. Physical Substrate Determinations

(1) The selected alternatives storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 lf of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an

incidental taper into East Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H (1V:3H on landward slope fronting the boardwalk) that will extend along the entire project area; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 lf of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Approximately 35,000 lf of beach fill and a total sandfill quantity of 4,570,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); planting of 34 acres of dune grass and installation of 75,000 lf of sand fence.

Structural components of the Project modification include the construction of 57 timber/gravel dune walkovers, extensions of existing dune walkovers and vehicle access ways. Construction of 6 new groins (two of the six groins originally proposed for the Project has been deferred indefinitely, and are not part of the proposed Project modification), the rehabilitation of 17 groins, the rehabilitation and extension of the eastern terminal groin.

(2) Sediment Type: Sediments similar to those present in the placement area will be utilized. No impacts are anticipated.

(3) Dredged Material Movement: Minor short-term movement and existing shore processes will continue.

(4) Physical Effects on Benthos: Minor short-term disruption. No long-term impact.

(5) Other Effects: None identified

(6) Action to Minimize Impacts: See section (5.0)

b. Water Circulation, Fluctuations, and Salinity Determinations

(1) Water

(a) Salinity: Proposed project is not expected to affect salinity because beach fill does not govern the overall water mass movements (tidal flow and river discharge) that control salinity.

(b) Water Chemistry: No major impacts are expected.

(c) Clarity: Temporary increase in turbidity will occur from sediment resuspension during placement of the material.

(d) Color: Minor temporary changes possible but no major impacts are expected.

(e) Odor: No measurable impacts are expected.

(f) Taste: Not applicable

(g) Dissolved Gas Levels: Possible short-term variation may occur due to turbulence created by placement of the material on the beach.

(h) Nutrients: Temporary and localized nutrient increases may occur due to sediment resuspension during beach fill activities. No long-term increase in nutrients and eutrophication will result from the proposed project.

(i) Eutrophication: None identified

(j) Other: None identified

(2) Current Patterns and Circulation: No impacts identified

(3) Normal Water Level Fluctuations: No impacts identified

(4) Salinity Gradients: No impacts expected

(5) Actions to Minimize Impacts: Not applicable

c. Suspended Particulate/Turbidity Determination

(1) Change at Disposal Site: Short-term, localized increases in suspended particulates/turbidity as a result of placement of material, but no long-term changes.

(2) Effects on Chemical and Physical Properties of the Water Column: Impact should be minimal since particles will settle out fairly rapidly and no toxic metals or organic compounds are anticipated to be encountered.

(3) Effects on Biota: Short-term exposure due to localized sediment resuspension during placement of material. No long-term effects are projected.

(4) Action to Minimize Impacts: Placement of material will be completed as early as possible to allow for optimum recruitment of benthic organism within the placement area.

d. Contaminant Determination: No impacts identified.

e. Aquatic Ecosystems and Organisms Determination: Possible effects to the gills of nekton species that are in the immediate area of placement. No major impacts are expected.

f. Proposed Disposal Site Determination: Not applicable.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: See section (4.0).

h. Determination of Secondary Effects on the Aquatic Ecosystem: None identified.

Findings of Compliance or Noncompliance

a. There are no practicable alternatives for the proposed action under the jurisdiction of Section 404(b)(1) Guidelines.

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

c. The proposal will not have significant adverse impacts on endangered species or their critical habitats. Formal coordination with the USFWS under section 7 of the Endangered Species Act of 1973 has been completed to insure the safety of any transient species that may be present during construction. Informal consultation with NMFS has been completed at this time.

d. The proposed action will not result in significant adverse impacts on human health or welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife and special aquatic sites.

e. All appropriate steps to minimize adverse environmental impacts have been taken.

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

Conclusions

Based on all of the above, the proposed action is determined to be in compliance with the Section 404(b)(1) Guidelines, subject to appropriate and reasonable conditions, to be determined on a case-by-case basis, to protect the public interest.

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix C

USFWS Coordination
(Fish and Wildlife Coordination Act Report)
(Biological Assessment)
(Biological Opinion)

U.S. Army Corps of Engineers
New York District

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

June 11, 2015

Colonel David A. Caldwell
District Engineer, New York District
U.S. Army Corps of Engineers
Jacob K. Javits Federal Bldg.
26 Federal Plaza
New York, NY 10278-0090

Dear Colonel Caldwell:

The U.S. Fish and Wildlife Service (Service) submits the enclosed document entitled, "Final Fish and Wildlife Coordination Act Report, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project."

The Service appreciates the Corps' assistance during the completion of this document. If you have any questions or require additional information, please contact Mr. Steven Papa of the Long Island Field Office, at 631-286-0485.

Sincerely,

Patricia Cole
for David A. Stilwell
Field Supervisor

Enclosure

cc:

NYSDEC, Stony Brook, NY (R. Marsh)
USFWS, Long Island Field Office, Islip, NY

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Branch

October 15, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: The Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project

Dear Mr. Stilwell:

The U.S. Army Corps of Engineer, New York District (District) is in receipt of your draft Fish and Wildlife Coordination Act Report (FWCAR) dated July 2014. The District has reviewed your report and respectively does not concur with some of the assumptions the Service has made on the proposed action. Long Beach Island, New York, has an extensive history of property damage and economic loss as a result of coastal flooding and erosion associated with frequent storms. Significant beach erosion and sand loss has reduced the width of the protective beach front and has exposed properties to a high risk of damage from ocean flooding and wave attack. Existing groins and jetties along the island have deteriorated and are becoming less effective at reducing sand loss along the shoreline and providing wave protection. As you are aware, the authorized coastal storm risk management project (previously referred to as a shore protection or storm damage reduction project) was designed to provide risk reduction against wave attack, erosion and inundation for homes and businesses along approximately 6.4 miles of oceanfront, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach. At the outset, it is important to recognize the high degree of collaboration and full agreement between the Federal, State and local agencies in this important effort. After analysis, the District concurs, in part with some of your eight recommendations, but not all of them. The following paragraphs specifically discuss each recommendation:

1. Recommendation 1 asks the District to explore additional alternatives for this project.
   1R. Based on the analyses performed between the original 1998 FEIS and the 2014 EA, the District concluded that the preferred alternative is the best alternative which will provide coastal storm damage management measures while enhancing the surrounding habitat. The District is confident that the proposed project represents a sound engineering solution to property damage concerns

within the project area and will perform as stated in the Environmental Assessment.

2. Recommendation 2 suggests that the District allow natural processes to occur allowing for partial overwash and dune blow outs within the residential developments and public park areas.
   2R. The District has a concern with a recommendation that will allow wave attack, erosion and inundation to occur anywhere in an area that is heavily populated. Since Hurricane Sandy, considerable amount of information has been exchanged between our respective agencies on the proposed project with the acknowledgements of our agencies respective missions. Consequently, the District will incorporate some recommendations, as applicable, with the understanding that some recommendations will not allow the project to be implemented within its intended purpose. The District requests this recommendation be taken out of the FWCAR.

3. Recommendation 3 recommends that the District ensure full protection of these shorebird species and their habitats prior to project implementation, through the development of long-term agreements with the Town of Hempstead, Nassau County, New York State, and Service. (Ref attached 8-26-14 TOH letter)
   3R. The District agrees with and plans to have the Town and County continue its protection of the designated habitats.

4. Recommendation 4 recommends that the District undertake a regional assessment of cumulative impacts of beach nourishment on fish and wildlife resources and develop a long-term comprehensive management plan for sensitive species within the project areas.
   4R. The District is currently engaged in creating (coordinating with the New York Department of Environmental Conservation-Region 1) a regional assessment protocol for the borrow areas. The District is also seeking to re-establish the concept of developing a Long-term Regional Comprehensive Management Plant (LTRCMP) for Threatened and Endangered Species as part of the Fire Island Inlet to Montauk Point Reformulation Study. As you are aware, the LTRCMP was initiated to fully understand the effects that the Reformulation alternatives might have on these species and their habitats. This concept would include all of the south shore of Long Island. The goals of the LTRCMP was to ensure adequate data collection to support a Biological Assessment and the development of educational, management and monitoring strategies to support conservation measures to contribute to the recovery of the species.

5. Recommendation 5 recommends that the District undertake an updated impact assessment on fish and wildlife resources relative to this project.
   5R. After review, the District believes that conditions offshore and inshore have not experienced any major change to the existing species assemblage.

6. Recommendation 6 recommends that all offshore dredging activities should be coordinated with the NYSDEC Region 1 in regard to the protection of resources under their jurisdiction.
   6R. See **4R** above. The District has coordinated and will continue to coordinate with the NYSDEC to ensure the minimization of impacts and protection of resources in relation to the implementation of Corps' projects. Specifically, to minimization of impacts to surf clams, The District is working with NYSDEC for a borrow area SOP

7. Recommendation 7 recommends the following in order to avoid and minimize impacts to the offshore borrow area Resource Category 3 habitats and achieve "no net loss of habitat value, while minimizing loss of in-kind habitat value".
   7R. The District agrees in part with this recommendation. As stated in **4R** above, the District and the NYSDEC are creating guidance for borrow area monitoring and has used some part of the Bureau of Ocean Energy Management (BOEM), formerly Minerals Management Services, protocols.

8. Recommendation 8 recommends that the Corps should consider habitat enhancements in less developed areas at Hempstead, Nickerson, and Lido Beaches to address unavoidable impacts. Potential enhancements include vegetation and predator control, invasive species removal, and grading to promote shorebird foraging.
   8R. The District agrees with this recommendation and understands that during the Endangered Species Act formal consultation process our respective agencies can work out the details.

The District would like clarification on the Service's position on existing condition in the project area and the project footprint. The Service has included the updrift sand fillet at Jones Beach Island (page 2). On page 19, under Future Resource Conditions Without the Project, paragraph three states: "In a place (Long Beach Island) where it is heavily groined, lack of suitable shorebird habitat erosion or accretion would not likely affect shorebird population". It is the District position that the project provides risk reduction against wave attack, erosion and inundation and will also maintain and enhance the habitat for fish and wildlife in the area. The Service describes that the habitat within the project area is of lower quality and yet throughout the draft FWCAR it is states that the project will result in long-term irreplaceable impacts by creating suboptimal habitat. It is also unclear to the District how the proposed project can disturb an already suboptimal habitat area.

Thank you for continued cooperation in advancing this effort. I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729

Sincerely,

Mr. Peter Weppler
Chief, Environmental Analysis Branch

Cc. USFWS-LIFO

Final Fish and Wildlife Coordination Act Report
Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project

Prepared For:
U.S. Army Corps of Engineers
New York District
New York, New York

Prepared By:

Department of the Interior
U.S. Fish and Wildlife Service
Long Island Field Office
Shirley, New York

Preparer: Steven T. Papa
New York Field Office Supervisor: David A. Stilwell

June 11, 2015

EXECUTIVE SUMMARY

This is the U.S. Fish and Wildlife Service's (Service) Final Fish and Wildlife Coordination Act (FWCA) Report for the U.S. Army Corps of Engineers' (Corps) proposed project entitled, "*Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project, Coastal Storm Risk Management Project (Long Beach Project*)."

The Fish and Wildlife Coordination Act (FWCA) (48 Stat 401; U.S.C. 661 *et seq.*) provides the basic authority for the Service's involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. In this report, the Service evaluates existing fish and wildlife resources within the project area of the Corps' proposed Long Beach Island Project and affected areas, provides an analysis of project impacts and minimization plans, and provides recommendations to the Corps regarding anticipated impacts and mitigation.

Overall, the Service has concluded that the proposed project will result in short- and long- term adverse impacts that would be consequential to fish and wildlife resources. The Service also concludes that informational and data gaps should be addressed. Mitigation measures (discussed below) were recommended in accordance with the Service's Mitigation Policy.

Proposed Action. The Corps' proposed Long Beach Island project comprises the following:

(1) Shoreline stabilization via rehabilitation or repair of 17 groins, including 15 groins in Long Beach and 2 groins in Point Lookout. The groin rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward 200-330 feet (ft) of each of the groins.

(2) Rehabilitation and extension of the eastern terminal groin in Point Lookout. The groin would be extended an additional 100 ft and its width increased to between 107 and 170 ft.

(3) Construction of a new groin field at Point Lookout, including four new groins for immediate construction and two groins classified as deferred construction. The new groins would begin 800 feet west of existing Groin 55 in Point Lookout. Four groins would be constructed with tapered lengths and spaced at an interval of 800 ft. Overall, groin lengths vary and range from 380 to 800 ft. The two deferred groins would be constructed if shoreline monitoring indicated downdrift erosion due to the four new groins.

(4) Construction of 57 timber/gravel dune walkovers, extensions of existing dune walkovers, and vehicle access ways;

(5) Construction of about 35,000 linear ft of dune and beach fill, extending from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This will include 1) a dune with a top elevation of +14 ft above North American Vertical Datum (NAVD); 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping to meet the nearshore bottom; 3) in the Nickerson Beach area in the Town of Hempstead, a dune along 5,000 linear feet of shoreline; 4) in Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, sloping to +7 ft NAVD; a 130 ft flat berm at +7 ft NAVD, then sloping to meet the existing bathymetry.

(6) Total sandfill quantity of 4,720,000 cubic yards dredged from an offshore borrow area for the initial fill placement, including tolerance, overfill, and advanced nourishment; and

(7) Planting of 34 acres (ac.) of dune grass and installation of 75,000 linear ft of sand fence.

Affected Resources. This report identifies major ecological communities and significant habitats in the eastern portion of the Corps' project area, the species that use those habitats, and the potential impacts to those species and habitats resulting from implementation of the proposed project. The eastern portion of the project area is within a Significant Coastal Fish and Wildlife Habitat as designated by the New York State Department of State (NYSDOS), Division of Coastal Resources. This portion of the project area has also been designated an Important Bird Area by Audubon New York, and has been identified as a Significant Fish and Wildlife Habitat by the Service. In addition to the above, federally-listed species including the piping plover (*Charadrius melodus*; threatened) and seabeach amaranth (*Amaranthus pumilus*; threatened), which are protected under the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*) have been documented in the project area. The red knot (*Calidris canutus rufa*), a species proposed for listing under the ESA has also been documented in the project area, as well as a number of other at-risk shorebird species including black skimmer (*Rhychops niger*), common tern (*Sterna hirundo*), least tern (*Sterna antillarum*), and American oystercatcher (*Haematopus palliatus*). Marine listed species under the jurisdiction of the National Ocean and Atmospheric Administration-National Marine Fisheries Service (NOAA/F) are also present in this area. Additional resources that were addressed in the Final FWCA Report that may be directly or indirectly affected by the proposed activity include significant populations of shorebirds and their breeding and migratory habitats, seabirds, finfish and shellfish communities; Essential Fish Habitats (EFH) and managed fish/shellfish species; species protected by state jurisdictions and/or the federal government.

Based on information provided in the Corps' Draft Environmental Assessment (EA) dated February 2014 and supporting documents, the Service has determined that the proposed project would likely result in acute and chronic adverse effects to irreplaceable significant fish and wildlife coastal habitats at Hempstead, Nickerson, and Lido Beaches in the eastern portion of the proposed project area, as well as in the offshore borrow areas and intertidal areas, which are utilized by seabirds and shorebirds. Adverse impacts include, but are not limited to, modification, fragmentation, and loss of nesting and foraging areas due to new groin construction; burial of prey resources in the intertidal and beach habitats every 5 years coinciding with beach renourishment cycles; destruction of prey resources and detrimental impacts on community composition in the offshore dredging areas with impacts lasting as long as 2.5 years; and changes in offshore bottom topography leading to suboptimal habitat conditions. These impacts are expected to occur during initial construction, post-construction, and renourishment phases of the proposed project, which extends 50 years into the future.

Mitigation Recommendations

(1) The Service recommends that the Corps explore additional alternatives to address shoreline protection in the eastern portion of the project area, in lieu of the proposed new groin field and terminal groin extension. The Corps has indicted there are uncertainties surrounding the effects of these structures on regionally important shorebird habitats. Since this habitat has been characterized as irreplaceable by the NYSDOS and determined to be a Resource Category I habitat by the Service as defined by the Service's Mitigation Policy (January 23, 1981, Federal Register v. 46 n. 15 pp. 7644-7663), it is necessary to avoid impacts to these habitats from anthropogenic sources of habitat loss, fragmentation, and modification. Additional alternatives may include relocating at-risk structures in the recreational beach areas, and evaluating upland non-structural approaches such as elevating structures, land acquisition, and flood-proofing similar to the non-structural alternatives envisioned for the mainland areas within the Fire Island Inlet to Montauk Point Reformulation Study Area.

(2) The Service recommends that the Corps restrict dune construction to areas closest to residential development and eliminate them in the public park and less developed areas at Hempstead, Nickerson, and Lido Beaches, which are Resource Category 1 habitats. The Service also recommends that the Corps eliminate the construction of the four new groins, deferred groins, and the terminal groin extension to protect these habitats, and limit berm construction to the area south of Point Lookout. This will allow natural processes to create and maintain, at the greatest possible extent, a mosaic of ocean beach habitats, including partial overwash, dune blowouts, sparsely-vegetated dunes and beaches, ephemeral pools, etc. All of these features are requisite habitat characteristics for all the species at-risk which use the eastern portion of the project area from Jones Inlet to Lido Beach.

3) The Service recommends that the Corps ensure full protection of these shorebird species and their habitats prior to project implementation, through the development of long-term agreements with the Town of Hempstead, Nassau County, and New York State, and Service.

4) The proposed project, which is one of many shoreline stabilization projects being undertaken or planned by the Corps, would likely adversely affect seabird and shorebird species of regional concern in the short-term and over the 50-year life of the project. Consequently, the Service recommends that the Corps undertake a regional assessment of cumulative impacts of beach nourishment on fish and wildlife resources. This would enable the Corps to adequately assess the impacts of its civil works program on a broader, landscape level.

5) The Service recommends that the Corps undertake an updated impact assessment on fish and wildlife resources relative to this project. The environmental studies referenced in the Draft EA which served as the basis of the Corps' impact analysis for the proposed project are well over 10 years old. An updated and comprehensive assessment would provide for the development of an environmental framework for the evaluation of project alternative impacts and mitigation screening. This effort would, in turn, assist the Service in fulfilling its FWCA responsibilities in recommending appropriate mitigation measures for fish and wildlife resources that may be impacted by dredging of the offshore borrow, intertidal, and beach and dune areas.

6) All offshore dredging activities should be coordinated with the NYSDEC Region 1 in regard to the protection of resources under their jurisdiction. A primary goal should be to avoid dredging in areas which contain significant concentrations of the commercially important Atlantic surf clam beds.

7) The Service recommends the following in order to avoid and minimize impacts to the offshore borrow area Resource Category 3 habitats and achieve "no net loss of habitat value, while minimizing loss of in-kind habitat value":

   a) The Corps should avoid exposing and impacting various sediment types outside the footprint of the offshore borrow area during dredging. Post-construction sediment sampling should be undertaken to ensure that sediment composition has not substantially changed so as to increase the probability that the pre-dredging benthic assemblage would have a higher probability of recolonization. Producing deep, steep-sided pits with little to no water circulation that may lead to silt and organic matter accumulation and hypoxic or anoxic conditions, should be avoided;

b) Pre-, concurrent, and post-construction monitoring of seabird abundance at the offshore borrow and control sites should be undertaken. These surveys will be necessary to develop appropriate mitigation measures. Until these surveys are completed, the Service is unable to provide adequate mitigation measures to protect these species;

c) The Corps should develop a pre- and post-construction monitoring program based on the guidance protocols developed by the Minerals Management Service (see Minerals Management Service 2001) and NOAA/F for finfish and benthic assemblages within the offshore dredging areas; and

d) The Corps should consult with the NYSDEC as to whether additional quantitative baseline surveys on the density and age distribution of surf clams should be collected to determine the surf clam resources within the offshore dredging area. This information can be used to determine areas, within the dredging zone, that should be excluded from dredging operations, and will also enable the Corps to better determine the value of surf clam resources that may be impacted by dredging.

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AUTHORITY, PURPOSE, AND SCOPE

This is the Fish and Wildlife Service's (Service) Final t Fish and Wildlife Coordination Act (FWCA) Report for the U.S. Army Corps of Engineers' (Corps) proposed "*Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Risk Management Project"* (Long Beach Project). This report is submitted in accordance with the FWCA of 1958, as amended (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq*.), which mandates Federal agencies to consult with the Service and the state wildlife agency, in this case, the New York State Department of Environmental Conservation (NYSDEC), for any projects that may impact the waters of the United States.

The purpose of the Corps' proposed project includes beach erosion and storm damage protection along 6.4 mile (mi.) of Long Beach Island, Nassau County, New York (NY), including maintenance over a 50-year time period. The impact assessment area which was delineated to assess the environmental impacts stretches from the updrift sand fillet at Jones Beach State Park to the Federal East Rockaway Inlet Navigation Channel. The southern and northern boundaries of the impact assessment area extend from 1,640 feet (ft) south of the southern edge of the designated offshore dredging area northern limit of the barrier beaches and dunes. The 1,640-ft distance was chosen as that was the potential migration distance of the sedimentation plume created by offshore dredging operations (Minerals Management Service 2001).

The scope of temporal effects includes short- to long-term impacts on a time scale from months to years due to the construction and the 50-year maintenance of the proposed project.

INTERAGENCY COORDINATION

The Draft FWCA Report was submitted to the Corps and NYSDEC, for their review and written concurrence. Throughout the preparation of this report, the Service coordinated with the Corps to obtain any pertinent engineering and biological reports.

ENDANGERED SPECIES ACT COORDINATION

The Service and the Corps are currently engaged in informal consultation under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.). In correspondence dated April 29, 2014, the Corps provided a biological assessment and determination that the proposed project would not be likely to adversely affect federally-listed threatened piping plover (*Charadrius melodus*; threatened) and seabeach amaranth (*Amaranthus pumilus*; threatened).

Under the authority of the ESA, the Service and NOAA/F share responsibility for the conservation, protection, and recovery of federally-listed endangered and threatened species. Section 7(a)(2) of the ESA requires federal agencies, in consultation with and with the assistance of the Service or NOAA/F, to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of any designated critical habitat. If listed species may be affected, then a Biological Opinion is issued to state the position of the Service or NOAA/F as to whether the Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

In consultation with the Service, the Corps shall utilize its authority to further the purposes of the ESA in the conservation and recovery of listed species and the ecosystems on which they depend. Further, 50 CFR 402.02 states that the "effects of an action" to be considered during consultation include "direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action...."

PRIOR CORPS OR FISH AND WILDLIFE SERVICE STUDIES AND REPORTS RELEVANT TO THE FEASIBILITY STUDY

United States Army Corps of Engineers. 1989. *Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York*. U.S. Army Corps of Engineers, New York District, New York, NY. Reconnaissance Report.

United States Fish and Wildlife Service. 1989. *Planning Aid Report for the Corps' Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project*. U.S. Fish and Wildlife Service, New York Field Office, Cortland, NY. The Planning Aid Report identified significant fish and wildlife resources and potential project impacts related to general beach nourishment storm protection alternative plans proposed by the Corps on Long Beach Island.

United States Fish and Wildlife Service. 1995. *Final Fish and Wildlife Coordination Act 2(b) Report, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project*. U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY. 32 pp.

United States Army Corps of Engineers. 1998. *Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Final Feasibility Report with Final Environmental Impact Statement*. U.S. Army Corps of Engineers, New York District, New York, NY. 89 pp.

United States Fish and Wildlife Service. 2004. *Draft Fish and Wildlife Coordination Act 2(b) Report, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Storm Damage Reduction Project*. U.S. Fish and Wildlife Service, Long Island Field Office, Islip, NY.

A number of planning documents found at http://www.nan.U.S. Army Corps of Engineers.army.mil/Missions/CivilWorks/ProjectsinNewYork/JonesInlettoEastRockawayInlet(LongBeach).aspx were also reviewed during the development of this FWCA Report and are incorporated by reference into this report.

DESCRIPTION OF THE PROJECT AREA

The project area includes Long Beach Island, which is about 10 miles (mi.) in length and between 1,500 to 4,000 ft in width (Figures 1-9). It stretches from Jones Inlet in the east to East Rockaway Inlet in the west. The project area includes the offshore sand mining area (Figure 2), which is located approximately 1.5 mi. south of Long Beach Island. The impact assessment area identified by the Service and used to evaluate project impacts includes the entirety of Long Beach Island's Atlantic Ocean beach and dune system, and associated intertidal, and subtidal habitats. The impact assessment area also includes the offshore borrow area and nearshore waters, as well as the updrift sand fillet at Jones Beach State Park. The updrift sand fillet was included in the impact assessment area as it may be impacted to changes in inlet dynamics resulting from the proposed shoreline stabilization project at Point Lookout (see U.S. Army Corps of Engineers 2014).

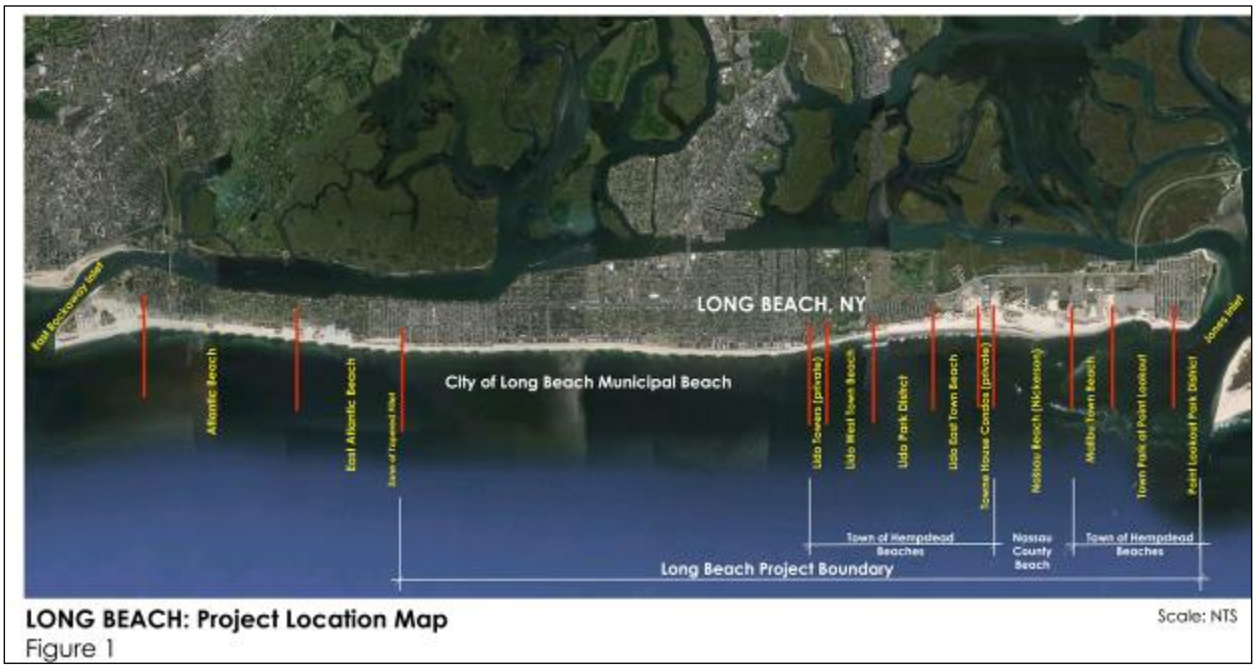

Figure 1. Map showing location of project area. From U.S. Army Corps of Engineers (2014).

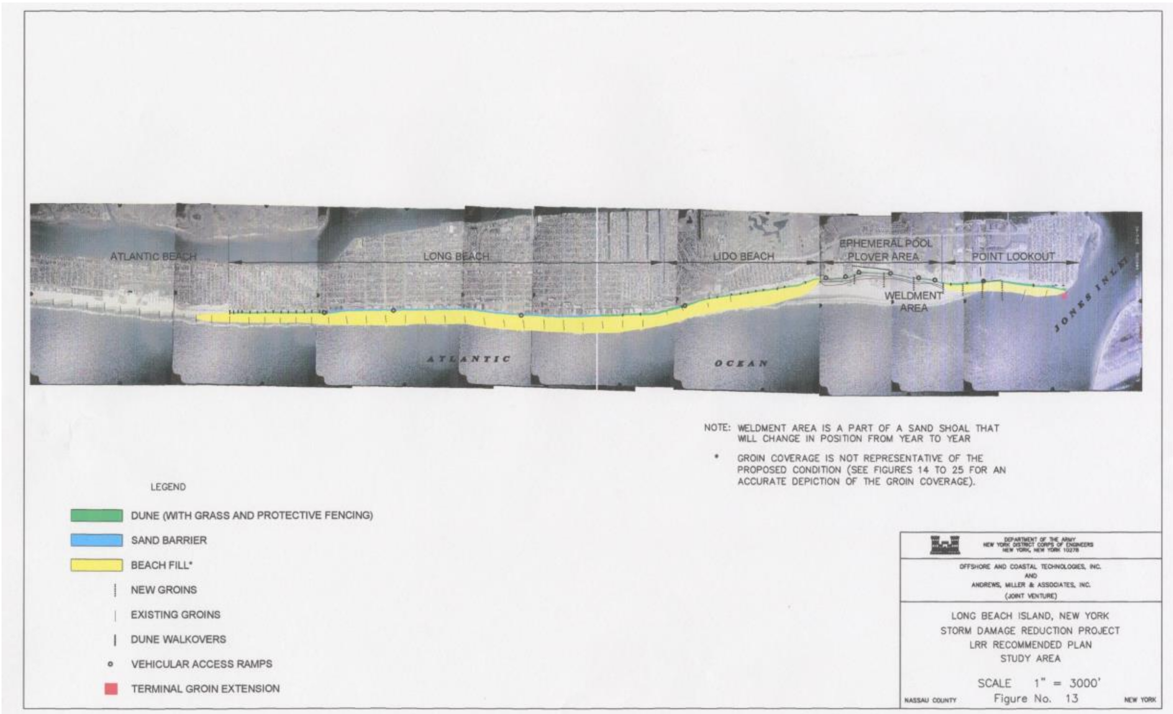

Figure 2. Map showing plan layout across the project area. From U.S. Army Corps of Engineers (2014).

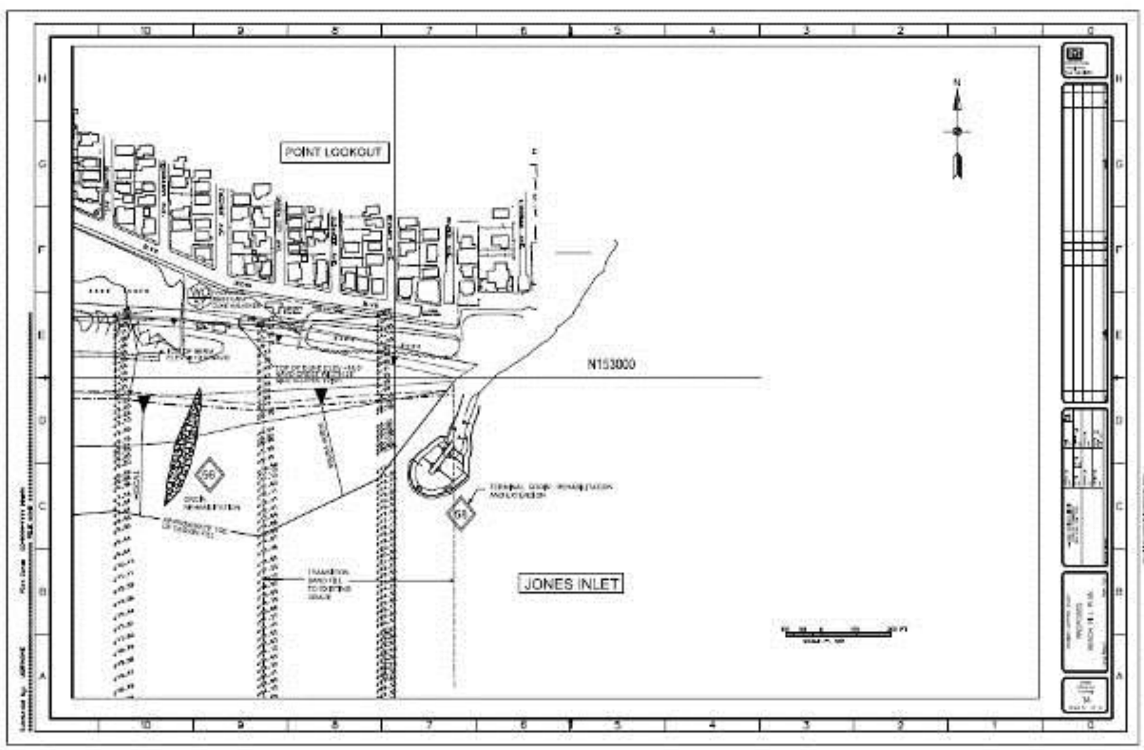

Figure 3. Map showing plan layout eastern terminus of the project area at Point Lookout. From U.S. Army Corps of Engineers (2014).

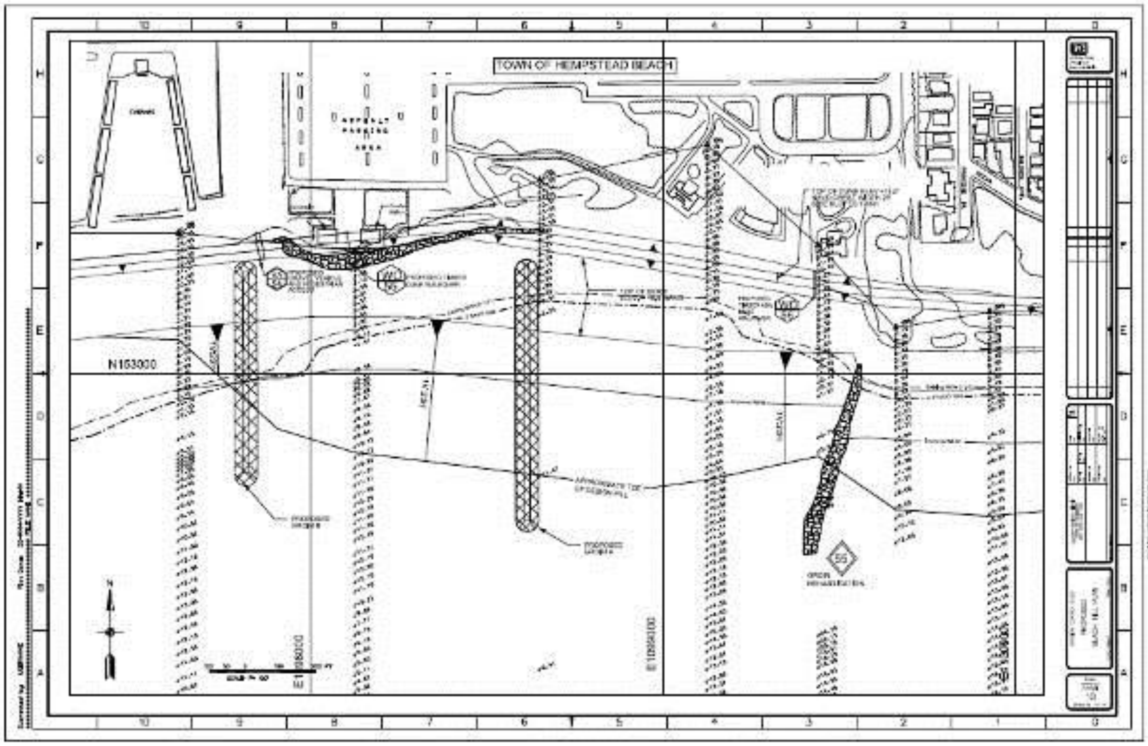

Figure 4. Map showing eastern portion of the project area at Town of Hempstead Point Lookout Beach. From U.S. Army Corps of Engineers (2014).

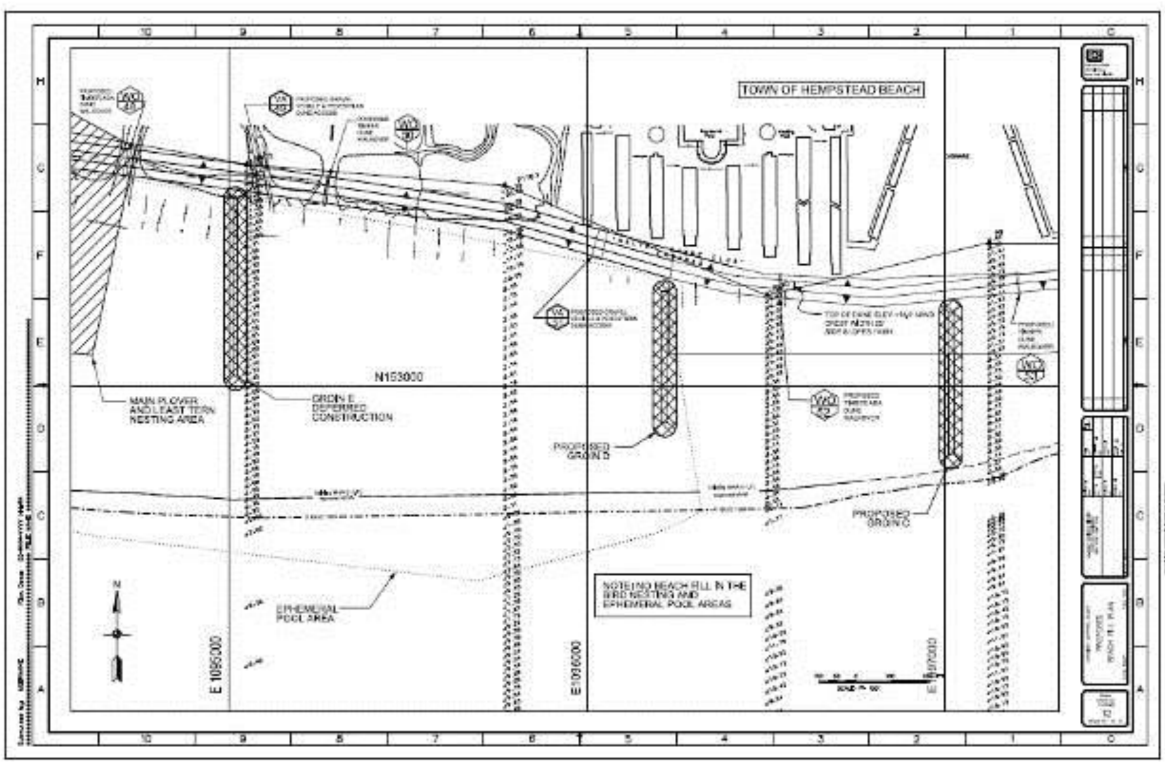

Figure 5. Map showing eastern portion of the project area at Town of Hempstead Beach. From U.S. Army Corps of Engineers (2014).

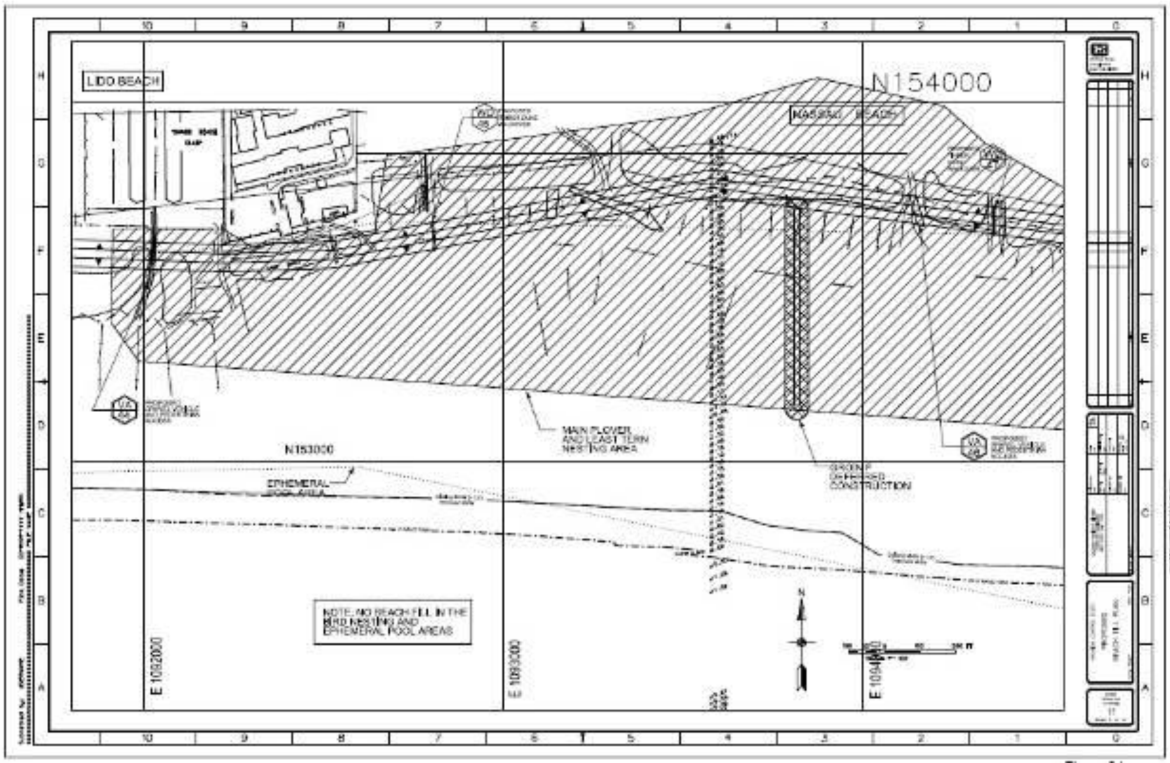

Figure 6. Map showing eastern portion of the project area at Nassau (Nickerson) Beach. From U.S. Army Corps of Engineers (2014).

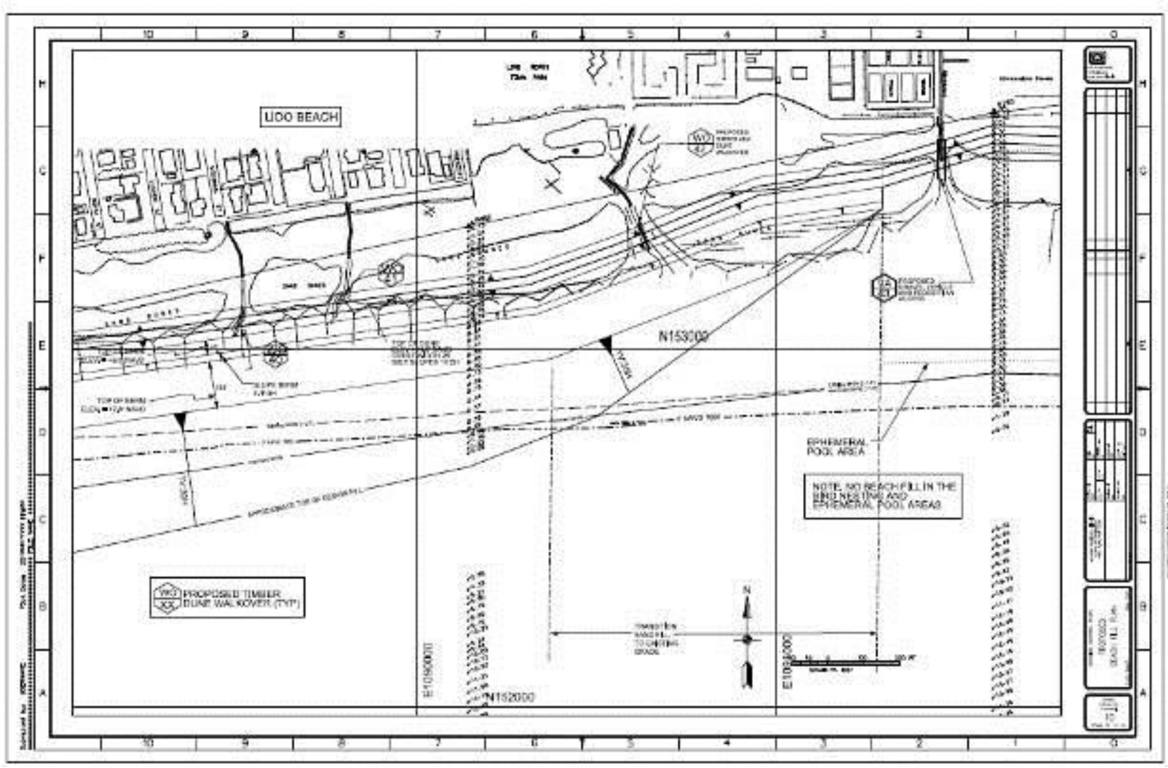

Figure 7. Map showing eastern portion of project area at Lido Beach East. From U.S. Army Corps of Engineers (2014).

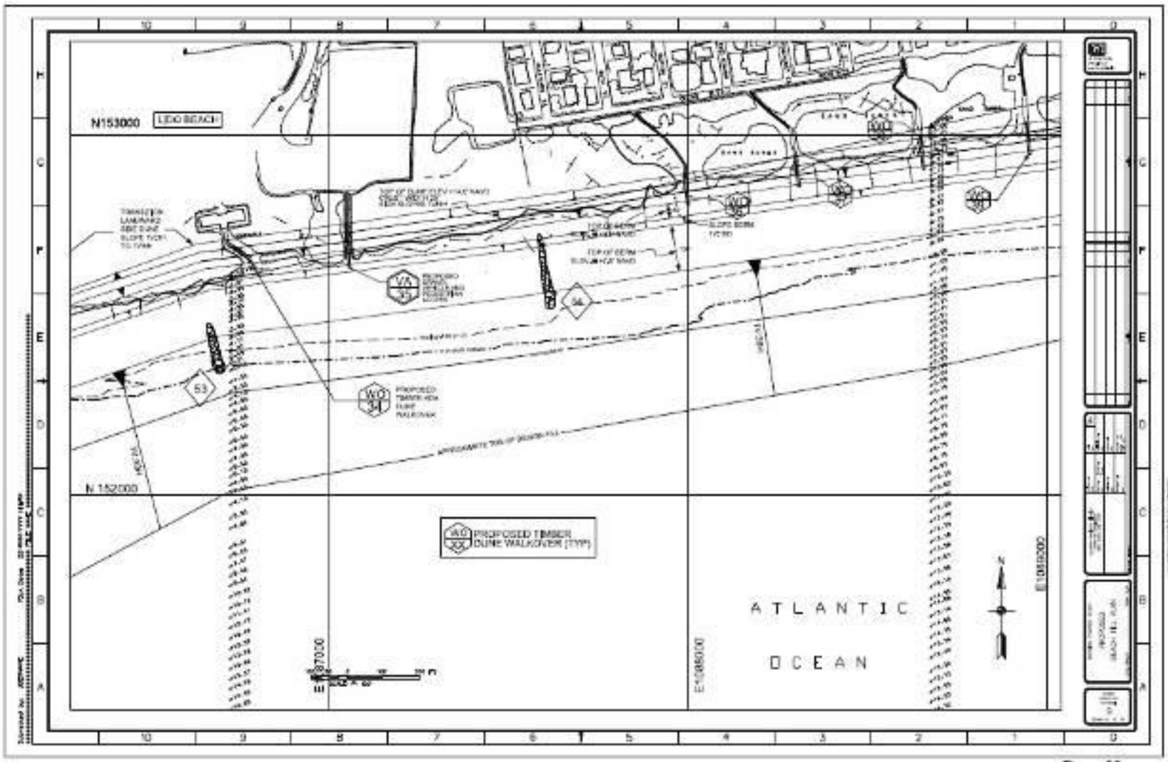

Figure 8. Map showing eastern portion of project area at Lido Beach West. From U.S. Army Corps of Engineers (2014).

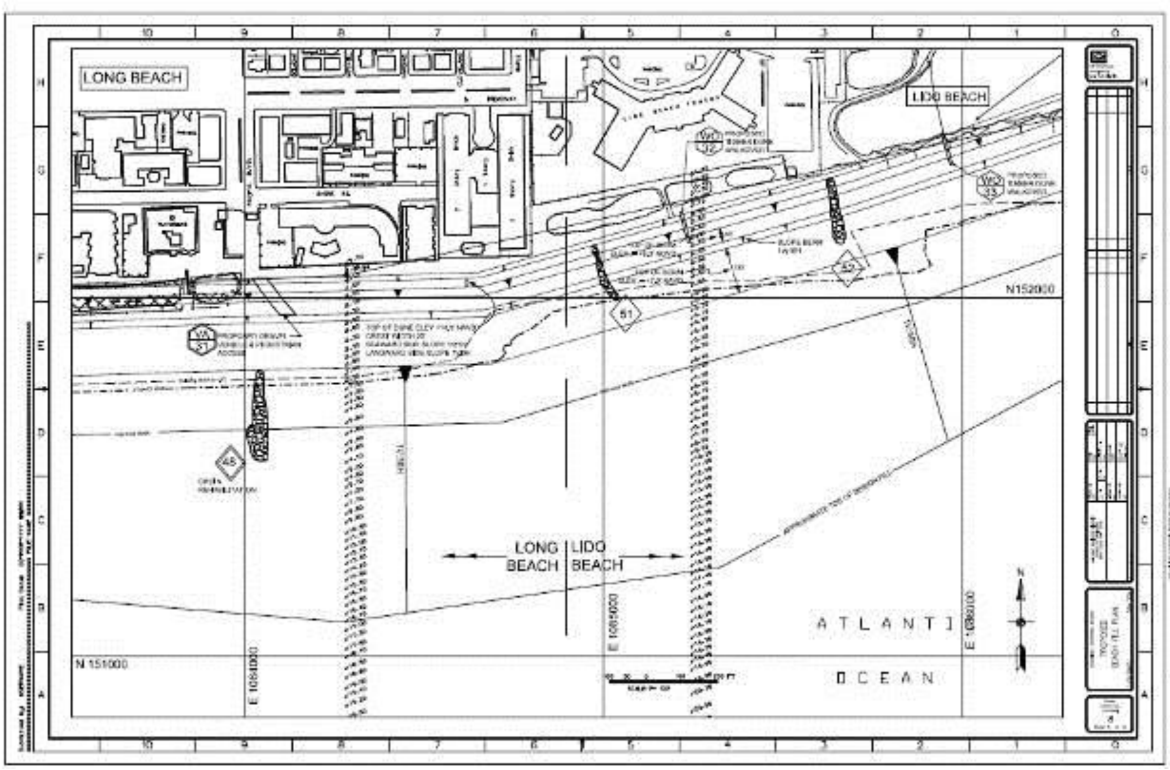

Figure 9. Map showing eastern portion of the project area at Lido Beach/Long Beach boundary. From U.S. Army Corps of Engineers (2014).

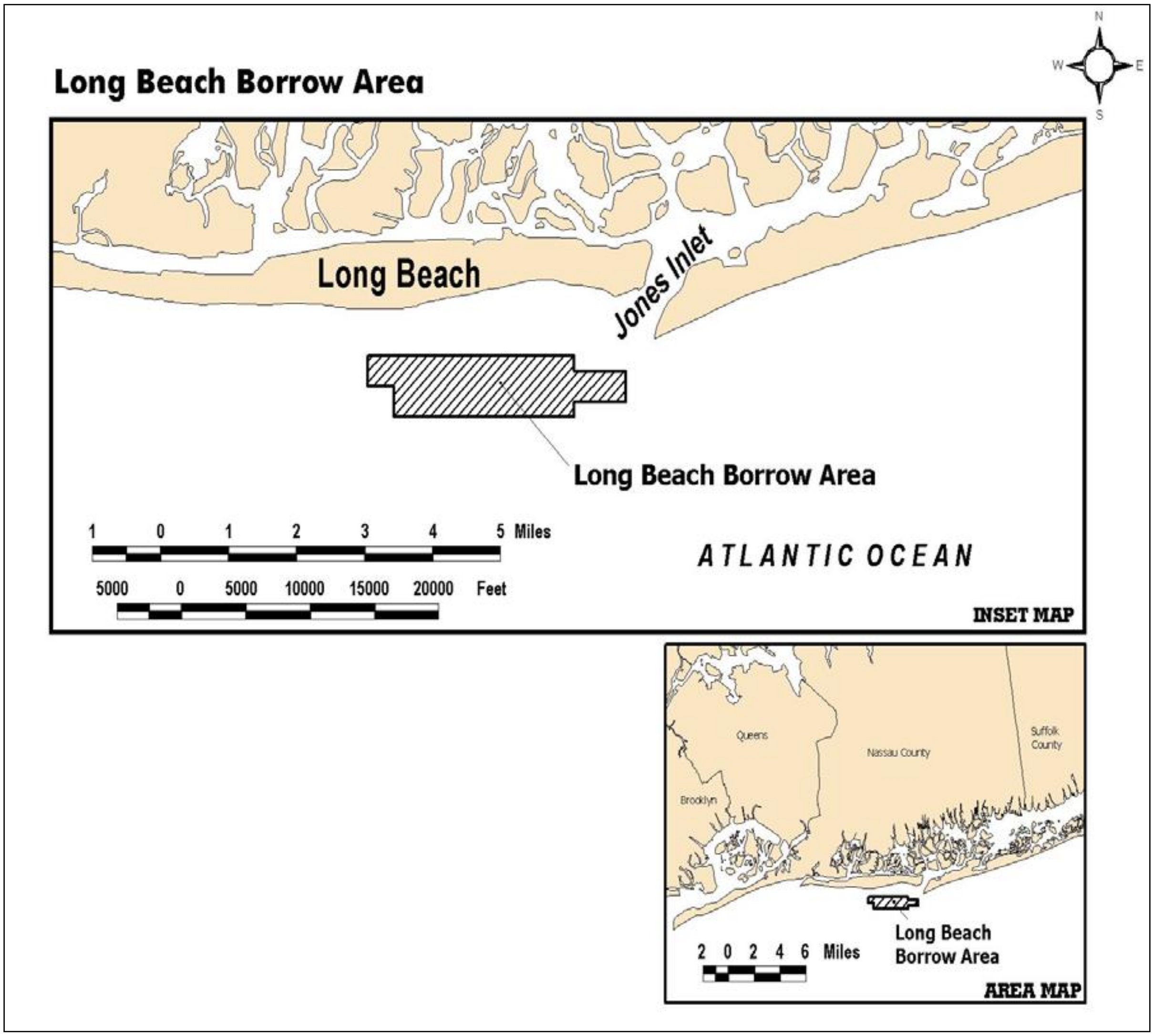

Figure 10. Map showing location of offshore borrow area. From U.S. Army Corps of Engineers (2014).

Geography

The Long Beach and Jones barrier islands lie within the Atlantic Coastal Plain Province, which extends beneath the Atlantic Ocean about 100 mi. offshore to the edge of the continental shelf (U.S. Fish and Wildlife Service 1997).

Land Cover and Use

Long Beach Island is a developed barrier island and includes the hamlets of Point Lookout and Lido Beach, the Village of Atlantic Beach, and the Incorporated City of Long Beach. Unincorporated areas are under the jurisdiction of the Town of Hempstead and Nassau County (Nickerson Beach and Silver Point). Long Beach Island is primarily residential with apartment houses, condominium complexes, beach clubs, hotels, and single-family residences along the ocean shore, central areas, and bay side. The Service's Lido Beach Wildlife Management Area (WMA) is located on the north shore of Long Beach in the vicinity of Nickerson Beach. This WMA is comprised of a 22 ac. wetland and shrub thicket complex supporting marsh birds and waterfowl species.

The ocean beach in the project area serves year-round residents as well as a substantial influx of summer visitors and vacationers. Park and recreational areas, which do not contain shoreline stabilization features, such as groins are located at Nickerson Beach County Park, Hempstead's Lido Beach, and Silver Point County Park.

The western portion of Jones Beach Island is located within Jones Beach State Park, a recreational park administered by the New York State Office of Parks, Recreation, and Historic Preservation.

Topography

The topography of Long Beach is typical of most barrier beach areas. It is extremely flat, with grades slightly higher near the ocean beaches. Grades vary, generally between 8 and 11 ft above mean sea level along the beachfront to grades at Reynolds Channel from 5 to 7 ft above mean sea level. Elevations are generally less than 10 ft above the National Geodetic Vertical Datum (NGVD) (U. S. Army Corps of Engineers 1998).

Water Quality

Given the area's population density, urban setting, early settlement, and resulting aging infrastructure, the watershed within the project area experiences considerable stress. Numerous sources, such as municipal and industrial discharges, urban storm runoff, combined and separate sewer overflows, contaminated sediments, oil and hazardous material spills, non-point source runoff, landfill leachate, dredge spoil disposal, and thermal discharges, all threaten the water quality of the Atlantic Ocean, Reynolds Channel, and the back bays. However, in spite of numerous water quality issues, the waters of the basin also remain a rich and valuable economic and ecological resource. (Saccardi and Schiff 2007).

Climate

The climate of Long Beach is dominated by the westerly winds of continental air masses and the Atlantic Ocean coastal waters provide a temperature moderating effect. As such, Long Beach averages 10 degrees Fahrenheit (°F) warmer in the winter and 10°F cooler in the summer than inland communities on Long Island and in New York. The average warmest month is July, with an average high of 83°F. On average, the coolest month is January, with an average high of 39°F. The highest recorded temperature was 104 degrees Fahrenheit in 1966. The lowest recorded temperature was -2°F in 1985. The most precipitation on average occurs in May, but is fairly evenly distributed throughout the year, with an average of 3.5 inches (in.) of precipitation a month. Average annual precipitation totals approximately 43 in. per year (Saccardi and Schiff 2007).

Tidal and Salinity Regimes

Tides along the south shore of Long Island are semi-diurnal. The mean tidal level for Long Beach Island is 2.0 ft above mean low water (MLW). The mean tidal range is approximately 3.6 ft and the spring tidal range reaches 4.3 ft above MLW (U.S. Army Corps of Engineers 1998).

Tidal fluctuations in the back bays average 3.6 to 4.2 ft. Salinity ranges from 25 to 30 parts per thousand, depending on location and the time of year; water temperature ranges from 28°F to 85°F (U.S. Fish and Wildlife Service 1997).

The ocean beach habitat of Long Beach Island consists of a continuous strip of low-lying beach with a series of approximately 60 stone and timber groins in the central portion of the island which extend offshore into the ocean from 200 to 600 ft. Groins are present in approximately 65 percent of the island shoreline.

DESCRIPTION OF ECOLOGICAL UNIQUENESS

The purpose of this section is to establish and identify significant fish and wildlife resources in the proposed project and FWCA analysis areas. This information provides the basis for the more detailed discussion of the ecological communities and significant habitats upon which the impacts of the Corps' selected plan and the fish and wildlife enhancement opportunities are subsequently evaluated.

This section focuses on migratory shorebirds and seabirds. However, the Service recognizes that ecologically and commercially important benthic and pelagic finfish, and commercial shellfish, as well as marine invertebrate species are found within the offshore borrow area, nearshore waters, and intertidal areas. The 1996 Congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (Public Law 94-265) set forth requirements for the NOAA/F, regional fishery management councils (FMC), and other federal agencies to identify and protect important marine and anadromous fish habitat. These amendments established procedures for the identification of Essential Fish Habitat (EFH) and a requirement for interagency coordination to further the conservation of federally managed fisheries. EFH is defined in the act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The definition for EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each Fisheries Management Plan. The proposed project area contains EFH for 27 species (U.S. Army Corps of Engineers 2014).

The nearshore waters of Long Island, including the proposed project area, may contain both federally-listed endangered and threatened species of sea turtles and marine mammals. During the summer and early fall months, sea turtles including Kemp's Ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), and loggerhead (*Caretta caretta*) sea turtles may be present. Principal responsibility for these species is vested with the NOAA/F who must be notified about the proposed project under the section 7 consultation requirement of the ESA.

In matters related to the geological resources, nearshore wave dynamics, and barrier island geomorphology, the Service recommends that the Corps contact the U.S. Geological Survey.

U.S. Fish and Wildlife Service (1989), (1995a) and (2004) provide descriptions of fish and wildlife resources and sensitive habitats within the project area and are incorporated by reference into this report. In addition, the Service's Final FWCA 2(b) Reports for the Corps' Westhampton Interim Storm Damage Protection Project (U.S. Fish and Wildlife Service 1994), Breach Contingency Plan (U.S. Fish and Wildlife Service 1995b), Fire Island Inlet to Moriches Inlet Storm Damage Protection Project (U.S. Fish and Wildlife Service 1998a), West of Shinnecock Inlet Interim Storm Damage Protection Project (U.S. Fish and Wildlife Service 1999), and Fire Island Inlet to Moriches Inlet, Fire Island Stabilization Project (U.S. Fish and Wildlife Service 2014) summarized the characteristics of barrier island communities for the Fire Island and Westhampton Barrier Islands, and the Southampton Barrier Spit. These reports are also incorporated by reference into this Final FWCA Report as they dealt with a similar subject matter regarding species' use and impacts of shoreline protection alternatives on marine, barrier island, and backbay habitats (dredging of borrow areas, burial of benthic invertebrates, downdrift erosion, etc.).

Long Beach Island and Jones Beach West are included in the "Hempstead Bays – South Oyster Bay Significant Fish and Wildlife Habitat Complex," which is comprised of significant land habitat and water habitat complexes (U.S. Fish and Wildlife Service 1997; Figure 11). High quality and irreplaceable maritime beach and dune communities at Nassau Beach (Nickerson Beach) and Silver Point on Long Beach Island and Jones Beach West have also been designated by the New York State Department of State (NYSDOS) Division of Coastal Resources as "Significant Coastal Fish and Wildlife Habitats" (http://www.dos.ny.gov/opd/programs/consistency/Habitats/LongIsland). As noted above, the Service's 22 ac. Lido Beach WMA is located on the north shore of Long Beach in the vicinity of Nickerson Beach and supports marsh birds and waterfowl species.

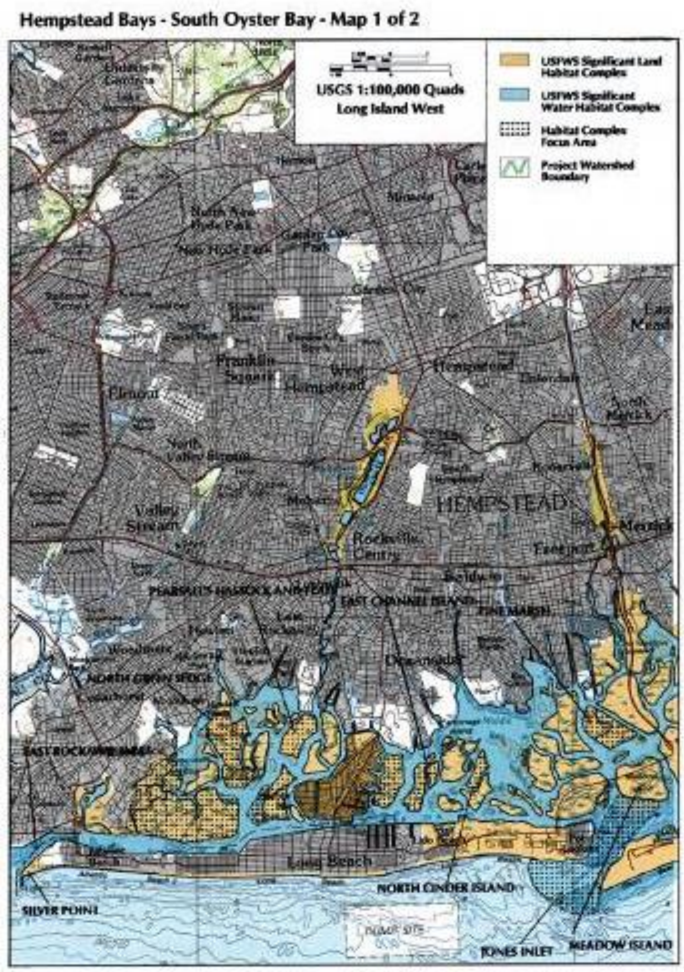

Figure 11. Map showing location of Hempstead Bays-South Oyster Bay Significant Fish and Wildlife Habitat Complex. From U.S. Fish and Wildlife Service (1997).

Figure 12. Map showing location of NYSDOS Significant Coastal Fish and Wildlife Habitat Area on Long Beach Island. From http://www.dos.ny.gov/opd/programs/consistency/scfwhabitats.html.

Long Beach Island and Jones Beach West are within the West Hempstead Bay/Jones Beach West Important Bird Area designated by Audubon New York and supports a number of species classified as "Species at risk," or as species of high conservation concern as noted in the U.S. Shorebird Conservation Plan (Niles and Clark 2004).

Figure 13. Map showing location of West Hempstead Bay/Jones Beach West Important Bird Area as designated by Audubon New York. From http://www.mapsportal.org/audubon_national_iba/ .

Species at risk/high conservation concern within the project area include piping plover, common tern (*Sterna hirundo*), least tern (*Sterna antillarum*), black skimmer (*Rhynchops niger*), American oystercatcher (*Haematopus palliatus*), and red knot (*Calidris canutus rufa*). The offshore waters of the proposed project area also provides foraging and overwintering habitat for many species of seabirds (U.S. Fish and Wildlife Service 1997).

EXPLANATION OF FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES

The Service's focused its analysis on the eastern 3 mi. of Long Beach Island and Jones Beach West updrift sand fillet. Within the eastern 3 mi., the Service is concerned about the potential detrimental impacts groin construction and terminal groin extension would have on fish and wildlife species and their habitats. At Jones Beach West updrift sand fillet, the Service is concerned about potential changes in inlet dynamics that may affect the sediment transport regime to an extent where endangered species habitat is adversely impacted. From the Service's perspective, a desired output of the proposed project is to ensure the conservation of healthy marine, estuarine, and terrestrial ecological communities.

Specific Service planning objectives are to enhance the existing significant habitat values at the proposed project site by:

(1) Obtaining basic biological data for the offshore, intertidal, and beach habitats;
(2) Evaluating and analyzing the potential benefits to fish and wildlife resources by expanding the number of reasonable alternatives for analysis;
(3) Identifying a project alternative that is most beneficial to fish and wildlife resources;
(4) Recommending conservation measures to avoid and minimize potential direct and indirect project-related impacts;
(5) Ensuring natural areas are protected and conserved; and
(6) Ensuring the proposed project promotes high value habitats for endangered and threatened species and migratory birds.

The Service's Mitigation Policy (January 23, 1981, Federal Register v. 46 n. 15 pp. 7644-7663) establishes a number of criteria which, if met, would allow the Service to support a water resource development project. These criteria are:

(1) The projects are ecologically sound;
(2) The least environmentally damaging alternative is selected;
(3) Every reasonable effort has been made to avoid or minimize damage or loss of fish and wildlife resources and uses;
(4) All mitigation recommendations have been adopted with guaranteed implementation to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal; and
(5) For wetlands and shallow water habitats, the proposed activity is clearly water dependent and there is a demonstrated public need.

Breeding and migratory shorebirds and seabirds were selected as evaluation species for the offshore and nearshore waters, and barrier island as these species would likely be affected by the proposed project. These species are also protected under the Migratory Bird Treaty Act (MBTA) of 1918 (40 Stat. 755, as amended; 16 U.S.C. 703 *et seq.*) and Executive Order 13186, Responsibilities of Federal Agencies To Protect Migratory Birds, dated January 10, 2001, and some, like the piping plover, are protected under the ESA.

The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The unauthorized taking of birds is legally considered a "take" under the MBTA and is a violation of the law. Neither the MBTA nor its implementing regulations, 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds that may be killed or injured by development projects. Under the provisions of the MBTA, the unauthorized take of migratory birds is a strict liability criminal offense that does not require knowledge or specific intent on the part of the offender. As such, even when engaged in an otherwise legal activity where the intent is not to kill or injure migratory birds, violations can occur if bird death or injury results.

The Service evaluates the importance of various habitats to trust resources, and whether or not the habitat is unique and irreplaceable on a national or ecoregion basis. This evaluation results in the Service establishing a planning goal, thus the degree of replacement reflects the value of the habitat. There are four Resource Categories of decreasing importance, with mitigation planning goals of decreasing stringency developed for these categories (Table 1).

Table 1. Service Mitigation Policy Resource Category, Designation Criteria and Mitigation Planning Goal.

Resource Category	Designation Criteria	Mitigation Planning Goal
1	Habitat to be impacted is of high value for evaluation species and unique and irreplaceable on a national basis or in the ecoregion section.	No loss of existing habitat value.
2	Habitat to be impacted is of high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion section	No net loss of in-kind habitat value.
3	Habitat to be impacted is of high to medium value for evaluation species and is relatively abundant on a national basis.	No net loss of habitat value, while minimizing loss of in-kind habitat value.
4	Habitat to be impacted is of medium to low value for evaluation species.	Minimize loss of habitat value.

The Service has determined that the eastern three miles of Long Beach Island that includes Hempstead, Nickerson, and Lido Beaches and the updrift portion of Jones Inlet at Jones Beach State Park are Resource Category 1 habitats due to its regional importance to a number of at risk shorebird species, significant concentrations of and identification as irreplaceable habitat by the NYSDOS (http://www.dos.ny.gov/opd/programs/consistency/Habitats/LongIsland and http://www.dos.ny.gov/opd/programs/pdfs/1984_SCFWH_technical_memorandum.pdf). The remainder of the project area within the Limits of the City of Long Beach and the Village of Atlantic Beach were determined to be Resource Category 4 habitat, due to presence of available shoreline foraging habitat for migrating shorebirds, but low value as nesting habitat due to current development and land use patterns. The offshore borrow area was determined to a Resource Category 3 habitat, due to its value as habitat for prey resources for seabirds on a local level but it characterized by a fairly high level of availability at this time.

The mitigation planning goals for each of these Resource Categories is provided in Table 1, above.

DESCRIPTION OF EVALUATION METHODS

The Service used several sources to evaluate the impacts of the proposed project to fish and wildlife resources. Service staff have made numerous observations of shorebirds, other wildlife, vegetation, and existing conditions on the proposed project site for close to 20 years. Service staff also reviewed other pertinent environmental information, contacted local and regional experts on shorebird biology and coastal geomorphology. The Service also reviewed numerous studies conducted by the Corps, bird conservation plans, and other relevant grey and peer-reviewed studies.

DESCRIPTION OF FISH AND WILDILFE RESOURCE CONDITIONS

While Long Beach Island is a fairly developed barrier island, it is recognized by federal and state agencies and national environmental organizations for its ecological importance to fish and wildlife resources. This area along with the western terminus of Jones Inlet contains Significant Land and Water Habitat Complexes designated by the Service and NYSDOS, Important Bird Areas designated by the Audubon New York, and certain fisheries and endangered marine species and shorebirds which require coordination and consultation under the ESA with NOAA/F and the Service.

Fish and Wildlife Habitats

Marine Ecosystem

The marine system consists of marine subtidal, marine intertidal, marine cultural, and maritime beach and dunes (Edinger *et al.* 2002) in the project area and impact assessment area. The marine subtidal habitat consists of the marine deepwater community, the marine intertidal subsystem includes the marine intertidal gravel/sand beach community, and the marine cultural subsystem includes marine riprap and artificial shore communities. The marine subtidal zone extends from the low tide mark to the lower limit of ocean bottom, 1,640 ft south of the proposed offshore dredging area. The marine intertidal zone is predominantly sandy habitat and is alternately exposed and submerged throughout tidal fluctuations, and is subject to the turbulence of waves, currents, and the shifting nature of the substrate. The marine cultural system includes man-made structures such as seawalls, jetties, groins, and bulkheads provide rocky habitat for both aquatic and avian species, and represent the marine riprap/artificial shore community.

The maritime beach system is represented by extremely sparse vegetation that occurs on unstable sand, gravel, or cobble ocean shores above mean high tide, where the shore is modified by storm waves and wind erosion. The maritime dune community is dominated by grasses and low shrubs that occurs on active and stabilized dunes along the Atlantic coast. This community consists of a mosaic of vegetation patches. This mosaic reflects past disturbances such as sand deposition, erosion, and dune migration (Edinger *et al.* 2002).

Fish and Wildlife Resources

Marine Invertebrates

This section only contains a brief description of these ecological resources. The Service recommends that the Corps coordinate with NOAA/F for a more in depth discussion of marine invertebrate resources in the project area and potential impacts resulting from implementation of the proposed project. The offshore marine habitat supports shellfish and crustaceans such as mud clam (*Mulinia lateralis*), razor clam (*Ensis directus*), surf clam (*Spisula solidissima*), blue mussel (*Mytilus edulis*), soft shell clam (*Mya arenaria*), blue crab, and American lobster (*Homarus americanus*) (U.S. Fish and Wildlife Service 1997). Other marine subtidal benthic macrofauna include tellin clam (*Tellinidae* spp.), sand dollar (*Echinarachnius parma*), amphipod species (*e.g.*, *Protohaustarius deichmaae*, *Unicola irrorata*), and polychaete species (*e.g.*, *Sthenelais limicola*, *Lumbrineris fragilis*, *Spiophanes bombyx*), all of which are found in habitats described as a medium, coarse-grain sand community (Steimle and Stone 1973). Benthic species in this area were last sampled in June 1993 (U.S. Fish and Wildlife Service 1995a).

Surf clam populations were previously known to occur from the shoreline to approximately 2 mi. offshore (New York State Department of Environmental Conservation 2002). Overall, the New York State waters of the Atlantic Ocean was noted as a major surf clam fishery. In 2001, 444,053 bushels of surf clams, with a value of $4.5 million were harvested (New York State Department of Environmental Conservation 2002). Historically, surf clam surveys conducted immediately west of this location along the Rockaway Beach Peninsula have been shown to produce a harvest valued at approximately $100,000 per 100 ac. or more (New York State Department of Environmental Conservation 1994).

Finfish

This section only contains a brief description of these ecological resources as the Service recommends the Corps consult with NOAA/F for a more in depth discussion of finfish resources in the project area and potential impacts resulting from implementation of the proposed project. U.S. Army Corps of Engineers (1998) includes a listing of finfish species sampled from the offshore waters of Lower New York Harbor during the mid-1980s which are suspected to utilize the proposed project area. Overall, the waters of the New York Bight, which includes, in part, Lower New York Harbor, support populations of many commercially and recreationally important fish (U.S. Fish and Wildlife Service 1997). Primary species include striped bass (*Morone saxatilis*), weakfish (*Cynoscion regalis*), bluefish (*Pomatomus saltatrix*), fluke, winter flounder (*Pseudopleuronectes americanus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), and Atlantic mackerel (*Scomber scombrus*) (U.S. Fish and Wildlife Service 1997). The nearshore subtidal zone is generally considered as a feeding zone by many species, including tautog (*Tautoga onitis*), northern puffer (*Sphoeroides maculatus*), black sea bass, striped bass, bluefish, and weakfish, although this has not been documented specific to this project area (U.S. Army Corps of Engineers 1998; U.S. Fish and Wildlife Service 1995a). Earlier reports also noted that adult bluefish and striped bass congregate in the deeper waters of Jones Inlet, as does the American sandlance (*Ammodytes americanus*), which is the major food item of the federally-listed roseate tern (*Sterna dougallii*; endangered) (*e.g.,* U.S. Fish and Wildlife Service 1997).

Avian Species

Both federal and state laws protect avian species covered in the Final FWCA, including the ESA, MBTA, and New York State Environmental Conservation Law Article 11.

Article 11 of New York State Environmental Conservation Law establishes most of the protections for the state's fish and wildlife. Article 11-0103(5)(b) legally defines protected birds, which includes black skimmers. Article 11-0107 prohibits the taking of all protected birds except as authorized by law or regulation. Article 11-0535 authorizes the State to create rules and regulations for species of special concern. The black skimmer is listed as a species of special concern under 6 NYCRR Part 182.5 section (c)(6)(vii). As a result of these legal protections, there is no open hunting season on black skimmers and the species cannot be taken without a permit from the NYSDEC (New York State Department of Environmental Conservation 2014).

The western terminus of Jones Island and beaches from Point Lookout to the eastern boundary of the City of Long Beach are used for foraging and breeding for federally- and state-listed shorebirds and other legally protected species. The eastern portion of the project area along with Silver Point at the western end of Long Beach Island, are the only two shorebird breeding areas on Long Beach Island, with the former being the most consistently productive for piping plovers. In addition to piping plover, common tern (New York State; threatened), least tern (New York State; threatened), black skimmer (New York State; Special Concern), and American oystercatcher breed in this the area. The red knot (proposed ESA) uses the site as a migratory stopover site. At Hempstead, Nickerson, and Lido Beaches, the piping plover abundance averages about 15 pairs from year to year, and at Silver Point about six pairs per year. In 2013, there were close to 762 pairs of common terns, 40 pairs of American oystercatchers, 47 pairs of least terns, and 364 pairs of black skimmers in this area at Hempstead, Nickerson, and Lido Beaches. Jones Beach West supported 335 pairs of piping plovers.

The U.S. Shorebird Conservation Plan (Clark and Niles 2000) identified American oystercatcher, red knot, and piping plover as species of high conservation concern.

The American oystercatcher is currently listed in Massachusetts, Rhode Island, Connecticut, and New York as a state species of greatest conservation need in the America oystercatcher Conservation Action Plan for the U.S. Atlantic and Gulf coasts. In addition, the NYSDEC has developed a Black Skimmer Conservation Management Plan due to the vulnerable populations at the two primary breeding areas on Long Island at Breezy Point, part of the Rockaways in Queens County, and Nickerson Beach (also referred to as Lido Beach) located on Long Beach in Nassau County. A third consistent colony location is also on Long Beach Island at Atlantic Beach. While the black skimmer population remains somewhat stable between years, recent trends in the loss or abandonment of most of New York's smaller colonies are putting that current level of stability at risk (New York State Department of Environmental Conservation 2014).

The two colonies at Breezy Point and Nickerson Beach comprise the majority of all recently documented nesting skimmers in New York and the importance of these two locations to the black skimmer cannot be understated. The two sites are in close proximity to each other with only 17 mi. between them (the Atlantic Beach site is approximately half way between the two). During both the 2010 and 2011 breeding seasons these two colonies were the only active skimmer colonies in New York State. Atlantic Beach was not surveyed in these years but evidence suggests skimmers were not present (New York State Department of Environmental Conservation 2014).

The loss of available habitat for nesting skimmers is the single largest threat to the continued breeding success of not only the black skimmer but all waterbirds along New York's coast. There have been two types of habitat loss that have influenced black skimmer breeding. The first loss was to beach and sandy habitats due to development pressures, with the second being the subsidence of marsh islands (Burger and Gochfeld 1990 referenced in New York State Department of Environmental Conservation 2014).

In the offshore areas, shearwaters and storm-petrels are the most abundant pelagic birds in the offshore waters of the New York Bight that are expected to occur in the project area. The greater shearwater (*Puffinus gravis*), sooty shearwater (*P. griseus*), and Wilson's storm-petrel (*Oceanites oceanicus*) breed in the southern hemisphere and spend much of their non-breeding period in the North Atlantic, including the New York Bight. Cory's shearwater (*Calonectris diomedea*) breeds in the eastern North Atlantic and Mediterranean and ranges west to the Atlantic Coast of North America during the summer and fall. The Manx shearwater (*Puffinus puffinus*) and Leach's storm-petrel (*Oceanodrama leucorhoa*) breed in the North Atlantic and migrate through the New York Bight in the summer and fall.

Seabird surveys during the 1980s also showed this area to contain concentrations of seabirds of between 3.1 mi. and 31 mi., respectively, during the spring and fall surveys (U.S. Fish and Wildlife Service 1997), however, more up to date surveys would need to be undertaken to adequately and accurately describe their abundance and distribution off of Long Beach Island, particularly in relation to the offshore borrow area.

In the winter, moderate densities of birds are observed dispersed over the entire continental shelf. During the winter, kittiwakes, skuas, gannets, and auks occur in the offshore waters of the New York Bight, while coastal waters are dominated by gulls, sea ducks, loons, and grebes. The black-legged kittiwake (*Rissa tridactyla*) breeds in the Arctic and is one of the more common pelagic birds in the open waters of the New York Bight during the fall, winter, and spring. Three species of alcids (auks) are regularly observed at low densities in the Bight during the winter, razorbill (*Alca torda*), dovekie (*Alle alle*), and thick-billed murre (*Uria lomvia*). These small, duck-like birds are found primarily in offshore waters where they feed on fish and crustaceans.

Two species of loons, common loon (*Gavia immer*) and red-throated loon (*G. stellata*), migrate through and winter in the New York Bight. These birds winter in both the pelagic and coastal zones of the Bight and also occur in coastal bays. Loons feed primarily on fish, but also feed on crustaceans, insects, and mollusks. Two species of grebes, horned grebe (*Podiceps auritus*), and red-necked grebe (*P. grisegena*), also frequent the nearshore waters and coastal bays. Sea ducks, including black, white-winged, and surf scoters (*Melanitta nigra, M. fusca,* and *M. perspicillata*), and long-tailed duck (*Clangula hyemalis*), are widely distributed in low numbers in the coastal waters of the New York Bight. Common eider (*Somateria mollissima*), king eider (*S. spectabilis*), and harlequin duck primarily winter off rocky coasts to the north of the New York Bight. Harlequin ducks are also regularly reported near the groins in Point Lookout, NY.

The maritime beach and dune communities have also been identified as the highest priority habitat in the Bird Conservation Plan for the Southern New England/Mid Atlantic Coast Region (U.S. Fish and Wildlife Service 2000). Species which inhabit these habitats include piping plover, American oystercatcher, short-eared owl (*Asio flammeus*), common tern, least tern, and horned lark (*Eremophila alpestris*) (U.S. Fish and Wildlife Service 2000). Ephemeral pools and interdunal swales behind the dunes at specific sites on Long Beach Island in less developed areas at Hempstead, Nickerson, and Lido Beaches provide optimal foraging areas for piping plover. Peak shorebird use of the barrier island is summer and fall, especially for the semipalmated plover (*Charadrius semipalmatus*), black-bellied plover (*Pluvialis squatarola*), willet (*Catoptrophorus semipalmatus*), semipalmated sandpiper (*Calidris pusilla*), least sandpiper (*C. minutilla*), and short-billed dowitcher (*Limnodromus griseus*).

Plant Species

Overall, characteristic plant species of the maritime beach community include beach grass (*Ammophila breviligulata*), sea rocket (*Cakile edentula*), seaside spurge (*Chamaesyce polygonifolia*), seabeach amaranth, and seabeach knotweed (*Polygonum glaucum*). The maritime dune community is dominated by grasses and shrubs which occur in patches or dense assemblages which reflect the level of disturbance this community experiences in the coastal zone. Characteristic species of naturally active dunes include beach grass, dusty miller (*Artemisi stelleriana*), beach pea (*Lathyrus japonicus*), sedge (*Carex silicea*), seaside goldenrod (*Solidago sempervirens*), and sand rose (*Rosa rugosa*). Over time, as dunes become stabilized, the vegetation experiences various levels of succession. In more stabilized settings, beach heather (*Hudsonia tomentosa*), bearberry (*Arcotostaphylos uva-ursi*), beach plum (*Prunus maritima*), pitch pine (*Pinus rigida*), or post oak (*Quercus stellata*) may be found in the dunes (Edinger *et al.* 2002).

Future Resource Conditions Without the Project

This report assumes that several on-going and future projects are likely to occur on Long Beach Island without the project. These projects include maintenance dredging of the Jones Inlet Federal Navigation Channel and East Rockaway Inlet Navigation Channel, and seasonal shoreline management efforts by the Town of Hempstead at Point Lookout and Hempstead Beach, whereby sand fencing is placed on the ocean beach in an effort to build the beach elevation by trapping windblown sand. The Town of Hempstead also conducts beach scraping where sand from the beach berm is graded to supply sand to areas with lower elevations. In the absence of the Long Beach Island Project, it is also likely that state and local governments would seek permits from the Corps' Regulatory Branch to undertake smaller-scale beach nourishment projects. As noted in the previous section, the Town of Hempstead would continue its program of beach scraping and sand entrapment. Finally, in addition, the Service expects to provide technical assistance and review of wind power proposals off of the south shore of Long Island, including the proposed project area. These proposals will require Clean Water Act, Section 404 and/or Rivers and Harbors Act of 1899, Section 10 permits from the Corps.

In the without-project condition, erosional events would continue and potentially threaten dunes or boardwalk structures (U.S. Army Corps of Engineers 1998), especially in the post-Hurricane Sandy condition (U.S. Army Corps of Engineers 2014). The Corps expects that this erosion would reduce the storm damage protection capability of the existing beach and dune exposing the coastal communities to extensive property damage and loss (U.S. Army Corps of Corps 2014). However, accretional events due to storms may also occur.

Natural processes and human activities would continue to greatly influence the ecological communities on Long Beach Island and in the offshore marine habitats. The maritime beach and dunes along the beaches which are heavily groined, such as in the City of Long Beach, could continue to erode or accrete due to natural processes. In the present situation of extensive development in the City of Long Beach and the lack of suitable shorebird habitat, either erosion or accretion of these beaches would not likely affect local shorebird populations.

In the future without project conditions at Hempstead, Nickerson, and Lido Beaches, natural processes would continue to create and maintain critical habitat features such as lower lying beaches, variable dune fields, and ephemeral pools. The Hempstead, Nickerson, and Lido Beach areas would be expected to remain stable and possibly become accretionary based on historical trends and continue to support breeding plovers and American oystercatchers. Similarly, the updrift fillet at Jones Beach West would probably remain in its current configuration as inlet dynamics would not be expected to drastically change in the without project condition. Further, in the without-project condition, the maritime beach in these areas have the ability to naturally accrete and form ephemeral pools, increasing the area available for breeding, foraging, roosting, and loafing. The marine intertidal system would fluctuate in response to patterns and rates of shoreline accretion and erosion in the without project condition.

The future of the proposed offshore dredging area in the without-project scenario would likely be the continued existence of this benthic-pelagic sandy bottom community in its present condition, which includes commercial shellfish harvesting, and commercial and recreation fin fishing, and natural ecological functioning. The offshore borrow would not be characterized by depressions created by dredging and existing populations of marine invertebrates and benthic/pelagic finfish species would not be disturbed or destroyed by mechanical dredging operations over the next 50 years.

DESCRIPTION OF SELECTED PLAN EVALUATED BY THE SERVICE

Proposed Action. The Corps has proposed a single alternative for the proposed Long Beach Island project, which comprises the following:

(1) Shoreline stabilization via rehabilitation or repair of 17 groins, including 15 groins in Long Beach and 2 groins in Point Lookout. The proposed rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward from 200 to 330 ft of each of the groins.

(2) New Groin Construction: the immediate construction of a new groin field at Point Lookout, including six groins that begin 800 ft west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 ft. Overall, groin lengths vary and range from 380 ft to 800 ft. The project also includes the deferred construction of two groins in the shorebird area.

(3) The rehabilitation and extension of the eastern terminal groin in Point Lookout. The groin would be extended an additional 100 ft, and its width increased to between 107 and 170 ft.

(4) Construction of 57 timber/gravel dune walkovers, extensions of existing dune walkovers, and vehicle access ways, as well as the construction of six new groins.

(5) About 35,000 linear ft of dune and beach fill would be constructed, extending from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This will include a dune with a top elevation of +14 ft above NAVD; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping to meet the nearshore bottom; 3) in the Nickerson Beach area in the Town of Hempstead, a dune along 5,000 linear ft of shoreline; 4) in Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, sloping to +7 ft NAVD; a 130 ft flat berm at +7 ft NAVD, then sloping to meet the existing bathymetry.

(6) Total sandfill quantity of 4,720,000 cubic yards from offshore borrow area for the initial fill placement, including tolerance, overfill, and advanced nourishment.

DESCRIPTION OF IMPACTS OF CORPS' PROPOSED PROJECT

Non-Ecological Impacts

The purpose of the project is to provide storm damage reduction benefits to Long Beach Island, with minimal benefits to the mainland of Long Island (U.S. Army Corps of Engineers 1998). Recreational benefits amount to less than 10 percent of the economic benefits resulting from the proposed project (U.S. Army Corps of Engineers 2014). The Corps predicts that without these project features and long term maintenance, coastal processes would reduce the storm damage protection ability of the project (U.S. Army Corps of Engineers 1993). Overall, the Corps anticipates that the project will result in positive impacts in terms of added protection to the shoreline, buildings and infrastructure, and human life.

Ecological Impacts

This section focuses primarily on the impacts to the shorebird nesting and foraging areas which are concentrated between Jones Inlet West to the eastern limit of the City of Long Beach. The proposed project has the potential to result in a number of direct and indirect physical and biological impacts in terms of scale and duration in the marine intertidal, maritime beach, and maritime dune habitats and species they support in the proposed project area.

Based on information provided in the Corps' Draft Environmental Assessment (EA) dated February 2014 and supporting documents, the Service has determined that the proposed project would likely result in acute and chronic adverse effects to irreplaceable significant fish and wildlife coastal habitats at Hempstead, Nickerson, and Lido Beaches in the eastern portion of the proposed project area, as well as in the offshore borrow areas and intertidal areas, which are utilized by seabirds and shorebirds. There is also concern that changes to inlet dynamics resulting from construction of the terminal groin or new groin field may impact the Jones West updrift sand fillet. Adverse impacts include, but are not limited to, modification, fragmentation, and loss of nesting and foraging areas due to new groin construction and terminal groin extension; burial of prey resources in the intertidal and beach habitats every 5 years coinciding with beach renourishment cycles; destruction of prey resources and detrimental impacts on community composition in the offshore dredging areas with impacts lasting as long as 2.5 years, and changes in offshore bottom topography leading to suboptimal habitat conditions. These impacts are expected to occur during initial construction, post-construction, and renourishment phases of the proposed project, which extends 50 years into the future.

As noted earlier, the Corps should coordinate with NOAA/F in regard to a full assessment of the potential impacts of the proposed project on marine invertebrate and finfish species in the intertidal, nearshore, and offshore areas. In short, the offshore dredging area encompasses about 550 ac. of marine subtidal habitat. The offshore impact area is increased when the sedimentation plume footprint, which can extend from 300 meters (m) to 500 m, respectively, from the dredge site, is considered. Some notable potential biological effects to fish and invertebrates include, but are not limited to, (1) removal or temporary loss of infauna and epifauna at the borrow site; (2) altered energy transfer on the food chain and altered composition of fish prey base; (3) loss of spawning habitat; (4) loss of overwintering habitat; and (5) changes in community structure (species present, diversity, abundance, and biomass in surrounding areas (Minerals Management Service 2001).

Much of the beach west of Point Lookout has historically been stable or accreting (U.S. Army Corps of Engineers 2014), and the proposed stabilization structures may potentially result in profound detrimental changes or losses to this habitat. For instance, the Corps (2014) noted that "New groins constructed east (updrift) of the site might contribute to the trigger for construction of the deferred groins [in the shorebird habitat]. The new groins may contribute to a reduction in sand supply toward the west, reducing the beach width." Further, U.S. Army Corps of Engineers (1998) noted that lengthening the terminal groin would be "detrimental on the west side of Jones Inlet, having major impacts to the inlet system and downdrift shoreline, while providing only minor benefits. Further, lengthening the terminal jetty would result in changes to the ebb shoal system, which could result in sediment sinks and sediment deficits west of the inlet." U.S. Army Corps of Engineers (1998) also noted that impacts could affect 8,000 ft of shoreline which would encompass the substantial portions of the shorebird breeding areas, potentially resulting in significant losses of breeding and ephemeral pool foraging habitats. The Corps (2014) refined this statement, indicating that such a condition would negatively impact irreplaceable shorebird breeding habitats.

Construction of the new groins will fragment the existing beach and intertidal habitat. If the landward portion of the groins become uncovered they could prevent or hinder the movement of precocial shorebird chicks such as piping plovers and American oystercatchers, preventing access to foraging areas or escape from predators, which could lead to chick fatality. Additionally, changes in nesting patterns may occur due to the presence of these structures.

The timing of dredging and placement of sand, as well as the rehabilitation of groins, during the initial and the periodic nourishment activities will also be a major factor regarding short- and long-term impacts for shorebirds. Changes in the beach morphology and sedimentological characteristics (slope, height, grain size, sorting coefficient, etc.) are not well characterized in the Draft EA (U.S. Army Corps of Engineers 2014), but are expected to negatively affect colonization of marine invertebrates, a major forage resource for shorebirds, to the intertidal zone. U.S. Army Corps of Engineers (1998) indicated that sediments in the offshore dredging area do not exactly match beach substrates in the proposed project area. A shift to finer or coarser sediments can affect the abundance of macrofauna prey resources which can have consequences for higher trophic levels (Peterson and Manning 2001). Morphological and sedimentological changes to the beach and dunes can also impact breeding habitat. For example, the Corps' Long Island Intracoastal Waterway Channel Maintenance Dredging Project resulted in the deposition of highly fine sand and mud dredge spoils on East Inlet, Moriches Bay, Brookhaven, NY, that was deemed unsuitable substrate for colonial waterbirds (U.S. Fish and Wildlife Service Long Island Field Office project file).

Beach construction activities are also usually disruptive operations, which involve the mobilization and use of heavy equipment and vehicles on the ocean beaches. Stabilization projects immediately adjacent to courtship, nesting, and brood-rearing areas have the potential to disturb shorebirds to the point where they may not successfully nest and fledge young or may result in nest failure or the mortality of unfledged chicks. Further, shorebirds may be precluded from using the habitat entirely, forcing them to seek appropriate habitat elsewhere (U.S. Fish and Wildlife Service 1995a). Even low levels of human activity have been shown to result in disturbance and displacement of shorebirds at migration staging and roosting areas (Pfister *et al.* 1992; U.S. Fish and Wildlife Service 1998b). The Corps is proposing time-of-year restrictions (April 1-September 1) within plover breeding areas at Nickerson Beach to address this potential impact. Human recreational activities may adversely affect productivity of shorebirds (Ruhlen *et al.* 2002) and influence foraging activity of some shorebird species (U.S. Fish and Wildlife Service 1996; Burger and Gochfeld 1991).

The proposed project will also result in changes to the existing dune structure, burial of dune vegetation, and vegetation succession. The proposed project will foster suboptimal conditions by creating a monotypic stand of American beach grass through artificial planting (34 ac.) which will decrease the area of sparsely vegetated habitat on the dune and the beach as beach grass areas expand out onto the beach.

In addition, dredging activities may also impact migratory or overwintering seabirds (Minerals Management Service 2004). Seabirds also use these habitats and can experience loss of foraging resources due to dredging, which can result in shifts in foraging patterns (U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, *pers. comm.* 2004). The Minerals Management Service which oversees exploration of offshore areas for mining, and oil and gas reserves, has recognized the potential impacts of their programs to seabirds and has undertaken, in certain areas of the country, surveys to understand seabird distribution and abundance in their project areas.

The effects of beach nourishment and the burial of groins would result in an increase in artificial rocky intertidal habitat. Some sand placement over groins will re-establish sandy bottomed intertidal habitat. Impacts associated with the placement of rock substrate into the intertidal zone to rehabilitate existing groins could include the mortality of clams, mussels, and other invertebrates that would be eliminated during groin construction, as well as short-term effects of increased turbidity in the immediate area. However, groins which are left uncovered will be colonized by species associated with a rocky substrate which may provide a food source for fishes, invertebrates, and avifauna.

In addition to the above, direct impacts also include burial of benthic resources due to the covering of these existing habitats with sand. Peterson and Manning (2001) stated that long-term adverse impacts to benthic fauna at North Topsail Beach, NC, occurred following beach nourishment. Lindquist and Manning (2001) reported that periodic nourishment of these beaches appeared to prevent the full recovery of benthic species.

The recovery of benthic macrofauna (those animals 0.5 millimeters or larger in size) after beach nourishment varies from one site to another. Studies completed in the 1970s indicate that when nourishment ceases, the recovery of benthic macrofauna is rapid, and complete recovery might occur within one or two seasons (Reilly and Bellis 1978). The ability of macrofauna to recover is due to: (a) their short life cycles, (b) their fast reproductive potential, and (c) the recruitment of plankton larvae and motile macrofauna from nearby unaffected areas (Naqvi and Pullen 1982). The Corps reported intertidal benthos communities recovered from beachfill impacts within six months, and impacts to the intertidal benthic community were more significant when sand particle size of nourished material did not match that of the existing beach, based upon monitoring of beach nourishment impacts on the New Jersey shoreline of the Atlantic Ocean (U.S. Army Corps of Engineers 2001).

The recovery of marine invertebrate prey resources will vary depending on the timing of the fill activity relative to the periods of highest biological activity in these zones of the beach, as well as compatibility of the dredged material with the existing beach substrate. Areas receiving sand in autumn will likely have a longer prey resource recovery period than areas receiving fill in the winter and early spring. In 2003, the time period for benthic recolonization was approximately 12 to 18 months for the Fire Island Community project area (Land Use Ecological Services, Inc., 2005).

Cumulative Effects

The Draft EA (U.S. Army Corps of Engineers 2014) does not address cumulative effects of the proposed project. The cumulative effects analysis in U.S. Army Corps of Engineers (1998) estimates that the total area affected by a number of Corps shoreline stabilization projects would only affect four percent of the total offshore habitat that is typically within the depth contours of designated offshore borrow areas. The Service recommends that the Corps expand the previous 1998 cumulative effects analysis to include the effects of the Corps, state, and local beach nourishment and dredging projects, as well as the area of intertidal and maritime beach and dune habitat that would be impacted across all project areas. In addition to quantifying the area of habitat which would be affected, the Corps should also evaluate the cumulative impacts of its coastal program (Planning and Operations/Navigation projects) on migratory birds, particularly those species and habitats of priority concern as established in various conservation plans that have been developed by local, state, and federal agencies.

As discussed above, various physical and biological data collection efforts would need to be undertaken across the south shore of Long Island in order to address the cumulative impacts of the Corps' beach nourishment and inlet maintenance programs, which collectively make up the Corps' Civil Works program. The lack of site-specific data for the proposed project area and other project areas currently prevents the Service from making an accurate assessment of the cumulative impacts of this project in the context of other on-going projects. However, the Service believes that there is enough information to suggest that cumulative impacts are, in many respects, likely adverse, given the already established effects of many of these projects on shorebirds including the piping plover.

Effects on Federally-listed Endangered/Threatened Species

Due to the potential for the proposed project to affect listed species, the Corps prepared a Biological Assessment pursuant to section 7 of the ESA, reaching a determination that the proposed project would not be likely to adversely affect the piping plover or seabeach amaranth. The piping plover is a federally-listed threatened species along the Atlantic Coast which nests on Long Island beaches. Dredging and beach disposal activities have potential to exert direct adverse effects on the piping plover as a result of disruption of courtship, nesting, and feeding activities during the breeding season, and alteration of their habitat. The operation of dredging equipment immediately adjacent to a shoreline that is used by piping plovers as a courtship, nesting, and feeding area has the potential to disturb plovers to the point where they do not successfully nest and fledge young. In addition, dredging equipment that is operated immediately adjacent to piping plover habitat may preclude plovers from using the habitat entirely, forcing them to seek appropriate habitat elsewhere.

Operation of machinery used to move dredge pipeline and to grade the nourished beach can greatly disturb plovers, their nests, and can endanger the lives of chicks. The placement of dredge pipeline can form a barrier prohibiting plover chicks from reaching foraging habitats including beach wrack and American beach grass. Beach slope is also a critical factor for habitat selection.

Seabeach amaranth may also be adversely affected by the proposed project. Proposed activities which may affect seabeach amaranth include beach nourishment, which would result in the burial of plants and seeds, disruption of seed production and dispersal, and degradation of habitat by promoting vegetative stabilization, perennial succession, and competition. Indirect effects may include trampling of plants and seeds by recreational activities, and removal of plants via mechanical beach grooming.

EVALUATION OF THE PROPOSED PROJECT IN COMPARISON WITH OTHER ALTERNATIVES

An evaluation and comparison of the selected plan to other plans was not requested by the Corps. Therefore, such an analysis was not undertaken.

DISCUSSION AND JUSTIFICATION OF FISH AND WILDLIFE CONSERVATION MEASURES

This report has focused on the migratory birds and their habitats, primarily maritime beach and dune communities, and marine intertidal and subtidal habitats, which support species which are highly imperiled or of high conservation concern, as well as priority habitats for conservation. The use of the proposed project area and adjacent habitats by these species and the potential impacts resulting from the proposed project are clear justifications to include conservation measures in these plans, and to further evaluate fish and wildlife enhancement opportunities in the study area. Further, habitats in the proposed project area have also received special protection and status as critical conservation areas through the NYSDOS designation as Significant Fish and Wildlife Habitats, warranting careful consideration of potential impacts, mitigation measures, and fish and wildlife enhancement opportunities.

MITIGATION RECOMMENDATIONS

1) The Service recommends that the Corps explore additional alternatives to address shoreline protection in the eastern portion of the project area, in lieu of the proposed new groin field and terminal groin extension. The Corps has indicted there are uncertainties surrounding the effects of these structures on regionally important shorebird habitats.

Since this habitat has been characterized as irreplaceable by the NYSDOS and determined to be a Resource Category I habitat by the Service as defined by the Service's Mitigation Policy (January 23, 1981, Federal Register v. 46 n. 15 pp. 7644-7663), it is necessary to avoid impacts to these habitats from anthropogenic sources of habitat loss, fragmentation, and modification. Additional alternatives may include relocating at-risk structures in the recreational beach areas, and evaluating upland non-structural approaches such as elevating houses, land acquisition, and flood-proofing similar to the non-structural alternatives envisioned for the mainland areas within the Fire Island Inlet to Montauk Point Reformulation Study Area.

2) The Service recommends that the Corps restrict dune construction to areas closest to residential development and eliminate them in the public park and less developed areas at Hempstead, Nickerson, and Lido Beaches which are Resource Category 1 habitats. The Service also recommends that the Corps eliminate the construction of the four new groins, two deferred groins, and the terminal groin extension, and limit berm construction to the area south of Point Lookout. This will allow natural processes to create and maintain, at the greatest possible extent, a mosaic of ocean beach habitats, including partial overwash, dune blowouts, sparsely-vegetated dunes and beaches, ephemeral pools, etc. All of these features are requisite habitat characteristics for all the species at-risk which use the eastern portion of the project area from Jones Inlet to Lido Beach.

3) The Service recommends that the Corps ensure full protection of shorebird species and their habitats prior to project implementation, through the development of long-term agreements with the Town of Hempstead, Nassau County, and New York State, and Service.

4) The proposed project, which is one of many shoreline stabilization projects being undertaken or planned by the Corps, would likely adversely affect seabird and shorebird species of regional concern in the short-term and over the 50-year life of the project. Consequently, the Service recommends that the Corps undertake a regional assessment of cumulative impacts of beach nourishment on fish and wildlife resources. This would enable the Corps to adequately assess the impacts of its civil works program on a broader, landscape level.

5) The Service recommends that the Corps undertake an updated impact assessment on fish and wildlife resources relative to this project. The environmental studies referenced in the Draft EA which served as the basis of the Corps' impact analysis for the proposed project are well over 10 years old. An updated and comprehensive assessment would provide for the development of an environmental framework for the evaluation of project alternative impacts and mitigation screening. This effort would, in turn, assist the Service in fulfilling its FWCA responsibilities in recommending appropriate mitigation measures for fish and wildlife resources that may be impacted by dredging of the offshore borrow, intertidal and beach and dune areas.

6) All offshore dredging activities should be coordinated with the NYSDEC Region 1 in regard to the protection of resources under their jurisdiction. A primary goal should be to avoid dredging in areas which contain significant concentrations of the commercially important Atlantic surf clam beds.

7) The Service recommends the following in order to avoid and minimize impacts to the offshore borrow area Resource Category 3 habitats and achieve "no net loss of habitat value, while minimizing loss of in-kind habitat value":

a) The Corps should avoid exposing and impacting various sediment types outside the footprint of the offshore borrow area during dredging. Post-construction sediment sampling should be undertaken to ensure that sediment composition has not substantially changed so as to increase the probability that the pre-dredging benthic assemblage would have a higher probability of re-colonization. Producing deep, steep-sided pits with little to no water circulation that may lead to silt and organic matter accumulation and hypoxic or anoxic conditions, should be avoided.

b) Pre-, concurrent, and post-construction monitoring of seabird abundance at the offshore borrow and control sites should be undertaken. These surveys will be necessary to develop appropriate mitigation measures. Until these surveys are completed, the Service is unable to provide adequate mitigation measures to protect these species.

c) The Corps should develop a pre- and post-monitoring program based on the guidance protocols developed by the Minerals Management Service (see Minerals Management Service 2001) and NOAA/F for finfish and benthic assemblages within the offshore dredging areas.

d) The Corps should consult with the NYSDEC as to whether additional quantitative baseline surveys on the density and age distribution of surf clams should be collected to determine the surf clam resources within the offshore dredging area. This information can be used to determine areas, within the dredging zone, that should be excluded from dredging operations, and will also enable the Corps to better determine the value of surf clam resources that may be impacted by dredging.

8) The Corps should consider habitat enhancements in less developed areas at Hempstead, Nickerson, and Lido Beaches to address unavoidable impacts. Potential enhancements include vegetation and predator control, invasive species removal, and grading to promote shorebird foraging. The Service is available to assist the Corps in developing specific habitat enhancement projects and specifications.

ENDANGERED AND THREATENED SPECIES RECOMMENDATIONS

Section 7(a)(2) of the ESA, requires all federal agencies, in consultation with the Secretary of the Interior, to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species. In consultation with the Service, the Corps shall utilize its authority to further the purposes of the ESA in the conservation and recovery of listed species and the ecosystems on which they depend. Further, 50 CFR 402.02 states that the “effects of an action” to be considered during consultation include “direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action....”

Based on our review of the proposed project, beach nourishment activities along the shoreline of Long Beach Island have the potential for direct and indirect adverse effects on piping plovers and seabeach amaranth. The section 7 consultation is on-going and being handled separately from this report.

SUMMARY OF FINDINGS AND SERVICE POSITION

The Service finds that implementation of the proposed project will cause adverse impacts to the ecological communities of the maritime beach and dune communities, and offshore borrow area, resulting in the shorebird habitat fragmentation, loss, and modification, elimination and disturbance of finfish and marine invertebrates. This shorebird habitat is irreplaceable and impacts should be avoided. The proposed project has the potential to exert both direct and indirect adverse effects on the piping plover and seabeach amaranth. The Corps has included time-of-year restrictions on construction in the plover breeding areas to address direct effects. Seabeach amaranth may also be adversely affected by the proposed project, which may result in the burial of adult plants and seeds, disruption of seed production and dispersal, and degradation of habitat by promoting vegetative stabilization, perennial succession, and competition.

If the project beaches are occupied by plovers, these birds may suffer indirect effects due to habitat modification, fragmentation, and loss, as well as from increased human activity on the stabilized beaches. Indirect effects of the project upon seabeach amaranth may include trampling of plants and seeds by recreational activities. These impacts will be addressed in the section 7 consultation.

Many of the major impacts to the Resource Category 1 habitats, such as habitat modification, loss, and fragmentation, can be avoided if the mitigation measures identified above are implemented. These measures are summarized as follows:

1) Relocate or eliminate construction of structures/groins to allow for natural process to create and maintain important ocean beach habitats in areas south of Point Lookout;
2) Consider non-structural alternatives; and
3) Eliminate dune construction in Resource Category 1 habitats at Hempstead, Nickerson, and Lido Beaches.

Many of the major impacts to Resource Category 3 impacts can be minimized by implementing the recommended mitigation measures, summarized as follows:

1) Implement a long-term shorebird management plan;
2) Undertake a cumulative impact and updated project impact assessment of beach nourishment impacts;
3) Coordinate with the NYSDEC Region 1 to avoid/minimize impacts to important Atlantic Surf Clam bed areas;
4) Utilize dredging practices to avoid deep, steep-sided borrow areas; and
5) Conduct seabird, finfish, and benthic assemblages to avoid areas important to these resources.

The Service also recommended habitat enhancement in the Resource Category 1 areas, where appropriate, to compensate for unavoidable project impacts

Overall, the Service finds that implementation of the proposed project has the potential to result in adverse effects to fish and wildlife resources of regional importance, as well as the federally- and state-listed piping plover and seabeach amaranth and their supporting ecosystems. The Service has recommended mitigation measures which will avoid and minimize adverse environmental impacts of the proposal. Some of these measures involve evaluating additional alternatives to shoreline stabilization, and physical and biological monitoring during various stages of project planning and construction.

CORPS' COMMENTS ON DRAFT FWCA Report

The Service is in receipt of the Corps' comments, dated October 15, 2014, which was received on October 22, 2014, to our June 30, 2014, Draft FWCA Report.

The mitigation recommendations from the Draft FWCA Report, a summary of the Corps comments, and the Service's responses are provided below.

Comment 1: Mitigation recommendation 1 of the Draft FWCA Report states, "The Service recommends that the Corps explore additional alternatives to address shoreline protection in the eastern portion of the project area, in lieu of the proposed new groin field and terminal groin extension. The Corps has indicted there are uncertainties surrounding the effects of these structures on regionally important shorebird habitats. Since this habitat has been characterized as irreplaceable by the NYSDOS and determined to be a Resource Category I habitat by the Service as defined by the Service's Mitigation Policy (January 23, 1981, *Federal Register* v. 46 n. 15 pp. 7644-7663), it is necessary to avoid impacts to these habitats from anthropogenic sources of habitat loss, fragmentation, and modification. Additional alternatives may include relocating at-risk structures in the recreational beach areas, and evaluating upland non-structural approaches such as elevating houses, land acquisition, and flood-proofing similar to the non-structural alternatives envisioned for the mainland areas within the Fire Island Inlet to Montauk Point Reformulation Study Area."

In response, the Corps has indicated that it will undertake no further alternative analyses for this project, stating that the project will function as designed and serve to enhance the surrounding habitat.

The Service can find no evidence that the proposed project will enhance the habitats in the eastern portion of the project area, especially in light of the uncertainties regarding the stability of the ebb shoal weldment area following the construction of the new groins A-D in this area as discussed in U.S. Army Corps of Engineers (2014). This recommendation will be retained in the final FWCA report.

Comment 2: Mitigation recommendation 2 of the Draft FWCA Report states, "The Service recommends that the Corps restrict dune construction to areas closest to residential development and eliminate them in the public park and less developed areas at Hempstead, Nickerson, and Lido Beaches which are Resource Category 1 habitats. The Service also recommends that the Corps eliminate the construction of the four new groins, two deferred groins, and the terminal groin extension, and limit berm construction to the area south of Point Lookout. This will allow natural processes to create and maintain, at the greatest possible extent, a mosaic of ocean beach habitats, including partial overwash, dune blowouts, sparsely-vegetated dunes and beaches, ephemeral pools, etc. All of these features are requisite habitat characteristics for all the species at-risk which use the eastern portion of the project area from Jones Inlet to Lido Beach."

The Corps expressed its concern that this recommendation will create additional risks for highly developed areas. The Service disagrees with this conclusion. This recommendation recognizes the Corps' mission to provide storm damage protection to developed areas on Long Beach Island, including those on the eastern end of the island in the Town of Hempstead, and in no way interferes with that stated goal. Our recommendation to eliminate or reduce shoreline stabilization was focused on the ocean beach habitats fronting the major parks areas within this reach and is consistent with maintaining the functions and values of these areas as Federally-recognized and New York State-designated significant coastal fish and wildlife habitat and bird conservation areas, which support significant concentrations of Federally- and state-listed species. This mitigation recommendation will be retained in the final FWCA Report.

Comment 3: Mitigation recommendation 3 of the Draft FWCA Report states, "The Service recommends that the Corps ensure full protection of shorebird species and their habitats prior to project implementation, through the development of long-term agreements with the Town of Hempstead, Nassau County, and New York State, and Service."

We recognize that the Corps has committed to adopting this recommendation to the extent it "plans to have the Town and County continue its protection of the designated habitats." We, therefore, expect that the Corps will develop a written agreement that will be incorporated in the project partnership agreement to ensure that that protection efforts extend over the entire project life, or 50 years. The Service further expects that the Corps will include the Service in this planning effort and seek our advice and agreement before any agreement is finalized with the Town and County. This recommendation will be retained in the final FWCA report.

Comment 4: Mitigation recommendation 4 of the Draft FWCA Report states, "The proposed project, which is one of many shoreline stabilization projects being undertaken or planned by the Corps, would likely adversely affect seabird and shorebird species of regional concern in the short-term and over the 50-year life of the project. Consequently, the Service recommends that the Corps undertake a regional assessment of cumulative impacts of beach nourishment on fish and wildlife resources and develop a long term comprehensive management plan for sensitive species within the Corps' shore project areas. This would enable the Corps to adequately assess the impacts of its civil works program on a broader, landscape level and provide mitigation as appropriate."

The Corps' response included a commitment to work with the NYSDEC to develop a protocol for undertaking a regional assessment of the offshore borrow areas south of Long Island and to resume development of a Long-term Regional Comprehensive Plan for Threatened and Endangered Species (LTRCMP) for the Fire Island Inlet to Montauk Point Reformulation Study to support a biological assessment for that project.

The Service recognizes the Corps' commitment to work with the NYSDEC on a monitoring protocol, and further recommends that the Corps secure funding to undertake such an assessment once the protocols are developed.

In regard to the LTRCMP, the Service has long championed the need for such a plan and believes that it could contribute information for the cumulative impact analyses we recommended above. However, it is likely that different studies and analyses would be needed to undertake a rigorous analysis of the cumulative effects of the Corps' Civil Works program on other sensitive fish and wildlife species, in addition to threatened and endangered species. This recommendation will be retained in the final FWCA report.

Comment 5: Recommendation 5 of the Draft FWCA Report states, "The Service recommends that the Corps undertake an updated impact assessment on fish and wildlife resources relative to this project. The environmental studies referenced in the Draft EA which served as the basis of the Corps' impact analysis for the proposed project are over 10 years old. An updated and comprehensive assessment would provide for the development of an environmental framework for the evaluation of project alternative impacts and mitigation screening. This effort would, in turn, assist the Service in fulfilling its FWCA responsibilities in recommending appropriate mitigation measures for fish and wildlife resources that may be impacted by dredging of the offshore borrow, intertidal, and beach and dune areas."

The Corps responded that offshore and inshore conditions and species assemblages have not experienced any major change that would necessitate a new analysis.

The Service disagrees with the Corps' position. Species' habitats and populations are constantly in fluctuation, thereby necessitating further analyses. We continue to recommend that the Corps ensure it has used the best available data in its review of the environmental effects of the proposed project. This recommendation will be retained in the final FWCA report.

Comment 6: Mitigation recommendation 6 of the Draft FWCA Report states, "All offshore dredging activities should be coordinated with the NYSDEC Region 1 in regard to the protection of resources under their jurisdiction. A primary goal should be to avoid dredging in areas which contain significant concentrations of the commercially important Atlantic surf clam beds."

In its response the Corps has committed to implementing this mitigation recommendation. This recommendation will be retained in the final FWCA report.

Comment 7: Mitigation recommendation 7 of the Draft FWCA Report states, "The Service recommends the following in order to avoid and minimize impacts to the offshore borrow area Resource Category 3 habitats and achieve "no net loss of habitat value, while minimizing loss of in-kind habitat value":

a) The Corps should avoid exposing and impacting various sediment types outside the footprint of the offshore borrow area during dredging. Post-construction sediment sampling should be undertaken to ensure that sediment composition has not substantially changed so as to increase the probability that the pre-dredging benthic assemblage would have a higher probability of re-colonization. Producing deep, steep-sided pits with little to no water circulation that may lead to silt and organic matter accumulation and hypoxic or anoxic conditions, should be avoided.

b) The Corps should develop a pre- and post-monitoring program based on the guidance protocols developed by the Minerals Management Service (see Minerals Management Service 2001) and NOAA/F for finfish and benthic assemblages within the offshore dredging areas.

c) The Corps should consult with the NYSDEC as to whether additional quantitative baseline surveys on the density and age distribution of surf clams should be collected to determine the surf clam resources within the offshore dredging area. This information can be used to determine areas, within the dredging zone, that should be excluded from dredging operations, and will also enable the Corps to better determine the value of surf clam resources that may be impacted by dredging."

The Corps has stated that it will work with the NYSDEC to develop guidance for offshore borrow areas. This recommendation will be retained in the final FWCA report.

Comment 8: Mitigation recommendation 8 of the Draft FWCA states, "The Corps should consider habitat enhancements in less developed areas at Hempstead, Nickerson, and Lido Beaches to address unavoidable impacts. Potential enhancements include vegetation and predator control, invasive species removal, and grading to promote shorebird foraging. The Service is available to assist the Corps in developing specific habitat enhancement projects and specifications."

In its response, the Corps committed to undertaking a habitat enhancement program via consultation with the Service, Town, and County. This recommendation will be retained in the final FWCA report.

In addition to the comments discussed above, the Corps requested clarification from the Service on two points. Firstly, the Corps requested clarification from the Service on its position on existing conditions in the project area and project footprint, noting that the Service included the updrift sand fillet at Jones Inlet in its impact assessment area. The Service included the updrift sand fillet in the impact assessment area as the Corps noted that it is an integral feature to the inlet and its stability, including the ebb tidal shoal weldment area which is located in the main shorebird breeding area south of Nickerson Beach (see appendix B of the U.S. Army Corps of Engineers 2014).

Secondly, the Corps stated in its letter, "The Service describes that the habitat within the project area is of lower quality and yet throughout the draft FWCA Report it states that the project will result in long-term irreplaceable impacts by creating suboptimal habitat. It is also unclear to the District how the proposed project can disturb an already suboptimal habitat area."

As stated in the Draft FWCA Report, our analysis focused on the eastern 3 miles of the project area which contains habitat for rare and threatened species, and was described as irreplaceable by the New York State Department of State Coastal Resources Division. We also assessed impacts to all habitats through resource category designations which were provided and discussed in the report. The project as a whole will impact various habitat types to varying degrees.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

May 13, 2015

Colonel Paul E. Owen
District Engineer
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Dear Colonel Owen:

The U.S Fish and Wildlife Service (Service) is in receipt of your letter dated May 1, 2015, requesting the Service to adopt the conference opinion on the U.S. Army Corps of Engineers' (Corps) Fire Island Inlet to Moriches Inlet Stabilization Project for the red knot (*Calidris canutus rufa*; threatened) as a biological opinion. The Corps has indicated that it concurs with the Service's conference opinion and all reasonable and prudent measures contained therein.

By receipt of this letter, your agency is provided formal notice that the Service has adopted the above referenced conference opinion as a biological opinion. Since all of the provisions in the opinion will be implemented as described, no further action is necessary at this point in time.

We appreciate and recognize all of the Corps' efforts during the consultation period to provide additional information and clarification of project features. In addition, we appreciate the detailed comments and feedback on both the piping plover biological opinion and red knot conference opinion your agency provided to the Service in your correspondence dated February 20, 2105, as well as the joint interagency field visit that was held on February 27, 2015, to further discuss the project and implementation of the project's avoidance and minimization measures, conservation measures, and reasonable and prudent measures. We hope to continue to build off the close cooperative relationship our agencies have developed and fostered in order to meet our respective and joint agency missions and responsibilities under the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*).

If you have any questions, please have your staff contact Steve Papa, of the Long Island Field Office, at (631) 286-0485.

Sincerely,

Patricia Cole for David A. Stilwell
Field Supervisor

cc: NYSDEC, Stony Brook, NY (M. Gibbons)

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

Environmental Branch

01 MAY 2015

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Coastal Storm Risk Management Project

Dear Mr. Stilwell:

The U.S. Army Corps of Engineers, New York District (District) is in receipt of the U.S. Fish and Wildlife Service's (Service) March 31, 2015 response to the District's February 20, 2015 comments on the Biological Opinion and Conference Opinion (BO) on the effects on the threatened piping plover (*Charadrius melodus;* Atlantic Coast population), the threatened seabeach amaranth (*Amaranthus pumilus*; threatened), and the rufa red knot (*Calidris canutus rufa*; now listed as threatened) for the above referenced project. The District has reviewed the Service's response and acknowledging that there is a need to provide coastal storm protection to the residents of Long Beach expeditiously, concurs with the Reasonable and Prudent Measures (RPMs) contained within the BO. As the Conference Opinion for the red knot was developed prior to the listing of the species, and the District concurs with the RPMs contained within it, the District requests that the Conference Opinion be considered as a BO issued through formal consultation.

The District appreciated how the Service expedited the formal consultation process by providing a BO earlier than scheduled, but remains concerned that it became a greater disadvantage than the time saver it was meant to be. The Service decision to produce a Final BO as its November 24, 2014 submittal (not the Draft BO the District was expecting), caused the District to lose the opportunity to provide comment and feedback. In hindsight, clearer communication must occur between our two agencies on these critical decisions associated with formal consultation under Section 7 of the Endangered Species Act.

If you any questions, please contact Mr. Peter Weppler – Chief, Environmental Analysis Branch at 917-790-8634.

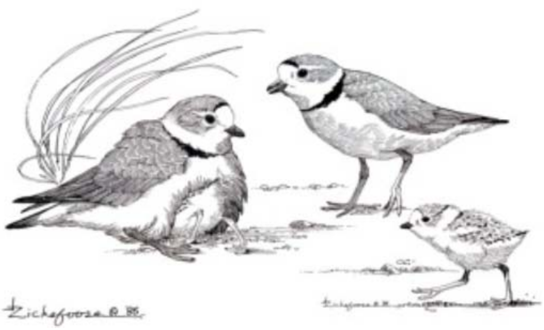
Sincerely,

Paul E. Owen
Colonel, U.S. Army
District Engineer New York District

cc. USFWS-LIFO

Biological Opinion and Conference Opinion

Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Coastal Storm Risk Management Project



Prepared for:

U.S. Army Corps of Engineers
26 Federal Plaza
New York, New York 10278

Prepared by:

U.S. Fish and Wildlife Service
Long Island Field Office
Shirley, New York 11967

David A. Stilwell
Field Supervisor

November 2014

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Page No.

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological and Conference Opinion (Opinion) addressing the U.S. Army Corps of Engineers' (Corps) Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Damage Risk Management Project (Long Beach Island Project; proposed project). At issue are the impacts to the piping plover (*Charadrius melodus*), seabeach amaranth (*Amaranthus pumilus*; threatened), roseate tern (*Sterna dougallii dougallii*; endangered), and red knot (*Calidris canutus rufa*), a species proposed for listing as threatened under the ESA.

This Opinion was prepared in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). The Corps' July 10, 2014, biological assessment (BA) and request for formal consultation was accepted by the Service on July 23, 2014. This Opinion is based on information provided in the Corps' BA (U.S. Army Corps of Engineers 2014a), as well as other sources of information cited herein, including but not limited to, additional project documents such as the Corps' Draft Environmental Assessment and technical appendices and Hurricane Sandy Limited Re-Evaluation Report (HSLRR; U.S. Army Corps of Engineers 2014b). A complete decision record for this consultation is on file at the Service's Long Island Field Office in Shirley, New York.

With respect to ESA compliance, all aspects of the Corps' project description in the Service's Opinion will be binding, including the specific nature, timing, and extent of the construction project, as well as all avoidance and minimization measures agreed to by the Corps and Service.

The BA did not provide a determination for the red knot or the roseate tern. The red knot is a migratory species that feeds and loafs along the Atlantic Coast beaches. A conference opinion is included herein to address the effect of the Long Beach Island project on this proposed species.

Roseate tern is occasionally observed roosting on Long Beach Island, but no critical habitat, as defined by the ESA, for the roseate tern has been designated in New York. After consideration of the project description and avoidance and minimization measures, we do not anticipate any adverse impacts to the roseate tern from the proposed project. Therefore, no further coordination with the Service is required pursuant to the ESA for this species. Should project plans change, or if additional information on this species becomes available, this evaluation may be reconsidered.

CONSULTATION HISTORY

The history of the consultation request includes any informal consultation, prior formal consultations on the action, documentation of the date consultation was initiated, a chronology of subsequent requests for additional data, extensions, and other applicable past or current actions (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

May 6, 2014	Service receives, via electronic correspondence, the Corps' not likely to adversely affect determinations for piping plover and seabeach amaranth and biological assessment for the proposed project.
June 16, 2014	Service requests clarification on locations of, and maintenance activities related to, the new groin construction in Point Lookout/Hempstead Beaches.
	Corps provides information concerning local government responsibilities to maintain groins and beach elevations
July 10, 2014	Corps, via electronic correspondence, resubmits BA to the Service and requests formal consultation for the Long Beach Island project.
July 22, 2014	Corps inquires about status of consultation initiation package.
July 23, 2014	Service transmits letter to Corps accepting the consultation initiation package.
October 1, 2014	Service requests coordinates of new and deferred construction groins in Point Lookout/Hempstead Beach area.
	Corps provides latitude and longitude coordinates for proposed groins A-F.
October 2, 2014	Service requests clarification on status of groin G, as it is referenced in Corps' HSLRR, but location coordinates were not provided.

October 6, 2014	Corps responds that groin G has been eliminated from the proposed plan.
October 7, 2014	Service requests clarification of endangered species conservation measures and funding allocations.
	Corps provides clarification that it will implement a March 31 to Sept 1 time of year restriction for construction activities in endangered species habitat, that they will apply a 300-foot (ft) buffer zone, and states no funding levels have been set.
October 9, 2014	The Service requests additional spatial information about the threshold trigger berm width west of proposed groin D.
October 10, 2014	Corps responds to the Service's October 9, 2014, request providing two graphics showing location of threshold trigger berm west of groin D.
October 16, 2014	The Service inquires about the status of beach only alternative assessments as well the probability that construction of groins A-D will influence downdrift erosion, and whether the Corps has calculated any shoreline recession related to the proposed new groins.
	Corps responds, providing references in feasibility report.
October 21, 2014	As a follow-up to the Service's October 16, 2014, inquiry, the Corps provides a copy of the Corps' Hydraulic Laboratory Storm and Coastal Processes Report for Long Beach Island.
October 27, 2014	The Service requests clarification on the post-project mean high water mark (MHW), whether the deferred groins are tapered, the threshold plan for addressing downdrift erosion, and information that was used to determine the amount of habitat lost due to sand fences as noted on pg 26 of the BA.

November 3, 2014 Corps provides clarification responding the post-project mean high water line is shown on the plan drawings. Where no berm is placed, the existing MHW and the improved MHW are the same.

The MHW line is not likely to recede to the seaward end of Groin D under expected long-term conditions with renourishment. However, should there be a change in the position of the weldment, a change in the updrift sediment supply, or one or multiple severe storms, the mean high water line could recede to the seaward end of groin D.

The deferred groins are tapered. The seaward end of groin D is approximately 150 ft south of N153,000. The seaward end of groin E crosses N153,000, and the seaward end of groin F is approximately 100 ft north of N153,000.

If erosion occurs to the extent that the deferred groins will be considered for construction, it is expected that a new analysis and decision document with accompanying environmental assessments will be made to reevaluate the recommended plan. At this time, the fill plan for the deferred groin area is the 110-ft wide berm, measured from the toe of the dune, plus renourishment. This would not cover the deferred groins all the way to their seaward ends.

Engineering Division does not have a sand fence alignment plan. The recommended plan includes an estimated total linear footage of sand fence to be provided, but does not detail how that fencing will be deployed.

November 4, 2014 Corps inquires about the status of the Opinion.

November 6, 2014 The Service requests clarification on time of year restrictions and the 300-ft buffer zone due to discrepancies between the BA and HSLRR documents.

November 7, 2014 Service requests spatial data for the proposed project features.

November 12, 2014	Corps responds to the Service's November 6 inquiry advising that the Corps can make the HSLRR reflect the BA and also stating that ultimately the Corps will defer to the BO regarding protection of the species, including time of year restrictions and buffer zones.
November 13, 2014	The Corps responds to the Service's November 7, 2014, request for spatial information of project features, providing geographical information system (GIS) shapefiles of new groin construction, old groin rehabilitation, dune layout, and berm layout for the entire project area.
November 17, 2014	The Service provides an update on the Opinion process, provides an overview of the reasonable and prudent measures and commits that the final Opinion will be delivered to the Corps on November 24, 2014.
November 21, 2014	The Corps agrees to implement a 1,000 m buffer for construction activities in the western portion of the Action Area. The Corps also proposes to establish a 200 m buffer around terminal groin number 58 and conduct construction activities in that location during the piping plover season.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED PROJECT

Background and General Description

The following is a summary of the proposed project as provided in the Corps' BA, Environmental Assessment, and HSLRR.

The proposed project is located on Long Beach Island, New York, stretching from Atlantic Beach to Jones Inlet (Figure 1). The purpose of the project is to provide coastal storm risk management and address ocean shoreline erosion that occurred as a result of Hurricane Sandy, which made landfall on October 29, 2012. According to the National Hurricane Center, Hurricane Sandy, at nearly 2,000 kilometers (km) in diameter, is the largest storm on historical record in the Atlantic basin (Hapke et al. 2013). It affected extensive areas of the east coast of the United States, and on Long Island, the storm caused substantial beach erosion. In some areas, dunes were extensively overwashed and several breaches formed as the storm made landfall during astronomical high tides (Hapke et al. 2013). While strong coastal storms, such as Hurricane Sandy, can often result in severe damages to physical structures, particularly on the barrier island, they are an important natural process of barrier islands that allow these systems to evolve in response to sea-level rise (Hapke et al. 2013).

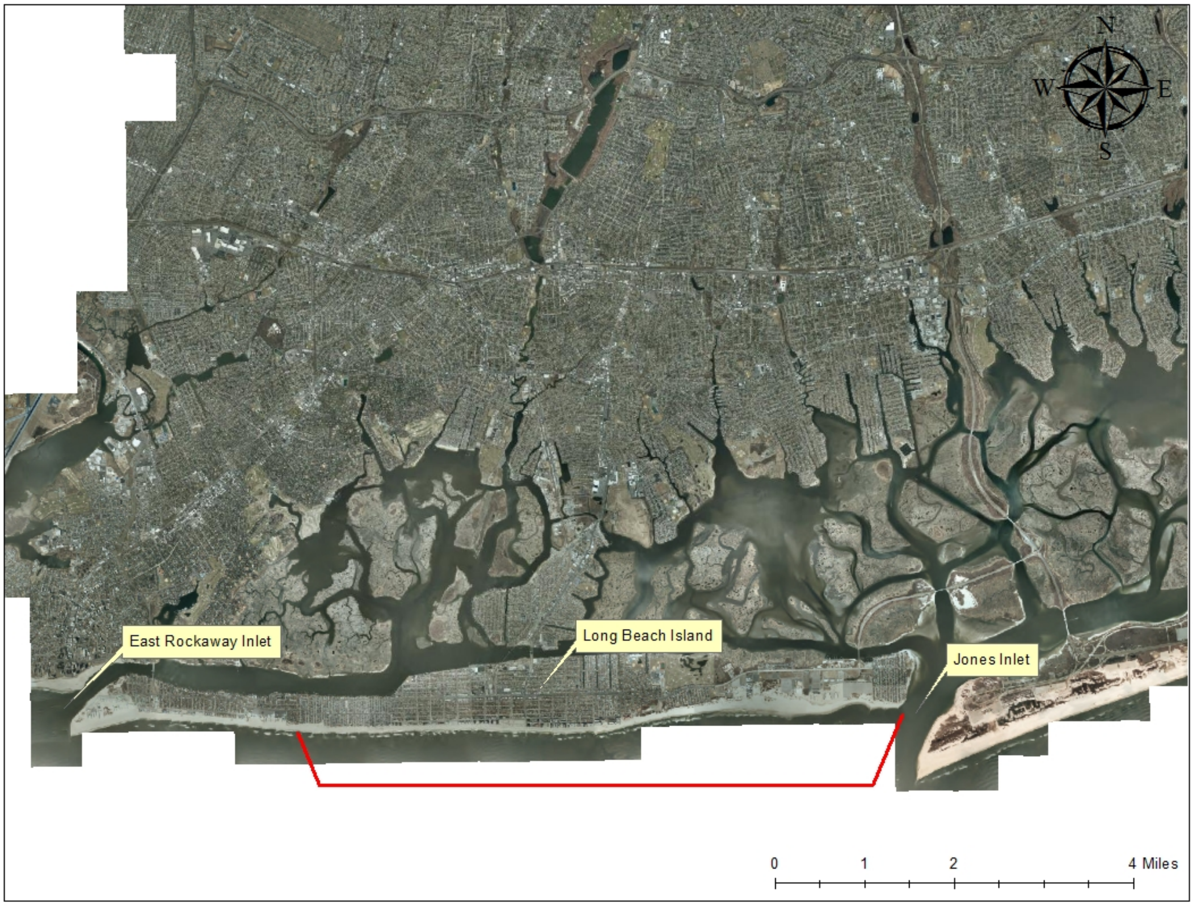

Figure 1. Map showing the Corps' proposed project area, Long Beach Island, New York.

The proposed project would directly and indirectly affect offshore, nearshore, intertidal, and beach habitats along 6.7 miles (mi) of Long Beach Island with some resultant downdrift effects on the remain 2.3 mi of Long Beach Island due to sediment transport processes. Short- and long-term changes to plover nesting, foraging, and chick rearing habitats mainly on the eastern end of Long Beach Island are anticipated. Sand that is placed in Point Lookout through the City of Long Beach is likely to migrate to the west and fill the updrift sand fillet at East Rockaway Inlet. Once the updrift fillet is filled to capacity, sand will then migrate into the East Rockaway Federal Navigation Channel. Overall, the Service does not believe that the downdrift effects would have any adverse impacts to endangered species that reside in those areas, so these areas are not addressed in this Opinion.

The project will result in short- and long-term impacts to seabeach amaranth plants and their habitats, as well as impact red knots and their foraging areas mainly on the eastern end of Long Beach Island.

Corps' Preferred Alternative

The Corps' plan include dune and/or berm construction, groin construction and rehabilitation, timber walkway construction, and vehicle and pedestrian access construction, beach grass planting, and sand fence installation along 6.7 miles (mi) of beach stretching from Jones Inlet to roughly the western boundary of the City of Long Beach. Sand for dune and beach construction would be obtained from ocean bottom habitats and Jones Inlet Federal Navigation Channel. The project life is 50 years and includes initial construction and periodic maintenance every five years. Initial construction of the project would be accomplished at full federal cost of about $177,876,000.00 (U.S. Army Corps of Engineers 2014b [LRR Report]). Periodic maintenance would be apportioned at a rate of 65 percent (federal) to 35 percent (State and local).

The Corps' preferred alternative is not the environmentally preferred alternative from the Service's perspective. The current plan includes hard shoreline stabilization structures in an environmentally sensitive area, located in the eastern end of the island between Jones Inlet and Lido Beach West Town Park. The Service recommends that the Corps re-evaluate its approach for this area and consider the use of soft stabilization in lieu of the construction of groins A-D. Beach nourishment has been a practice that has been undertaken over many years to maintain the shoreline position at Point Lookout Town Park and protect the parking lot and other park related structures (U.S. Army Corps of Engineers 2014b). Other upland measures could also be explored to provide flood proofing and hazard mitigation via consultation with the Federal Emergency Management Agency (FEMA).

Project Design, Features, and Layout

Dune and Berm Construction, Beach Grass Planting and Sand Fence Installation

The proposed project includes 35,000 ft of dune construction and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including a taper into East Atlantic Beach.

The dune design profiles include a top elevation of +14 ft above National American Vertical Datum of 1988 (NAVD), a top width of 25 ft, and landward and seaward slopes of 1 vertical (V):5 horizontal (H) that will extend along the entire project area. Dunes will have a 1V:3H landward slope fronting the City of Long Beach boardwalk.

The berm design in Point Lookout would extend a minimum of 110 ft from the seaward toe of the proposed dune at an elevation of +9 ft NAVD. It would have a 1V:20H slope and intersect with existing nearshore bottom at around the 20 ft contour. At Nickerson Beach, the proposed project includes construction of a dune (no berm) along approximately 5,000 ft of shoreline, as well as beach grass planting, sand fence installation, dune walkover construction, and vehicle access construction. A "stepped" beach berm is proposed for Lido Beach and the City of Long Beach. It would extend 40 ft from the seaward toe of the proposed dune at an elevation of +9 ft NAVD, and include a 1V:10H slope to +7 ft NAVD, and a 130 ft berm at +7 ft NAVD, with a 1V:30H slope intersecting with the nearshore bottom at the 20 ft contour. Sand fence installation and beach grass planting is also planned for this area.

A total of 4,720,000 cubic yards (yd^3) of sand would be dredged from the ocean bottom habitats for the initial fill placement, including tolerance, overfill, and advanced nourishment. The proposed project also includes planting of 34 acres (ac) of dune grass and installation of 75,000 ft of sand fence.

<u>Groin Rehabilitation and Construction</u>

The proposed project includes the rehabilitation of 17 groins, including 15 groins in the City of Long Beach and two groins in Point Lookout. Groin rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward 200 to 330 ft of each of the groins. Each groin will have a crest width of approximately 13 ft and side slopes of 1V on 2H.

Four groins (named groins A-D) are targeted for immediate construction in Point Lookout, with two more groins (groins E and F) proposed for deferred construction based on the stability of the existing ebb shoal weldment area and uncertainty regarding the performance of the new groins. In an attempt to minimize the effects of these new groins on inlet dynamics and longshore transport processes, the Corps has designed the four new groins with tapered lengths and an interval spacing of 800 ft. Groin lengths would range from 380 ft to 800 ft. Each groin will have a crest width of approximately 13 ft and side slopes of 1V on 2H.

The Corps plans to monitor the project area according to the schedule of activities given in Table 1, below, in the vicinity of Point Lookout and Nickerson Beach for any potential downdrift erosional issues stemming from construction of groins A-D. If downdrift erosion is observed, construction of the two remaining deferred groins may be made along with additional beach nourishment.

Table 1. Corps' Proposed monitoring activities to track shoreline changes west of groin D. From U.S. Army Corps of Engineers (2014b).

Recommended Activity	Required Analysis	Frequency of Activity and Analysis	Expected Products	Criteria for Triggering Construction or Affecting Maintenance
Beach profile survey	Compare profiles to previous survey, compare berm width to required trigger (250’ berm width), indicate trends in berm width by comparing present width to prior three years.	Minimum annually in February-early March	Scaled profile plots comparing present profile to prior three surveys, scaled plan view plot with contours overlaid on prior position of +6’ NAVD contour and dune toe, table comparing berm widths and changes in berm width to prior three surveys.	Berm width less than 250’ will trigger construction; trends in berm width change will indicate potential trigger condition in the future. Erosion of the Jones Beach fillet will indicate an interruption in sand supply.
Aerial photography	Digitize photography; digitize shoreline position from approximately two miles east of Jones Inlet to Lido Beach	Annually in early spring	Digitized shoreline plotted in plan view atop mapping with comparison to previous three available shorelines.	With profile data, a shift in the weldment position will indicate how many deferred structures are (or will be) required.
Hydrographic surveys of the inlet and shoals	Produce a digital survey of the inlet and shoal features; also a contour plot of digital terrain model of the features to quantify volumes of sediment erosion or accretion.	Every three years or when a trigger point is identified or imminent (trend indicates a trigger within a year in the future)	Digital file of survey data, contour plot of digital terrain model of bottom features.	Changes in position, geometry, shoaling, or erosion of the channels, and/or shoals; identify processes causing changes, trends. Recommend changes to long-term project maintenance.
Directional wave and water level measurements	Quantify waves and water levels impacting the project.	Continuously from project start for 5 years.	Annual and long-term graphs of water level, wave height, period, and direction, wave rose, and summary of the top 20 significant storm events by water level and wave height (annually and for all project years).	Will provide a correlation between profile change and incident wave and water level conductions. Will help to verify that a trend or trigger is not a temporary result of storm or seasonal conditions.
Analysis report	Report to include all analyses described above.	Annually, to include each activity described above.	Digital and hard copy report, analyzed data sets in digital form.	Coastal engineering analysis of all task including construction trigger or trends toward triggering deferred construction.

Point Lookout Terminal Groin Rehabilitation and Extension

The proposed project includes rehabilitation of the existing terminal groin (Groin 58) at Point Lookout, including extending its length an additional 100 ft beyond its current length of 200 ft, and its width to between 107 and 170 ft; groin widths currently range from 50 to 107 ft (U.S. Army Corps of Engineers 1999).

Dune Walkovers, Vehicle Access, and Boardwalk Extensions

Dune walkovers, vehicle access points and boardwalk extensions are proposed for the City of Long Beach and the Town of Hempstead. A total of 57 timber dune walkovers, including 17 American with Disabilities Act (ADA) compliant timber walkovers, nine gravel surface vehicle and pedestrian walkovers, 29 non-ADA compliant walkways, two timber vehicular access ways, and eight extensions to existing walkovers, are currently proposed.

Offshore Sand Borrow Areas Locations and Dredged Material Volumes

The proposed project area includes nearshore ocean bottom habitats that have been identified for the purpose of sand mining (Figure 2). Sand, shell, sessile organisms, and benthic infauna would be dredged and transported to the beaches via a series of pipes and pumps. Once transported to the beach, the dredged material would be dewatered, redistributed by bulldozers and other heavy equipment to create the dune and beach, then further stabilized with sand fencing and beach grass plantings, depending on the placement site.

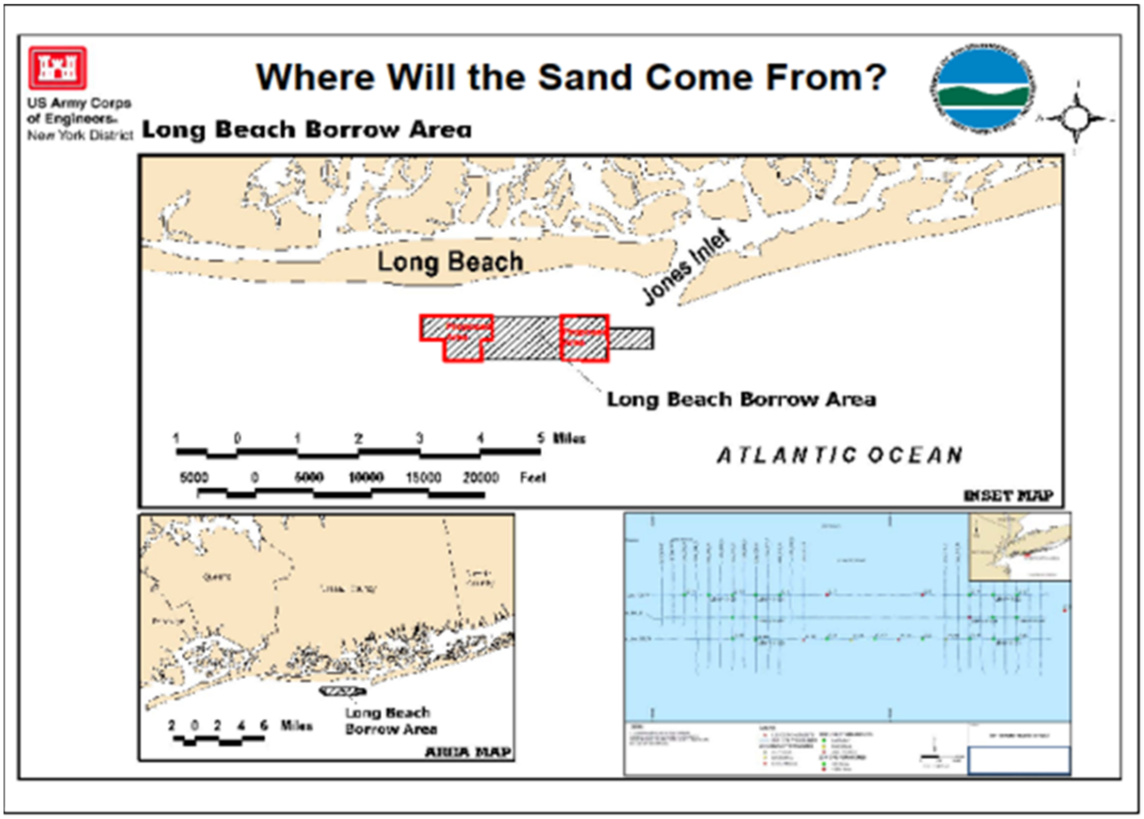

Figure 2. Map showing general location of sand source borrow area. From http://www.nan.usace.army.mil/Missions/CivilWorks/ProjectsinNewYork

The total initial project fill volume would be 4,720,000 yd^3 sand. Renourishment sand volume is estimated at 1,770,000 yd^3 every five years.

CORPS PROPOSED AVOIDANCE AND MINIMIZATION MEASURES FOR ENDANGERED SPECIES

The Corps has proposed to undertake the following avoidance and minimization measures for piping plovers and seabeach amaranth:

<u>Piping Plover</u>

(1) Conduct surveys during the spring/summer, and prior to construction activities to identify nesting plover in the project area and to document all known location of plovers. In addition, the Corps will document any other federal- or state-listed wildlife species observed in the project area during the survey and will initiate consultation with the appropriate state and federal agencies;

(2) Erect symbolic fencing and signs around all plover nests and brood rearing areas located in the construction area to deter human use of the area and to protect sites from incidental disturbance from construction activities;

(3) Limit construction activities near known plover nesting areas to the period between September 2 through April 14 to avoid the key shorebird nesting period;

(4) Avoid all delineated locations of the species during the breeding season and undertake all practicable measures to avoid incidental taking of the species;

(5) Reinitiate consultation with the Service to identify acceptable alternatives should any plover nest sites be identified with the direct construction footprint;

(6) Monitor the project area before, during, and after construction;

(7) Educate residents, landowners, beach visitors, and beach managers on the piping plover;

(8) Encourage local agencies to place time restrictions on beach use by vehicles to avoid key nesting and fledging periods;

(9) Conduct follow up surveys of plover habitat within the project area. Surveys will be conducted for three consecutive nesting seasons post construction and a summary report regarding habitat use and nesting will be provided annually to the Service;

(10) Beach fill would not be placed within 1,000 m of known populations of piping plover or other state or federally-listed shorebirds/seabirds during the breeding season, except in the area of the terminal groin at Point Lookout.

11) Implement a 200 m work zone around terminal groin 58, delineated by fencing that is impenetrable to plover chicks to minimize impacts plovers as a result of groin reconstruction activities.

Seabeach Amaranth

(1) Conduct surveys during July/August to determine the presence/absence of seabeach amaranth within the project area and to document all known locations of amaranth. In addition, the Corps will document any other federal- or state-listed plant species observed in the project area during the survey and will initiate consultation with appropriate state and federal agencies;

(2) Erect symbolic fence and signs around all seabeach amaranth plants located in the construction area to deter use of the area and to protect plants;

(3) Restrict construction activities in areas of known populations during the growing season (allow limited activities only from June to November);

(4) Avoid all delineated locations of the plant and will undertake all practicable measures to avoid incidental taking of the plant;

(5) Reinitiate consultation with the Service to identify acceptable alternatives should any seabeach amaranth plants be identified within the direct construction footprint;

(6) Educate residents, landowners, beach visitors, and beach managers on the seabeach amaranth; and

(7) Conduct follow up surveys of seabeach amaranth habitat within the project area. Surveys will be conducted for three consecutive nesting seasons post construction and a summary report regarding habitat use and nesting will be provided annually to the Service.

SEABEACH AMARANTH

STATUS OF THE SPECIES

Species/Critical Habitat Description

Seabeach amaranth is an annual plant native to the barrier island beaches of the Atlantic Coast, from Massachusetts to South Carolina. The original range of this species extended from Cape Cod, Massachusetts, to central South Carolina, a stretch of coast about 994 mi, a geographic range of low tidal amplitude. Tidal amplitude and the relative importance of tidal versus wave energy in shaping coastal morphology are thought to limit the geographic range of seabeach amaranth rather than availability of sandy beach substrates or sea water temperatures. The range of seabeach amaranth also includes islands with high wave energy, low tidal energy, frequent overwash, and frequent breaching by hurricanes with resulting formation of new inlets (Weakley and Bucher 1992).

Within its range, the species' primary habitat consists of early successional beaches created by overwash events at accreting ends of barrier islands, lower dunes and upper strands of non-eroding beaches. Seabeach amaranth is never found on beaches where the dune is scarped by undermining water at high storm tides (Weakley and Bucher 1992). Occasionally, small temporary populations are established in secondary habitats, such as blowouts in dunes, and in sand or shell dredged spoil or in beach nourishment material (Weakley and Bucher 1992).

Upon germination, the plant initially forms a small un-branched sprig. Soon after, it begins to branch profusely into a low-growing mat. Seabeach amaranth's fleshy stems are prostrate at the base, erect or somewhat reclining at the tips, and pink, red, or reddish in color. The leaves of seabeach amaranth are small, rounded, and fleshy, spinach-green in color, with a characteristic notch at the rounded tip. Leaves are approximately 0.5 to 0.98 inches in diameter and clustered toward the tip of the stem (Weakley and Bucher 1992). Plants often grow to 15 inches in diameter, consisting of 5 to 20 branches, but occasionally reach 35.4 inches in diameter, with 100 or more branches. Flowers and fruits are inconspicuous and are borne in clusters along the stems. Seeds are 0.1 inches in diameter, dark reddish-brown, and glossy, borne in low-density, fleshy, iridescent utricles (bladder-like seed capsules or fruits), 0.15 to 0.23 inches in length (Weakley and Bucher 1992). The seed does not completely fill the utricle, leaving an air-filled space (U.S. Fish and Wildlife Service 1996a).

Many utricles remain attached to the parent plant and are never dispersed, leading to *in situ* planting. This phenomenon has also been observed in sea rockets (*Cakile edentula*) and may be an adaptation to dynamic beach conditions. If conditions remain favorable at the site of the parent plant, then the seed source for retention of that site is guaranteed. When habitat conditions become unsuitable, other seeds have been dispersed to colonize new sites (Weakley and Bucher 1992).

Life History

Individual plants live only one season with only a single opportunity to produce seeds. The species overwinters entirely as seeds. Germination of seedlings begins in April and continues at least through July. In the northern part of the range, germination occurs slightly later, typically late June through early August. Reproductive maturity is determined by size rather than age and flowering begins as soon as plants have reached sufficient size. Even very small plants can flower under certain conditions. Flowering sometimes begins as early as June in the Carolinas, but more typically commences in July and continues until the death of the plant. Seed production begins in July or August and reaches a peak in most years in September. Seed production likewise continues until the plant dies. Senescence and death occur in late fall or early winter (U.S. Fish and Wildlife Service 1996a). While seabeach amaranth seems capable of essentially indeterminate growth (Weakley and Bucher 1992), predation and weather events, including rainfall, hurricanes, and temperature extremes, have significant effects on the length of the species' reproductive season. As a result of one or more of these influences, the flowering and fruiting period can be terminated as early as June or July (U.S. Fish and Wildlife Service 1993).

A dynamic, early successional "pioneer" species, seabeach amaranth is also termed as "fugitive" because its populations are constantly shifting to newly-disturbed areas. The plant is eliminated from existing habitats by competition and erosion and colonizes newly-formed habitats by dispersal and (probably) long-lived seed banks. A particularly strong negative association has been reported between seabeach amaranth and beach grasses, such as American beach grass (*Ammophila breviligulata*) (Weakley and Bucher 1992; U.S. Fish and Wildlife Service 1996a). Pauley *et al.* (1999) documented a negative correlation between seabeach amaranth and several dominant foredune species. A positive correlation has been observed between seabeach amaranth and sea rocket *(Cakile edentula*), an annual plant (Hancock 1995).

New habitats are created by island overwash and breaching in areas where natural processes are allowed to proceed. Therefore, seabeach amaranth requires extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner. Such conditions allow the plant to move around in the landscape, occupying suitable habitats as they are formed (U.S. Fish and Wildlife Service 1996a).

Seeds are dispersed by a variety of mechanisms involving transport via wind and water. Seeds retained in utricles are easily blown about, deposited in depressions, the lee behind plants, or in the surf. Naked seeds are also commonly encountered in the field and are also dispersed by wind, but to a much lesser degree than seeds retained in utricles. Naked seeds tend to remain in the lee of the parent plant or get moved to nearby depressions (Weakley and Bucher 1992). Observations from South Carolina indicate that seabeach amaranth seeds are also dispersed by birds through ingestion and eventually deposited with their droppings (Hamilton 2000).

Population Dynamics

Seabeach amaranth has been found to have a strongly clumped distribution (Hancock 1995), but their density is extremely variable within and between populations. A typical density is 100 plants per 0.6 mi of beach, though occasionally on accreting beaches, dense populations of 1,000 plants or more per 0.6 mi of beach can be found. Island-end sand spits generally have higher densities than oceanfront beaches (Weakley and Bucher 1992). On Long Island, however, dense assemblages and high abundances have been recorded on central barrier island locations, such as Cedar and Gilgo Beaches in the Town of Babylon (Young 2002).

Seabeach amaranth concentrations can be found in the wrackline (Mangels 1991; Weakley and Bucher 1992; Hancock 1995; MacAvoy 2000). Pauley *et al.* (1999) suggested that organic litter may be an advantageous microhabitat for seabeach amaranth when it contains higher levels of organic material and moisture than bare sand.

Range-wide Status and Distribution

On April 7, 1993, seabeach amaranth was added to the List of Endangered and Threatened Wildlife and Plants as a threatened species (U.S. Fish and Wildlife Service 1993). The listing was based on the elimination of seabeach amaranth from two-thirds of its historic range, and continuing threats to the 55 populations that remained at the time. No critical habitat, as defined under the ESA, has been designated for this species.

Threats/Reasons for Listing

Habitat Loss and Degradation

The primary threats to seabeach amaranth are the adverse alterations of habitat caused by beach erosion and shoreline stabilization. Although seabeach amaranth does not persist on eroding scarped beaches, erosion is not a threat to the continued existence of the species under natural conditions. Erosion in some areas is balanced with habitat formation elsewhere, such as accreting inlets and overwash areas, resulting in an equilibrium that allows the plant to survive by moving around the landscape. Seabeach amaranth has persisted through even relatively rapid episodes of sea level rise and barrier island retreat. An unstabilized barrier island, even a retreating one, contains localized accreting areas, especially in the vicinity of inlets (U.S. Fish and Wildlife Service 1996).

Human alteration of the barrier island ecosystem generally tips the equilibrium between habitat destruction and creation in favor of destructive erosional forces. Erosion is accelerated in many areas by human-induced factors, such as reduced sediment loads reaching coastal areas due to damming of rivers and beach stabilization structures (e.g., terminal groins and inlet jetties). Additionally, when the shoreline is "hardened" by artificial structures (e.g., seawalls and bulkheads), overwash and inlet formations are curbed. Erosion may also be increasing due to sea level rise and increased storm activity caused by global climate change (U.S. Fish and Wildlife Service 1993).

Although storms and erosion threaten seabeach amaranth, attempts to artificially stabilize beaches against these natural processes are generally more destructive to the species and to the beaches themselves in the long term (U.S. Fish and Wildlife Service 1993). Structural and non-structural beach stabilization techniques, such as beach nourishment, sand fences, and beach grass planting, are generally detrimental to seabeach amaranth, a pioneer, upper beach annual whose niche or “life strategy” is the colonization of unstable, un-vegetated beaches (U.S. Fish and Wildlife Service 1996a). Seabeach amaranth only very rarely occurs when sand fences and vegetative stabilization have taken place and, in these situations, is present only as rare, scattered individuals or short-lived populations (Weakley and Bucher 1992).

Beach nourishment can have temporary, small-scale positive, site-specific impacts on seabeach amaranth. Although more study is needed before the long-term impacts can be accurately assessed, seabeach amaranth has colonized several nourished beaches and has thrived in some sites through subsequent reapplications of fill material (U.S. Fish and Wildlife Service 1993). On the landscape level, beach nourishment is intended to stabilize the shoreline and curtail the natural geophysical processes of barrier islands, something that is detrimental to the range-wide persistence of the species. Beach nourishment projects may cause site-specific adverse effects by crushing or burying seeds or plants or by altering the beach profile or upper beach microhabitat in ways not conducive to colonization or survival. Deeply burying seeds during any season can have serious effects on populations (U.S. Fish and Wildlife Service 1996a), particularly to isolated populations, which are separated from seed sources. Adverse effects of beach nourishment may be compounded if accompanied by artificial dune construction and dune stabilization with sand-fencing and/or beach grass or followed by high levels of erosion and flooding of the upper beach, which create scarped conditions.

Seabeach amaranth is vulnerable to habitat fragmentation and isolation of small populations (U.S. Fish and Wildlife Service 1993). Fifty to seventy-five percent of coastlines within its range have been rendered "permanently" unsuitable. This makes it increasingly more difficult to recover the species because any given area will become unsuitable at some time due to natural forces. If a seed source is no longer available in the vicinity of these habitat patches, seabeach amaranth will be unable to re-establish itself when the area once again provides suitable habitat. In this way, the species can progressively be eliminated even from generally favorable stretches of habitat surrounded by “permanently” unfavorable areas. Fragmentation of habitat in the northern part of the species range apparently led to regional extirpation during the last century as no nearby seed sources were available to re-colonize nourished sites (Weakley and Bucher 1992).

As noted below, New York and New Jersey beaches have been especially affected by past and on-going habitat modification and beach stabilization. New Jersey has the highest degree of shoreline stabilization of any state, with 43 percent of its shoreline being hard-stabilized (Pilkey and Wright 1988). Much of New York is included in current or proposed long-term beach stabilization projects. Cumulatively, these projects contribute significantly to the overall stabilization of the New York-New Jersey shoreline, which increase the vulnerability of seabeach amaranth to declining habitat conditions and catastrophic events. As discussed below, these factors are particularly important given the recent seabeach amaranth population shift from south to north.

Recreation and Off-Road Vehicles

Intensive recreational and ORV use on beaches can threaten seabeach amaranth populations by crushing plants and impacting their habitats. Light pedestrian traffic, even during the growing season, usually has little effect on seabeach amaranth (U.S. Fish and Wildlife Service 1993), whereas, seabeach amaranth populations are sometimes eliminated or reduced by repeated trampling on narrow beaches or beaches that receive heavy recreational use.

Plants generally do not survive even a single pass by a truck tire (Weakley and Bucher 1992). Sites where ORVs are allowed to run over seabeach amaranth plants often show severe population declines (New York Natural Heritage Program [NYNHP] 2002) or decreased habitat suitability (U.S. Fish and Wildlife Service, internal field notes, 2008a). ORV use during the plant's dormant season has shown little evidence of significant detrimental effects, unless it results in massive physical erosion or degradation of the site, such as compacting or rutting of the upper beach. In some cases, winter ORV traffic may actually provide some benefits for the species by setting back succession of perennial grasses and shrubs with which seabeach amaranth cannot successfully compete. Extremely heavy ORV use, however, even in winter, may have some negative impacts, including pulverization of seeds (Weakley and Bucher 1992).

Mechanical beach raking, more common on northern beaches, may also have contributed to the previous extirpation of seabeach amaranth from that part of its range (U.S. Fish and Wildlife Service 1996a). In New York and New Jersey, plants were found along a nearly continuous length of beach, noticeably interrupted by stretches that are routinely raked.

Herbivory

Predation by webworms (caterpillars of small moths) is a major source of mortality and lowered fecundity in the Carolinas, often defoliating plants by early fall (U.S. Fish and Wildlife Service 1993). Defoliation at this season appears to result in premature senescence and mortality, reducing seed production, the most basic and critical parameter in the life cycle of an annual plant. Webworm predation may decrease seed production by more than 50 percent (Weakley and Bucher 1992). In New York, herbivory by saltmarsh caterpillars (*Estigmene acraea*) has been observed (U.S. Fish and Wildlife Service 1996a). Webworm herbivory of seabeach amaranth has not been documented in Delaware (DE) or Maryland (MD). Overall, webworm herbivory is probably a contributing, rather than a leading, factor in the decline of seabeach amaranth. In combination with extensive habitat alteration, severe herbivory could threaten the existence of the species (Weakley and Bucher 1992).

Utilization and Collection

Seabeach amaranth is generally not threatened by over-utilization or collection, as it does not have showy flowers and is not a component of the commercial trade in native plants. However, because the species is easily recognizable and accessible, it is vulnerable to taking on federal lands, vandalism, and the incidental trampling by curiosity-seekers. Seabeach amaranth is an attractive and colorful plant, with a prostrate growth habit that could lend itself to planting on beach front lots. The species effectiveness as a sand binder could make it even more attractive for this purpose. In addition, seabeach amaranth is being investigated by the U.S. Department of Agriculture and several universities and private institutes for its potential use in crop development and improvement. Over-collection and development of genetically-altered, domesticated varieties are potential, but currently unrealized, threats to the species (U.S. Fish and Wildlife Service 1993).

Range-wide Trends

Weakley and Bucher (1992) completed range-wide surveys of seabeach amaranth at known historical sites in 1987 and 1988. In 1987, 39 populations contained a total of 11,740 plants. In 1988, 45 populations contained a total of 43,651 plants, representing a 372 percent increase in one year. A survey in 1990 revealed 43 populations with a total of 11,075 plants in the Carolinas, plus an additional 13 populations with 357 plants that reappeared on Long Island, New York (Clements and Mangels 1990). Even with the addition of the NY populations, the 1990 survey documented a range-wide reduction of 74 percent from the 1988 census.

Range-wide population data from 1987 to 2013 are provided in Table 1. From 2000 to 2013, the range-wide population of seabeach amaranth has drastically declined from 249,261 to 1,308 plants. Long Island had a drastic decline from a high of 244,608 plants in 2000 to 729 plants in 2013. Drastic declines also occurred in Maryland-Virginia (high of 3,331 in 2001 to 8 in 2013), North Carolina (33,514 in 1995 to 153 in 2013), South Carolina (2,312 in 2000 to 0 in 2013), and New Jersey (10,908 in 2002 to 314 in 2013). The greatest number of plants in 1997, 1999-2004, 2006-2009, 2011, and 2013 has occurred in New York. North Carolina had the highest plant count all the other years, with the exception of New Jersey in 2012.

Historically, seabeach amaranth occurred in nine states from Massachusetts to South Carolina. The populations, which have been extirpated, are believed to have succumbed as a result of hard shoreline stabilization structures, erosion, tidal inundation, and possibly, herbivory by webworms (U.S. Fish and Wildlife Service 1994). The continued existence of the plant is threatened by these activities (Elias-Gerken 1994, Van Schoik and Antenen 1993), as well as the adverse alteration of essential habitat primarily as a result of "soft" shoreline stabilization (beach nourishment, artificial dune creation, and beach grass plantings), but also from beach grooming and other causes (Murdock 1993).

Populations of seabeach amaranth at any given site are extremely variable (Weakley and Bucher 1992) and can fluctuate by several orders of magnitude from year to year. For example, seabeach amaranth declined from 55,832 plants in 2003 to 2,639 plants in 2006 at the Westhampton Island West survey site (NYNHP 2006). The primary reasons for the natural variability of seabeach amaranth are the dynamic nature of its habitat and the significant effects of stochastic factors, such as weather and storms, on mortality and reproductive rates. Although wide fluctuations in species populations tend to increase the risk of extinction, variable population sizes are a natural condition for seabeach amaranth; the species is well-adapted to its ecological niche (U.S. Fish and Wildlife Service 1996a).

Table 2. Seabeach Amaranth Range-Wide Plant Counts 1987-2013.

Year	DE	NY	MD-VA	NC	NJ	SC	RI-CT-MA	Total
1987	0	0	0	10278	0	1341	0	11619
1988	0	0	0	20261	0	1800	0	22061
1989	0	0	0	0	0	0	0	0
1990	0	331	0	4459	0	188	0	4978
1991	0	2251	0	1170	0	0	0	3421
1992	0	422	0	32160	0	15	0	32597
1993	0	195	0	22214	0	0	0	22409
1994	0	182	0	13964	0	560	0	14706
1995	0	599	0	33514	0	6	0	34119
1996	0	2263	0	8455	0	0	0	10718
1997	0	11918	0	1445	0	2	0	13365
1998	0	10699	2	11755	0	141	0	22597
1999	0	31196	1	596	0	196	0	31989
2000	37	244608	1160	105	1039	2312	0	249261
2001	71	205233	3331	5088	5813	231	0	219767
2002	417	193412	2794	4387	10908	0	0	211918
2003	12	114535	503	11230	5087	1381	0	132748
2004	9	30942	535	11214	6817	2110	0	51627
2005	6	16813	627	19978	5795	671	0	43890
2006	39	32553	1551	3190	6522	721	0	44576
2007	19	3914	2179	872	2191	60	0	9235
2008	11	4416	1048	1575	1141	51	0	8242

2009	44	5402	1260	798	3226	26	0	10756
2010	29	534	203	2299	936	0	0	4001
2011	33	2662	240	373	2641	0	0	5949
2012	302	1213	251	152	1238	0	0	3156
2013	104	729	8	153	314	0	0	1308

New Threats

New threats including mammalian and avian herbivores, and disease to seabeach amaranth have been documented since the species was listed in 1993. These factors are lesser threats than habitat modification, but may increase the risk of extinction by compounding the effects of other, more severe threats. Several additional herbivores of seabeach amaranth have been observed including white-tailed deer (*Odocoileus virginianus*), eastern cottontail rabbits (*Sylvilagus floridanus*), and migratory songbirds (Van Schoik and Antenen 1993). The first known disease of seabeach amaranth was documented in South Carolina in 2000. During the 2000 growing season, an oomycete (*Albugo* spp.) was observed on seabeach amaranth in several South Carolina sites (Strand and Hamilton 2000). Effects on infected individuals were significant, resulting in death of the plants two to four weeks after lesions were first observed. Anecdotal observations suggest that isolated plants tended to avoid infection (Strand and Hamilton 2000).

Seabeach Amaranth Populations and Habitats Likely to be Affected by the Proposed Action

Beach stabilization projects generally cause the loss and degradation of suitable seabeach amaranth habitats. These types of projects are undertaken by both federal and non-federal entities and include, but are not limited to, inlet maintenance dredging with beach disposal, dune construction and stabilization with beach grass plantings, and sand fence installation.

There is a long history of beach stabilization activities by the Corps on Long Island. Almost exclusively, these are undertaken for the purpose of protecting development and infrastructure on the barrier islands or the mainland. From 1986 to the present, the Corps has consulted with the Service under the ESA for beach nourishment or federal navigation projects on Long Island, which adversely affected both the seabeach amaranth and its habitat, for the following projects: Shinnecock Inlet Federal Navigation Channel (consultation December 1986), Westhampton Interim Storm Damage Protection Project (consultation December 1994), Breach Contingency Plan (consultation July 1995), West of Shinnecock Inlet Interim Storm Damage Protection

Project (consultation March 2001), East Rockaway Inlet Navigation Project, East Rockaway Inlet to Rockaway Inlet Beach Protection Project, Jones Inlet Navigation Project, and the Fire Island Inlet to Moriches Inlet Stabilization Project (consultation May 2014).

Ultimately, these projects accelerate the formation of mature dunes and preclude natural processes that would otherwise form the sparsely vegetated, low-lying, early-successional barrier beach habitats important to seabeach amaranth. Under natural conditions, barrier beaches continually erode and accrete. Storms and high tides create overwash fans and flats behind and between dunes. Periodic breaches along barrier islands allow for the formation of new inlet areas, while accretion over time fills in inlets. Seabeach amaranth evolved in these highly dynamic ecosystems and have adapted to relocating growing sites in response to natural coastal processes. As dune or back beach sites become established in accreting areas and vegetated through natural succession, these sites decline in habitat suitability for this species.

ENVIRONMENTAL BASELINE

Description of the Action Area

The environmental baseline includes the past and present impacts of all federal, State, or private activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early consultation, and the impact of State or private actions that are occurring in the action area. As defined in 50 CFR §402.02, “action” means all activities or programs of any kind authorized, funded, or carried out, in whole, or in part, by federal agencies in the United States or upon the high seas. The “action area” is defined as all areas to be affected directly, or indirectly, by the federal action, and not merely the immediate areas involved in the action, which have resulted in habitat fragmentation, loss, and functional homogenization, and impacts to the species and population as a whole. The current amaranth distribution on Long Beach Island is reflective of all of these impacts.

The Action Area corresponds to the Corps’ plan sheets numbered 8-14 (U.S. Army Corp of Engineers 2014b). It extends from terminal groin 58 in Point Lookout to the western end of the Lido Beach West Town Park for a distance of 3 mi, and includes the beach area between mean high water and the existing dunes.

Status of the Species in the Action Area

Both the western (Atlantic Beach) and eastern (Point Lookout to Lido Beach West Town Park) ends of Long Beach Island support populations of seabeach amaranth. Annual surveys for seabeach amaranth are conducted annually by the Town of Hempstead's Department of Conservation and Waterways. There are no records of seabeach amaranth in the Action Area from 1990-1997. From 1998 to 2013, abundance ranged from 3 to 62 plants. The average population over this time frame is 19 plants.

Factors Affecting the Species in the Action Area

Threats include beach stabilization efforts, intensive recreational use, and ORV use by administrative agencies. Past and on-going efforts within the Action Area to stabilize the ocean beaches include dune construction, beach nourishment, groin construction, beach scraping, installation of sand fences, and planting of American beach grass. These activities inhibit the barrier island processes that allow for the creation of transitory, storm-created habitats that are important to the recovery of seabeach amaranth. ORVs are used by local governments for beach grooming, law enforcement patrols, garbage collection, and public safety. Since seabeach amaranth prefers habitats similar to those used by piping plovers (i.e., early successional beach habitat), some protection for seabeach amaranth from ORV use is attained through restriction of vehicle use during the piping plover breeding season. This protection typically only extends to the end of the piping plover season either September 1 or the last date of fledging. Adverse impacts are possible beyond this period to seabeach amaranth plants if they are not surveyed and protected. The exact extent of the impacts due to vehicle use in the action area is unknown.

EFFECTS OF THE ACTION

In evaluating the effects of the federal action under consideration in this consultation, 50 CFR §402.2 and 402.13(g)(3) require the Service to evaluate both the "...direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Factors that were considered in this effects analysis were: proximity of the proposed project to the listed species and their habitats, the geographic area where the disturbance will occur, the timing of the proposed actions to the sensitive periods of the species' life cycle, the effects of the action on the species' life cycle, population size, variability or distribution, the duration of the action, and the frequency of disturbance (U.S. Fish and Wildlife Service and National Ocean and Atmospheric Administration 1998).

Direct Effects

The Corps will restrict construction activities in areas of known populations during the growing season (allow limited activities only, from June through November) (U.S. Army Corps of Engineers 2014a). The Corps did not provide a description of what types of activities would be considered "limited activities." The Service anticipates that the proposed project would result in direct adverse effects to seabeach amaranth due to construction activities that would take place during the growing season. As discussed in more detail below, adverse effects include burial, crushing, trampling of plants and their seeds, and interspecific plant competition.

When beach nourishment is conducted during the growing season, plants that have germinated will be crushed or pulled from their substrate by bulldozers or other heavy equipment. Whether construction activities occur during or after the growing season, any existing seed banks will be mechanically buried, crushed, redistributed, or re-deposited along the shore. Artificial beach construction that results in the placement of sand directly on seabeach amaranth plants during, or prior to the end of, the growing season will result in mortality of those plants (Weakley and Bucher 1992) and the loss of seed production.

Beach nourishment that is conducted in the winter would likely have minimal impacts to the adult plants as they will already have set seed and will not survive the winter in the wild. The severity of the impacts to the seeds depends on the depth of burial, erosional climate, the nature of seabeach amaranth's seed bank, and the importance of long distance seed dispersal to outlying population maintenance. Deeply burying seeds with sand may also affect their ability to germinate in the next growing season, having potential deleterious effects on local populations. In addition, any seeds dispersed to the project area from nearby populations prior to beach nourishment would likely be buried after beach nourishment commenced. Overall, the Service expects up to 100 percent burial of the amaranth seed bank wherever beach nourishment, dune construction, and groin construction are proposed in the Action Area.

Indirect Effects

The Service has identified the following indirect adverse effects on seabeach amaranth resulting from the proposed project. Indirect effects are those that occur as a result of the proposed project, but can occur at a later time, and distance.

Loss of Habitat Formation

The proposed project will perpetuate shoreline stabilization in the last remaining unstabilized portion of Long Beach Island and impede the natural processes of habitat creation and maintenance. As has been evidenced in other areas on Long Island, high quality seabeach amaranth habitat is characterized by unstabilized, rather than stabilized, beaches. In developed areas, this would occur if infrastructure destroyed by natural forces was not rebuilt, breaches and overwash habitats were permitted to occur, and new inlets were allowed to form and/or close naturally.

By interfering with natural processes and geomorphological changes that they foster, the proposed project would likely negatively influence the distribution and abundance of seabeach amaranth on Long Beach Island. The unstabilized beaches in the action area could be adversely affected by the project due to the uncertainties surrounding the downdrift effects of the proposed groin A-D construction.

Creation of Suboptimal Beach and Dune Habitats

Through the construction of groins and artificial berms and dune, the proposed project would create and perpetuate suboptimal beach and dune habitats for seabeach amaranth. This may lead to lower plant abundances due to reduction in suitable habitat conditions, competition with American beach grass, increased pedestrian recreational activities, and ORV use.

The construction and maintenance of an artificial continuous dune line, as opposed to a natural dune line characterized by dune swales, blowout, and overwashes, will indirectly affect this species by interrupting natural processes that maintain suitable habitat. High-quality seabeach amaranth habitat is generally characterized by sparse vegetation and early successional beaches that do not contain man-made and stabilized dunes (Weakley and Bucher 1992). Unstabilized dune fields provide more potential seabeach amaranth habitat as they tend to have lower profile, gently sloping dunes than artificial or stabilized dunes. Interdunal swales and gently-sloping foredune habitats become important when the berm has been narrowed by erosion, as happens following severe coastal storms or toward the end of a recurring sand renourishment cycle.

The planting of beach grass and installation of sand fence on 3 mi of beach in the Action Area will artificially accelerate growth and coverage of beach grass on the dunes and upper beaches. This will limit the amount of available suitable habitat for this species and will create suboptimal habitat conditions. Naturally occurring or managed sparse vegetation plots pose limited adverse effects to seabeach amaranth, but artificially planted areas that rapidly grow into dense areas of perennial vegetation precludes use by this species. Weakley and Bucher (1992) report that stabilization of seabeach amaranth habitat allows for succession to a densely-vegetated perennial community, rendering the beaches only marginally suitable for seabeach amaranth. Because seabeach amaranth is susceptible to habitat fragmentation (Weakley and Bucher 1992; Murdock 1993), destruction of a single and sizeable population could result in local extirpation. Seabeach amaranth is rarely encountered in areas that have been snow fenced (Weakley and Bucher 1992), but the relationship between sand fencing and seabeach amaranth populations has not been fully investigated on Long Island.

Further, vertical sand accretion and burial caused by sand fences are detrimental to seabeach amaranth and their use is contradictory to seabeach amaranth recovery.

Recreation and Administrative Activities

The proposed project would most likely increase recreational activities on the ocean beaches (U.S. Army Corps of Engineers 2014a). Within Sea Bright and Monmouth Beach, NJ, evidence of adverse impacts to seabeach amaranth was obvious in areas of intensive recreational use, such as at beach access paths or at a site near a volleyball net. The primary effect of increased recreation activities is the trampling and crushing of plants. Service observations suggest that high levels of recreational activity are precluding colonization in these areas. Colonization is unlikely to occur on intensively used recreational beaches, but would be more likely in areas where symbolic fencing was erected for the protection of piping plovers and other beach nesting birds (U.S. Fish and Wildlife Service 2002).

Duration of Effects

The proposed project would result in impacts to the species for at least fifty years, which is the anticipated life of the project (U.S. Army Corps of Engineers 2014a; BA). Unless the proposed groins are deconstructed at that time, effects of the project would likely persist past the project life.

Effects of the Corps' Avoidance and Minimization Measures

The following avoidance and minimization measures were included in the Corps' BA for this project (U.S. Army Corps of Engineers 2014a):

(1) Conduct surveys during July/August to determine the presence/absence of seabeach amaranth within the project area and to document all known locations of amaranth. In addition, the Corps will document any other federal or state-listed plant species observed

in the project area during the survey and will initiate consultation with appropriate state and federal agencies;

(2) Erect symbolic fence and signs around all seabeach amaranth plants located in the construction area to deter use of the area and to protect plants;

(3) Restrict construction activities in areas of known population during the growing season (allow limited activities only from June to November);

(4) Avoid all delineated locations of the plant and undertake all practicable measures to avoid incidental taking of the plant;

(5) Reinitiate consultation with the Service to identify acceptable alternatives should any seabeach amaranth plants be identified within the direct construction footprint;

(6) Educate residents, landowners, beach visitors, and beach managers on the seabeach amaranth; and

(7) Conduct follow up surveys of seabeach amaranth habitat within the project area. Surveys will be conducted for three consecutive nesting seasons post construction and a summary report regarding habitat use and nesting will be provided annually to the Service.

The Corps' proposed measure numbers 1 and 2 should be clarified in the context of existing seasonal monitoring and management efforts undertaken by the Town of Hempstead. Without any information on the definition of limited activities we are unable to fully assess Measures 3 and 4. Measure 5 deals with a reinitiation of formal consultation due to continuing adverse effects of the project. Measure 6 is a positive action proposed by the Corps to promote recovery of the species. Measure 7 involves post construction surveys, but it is unclear how this information will be applied.

CUMULATIVE EFFECTS

Local/State actions that are reasonably certain to occur in the project area that could potentially affect seabeach amaranth include beach cleaning, installation of sand fencing, and use of ORVs.

The installation of sand fences or the planting of beach grass are common practices in attempting to stabilize nourished beaches and have occurred on other sites on Long Island without federal (Service, Corps) or state (New York State Department of Environmental Conservation; NYSDEC) coordination/authorization. Beach grooming would also be expected to continue and result in adverse effects to the species through direct crushing of plants or removal via rakes.

Vegetation planting and sand fences, in association with beach nourishment, will artificially accelerate growth of dense vegetation that precludes use of habitat by seabeach amaranth and degrades the habitat for this species. This effect will limit the amount of available suitable habitat for these species and will create suboptimal habitat conditions. Artificially planted areas that rapidly grow into dense areas of perennial vegetation preclude use by this species. Weakley and Bucher (1992) report that stabilization of seabeach amaranth habitat allows for succession to a densely-vegetated perennial community, rendering the beaches only marginally suitable for seabeach amaranth, which is rarely encountered in areas that have been snow fenced.

CONCLUSION

50 CFR §402.14 requires that biological opinions include the Service's opinion on whether the proposed action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Jeopardize the continued existence of a species means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a recovery unit by reducing the reproduction, numbers, or distribution of that species in the wild.

The proposed project is likely to adversely affect seabeach amaranth. Effects will depend on the degree of connection between populations within the Action Area, the importance of seed import and export to population maintenance, the success of proposed conservation measures in minimizing adverse effects, and the net effect of the proposed project on populations within the project area.

After reviewing the current status of seabeach amaranth, the environmental baseline for the Action Area, the direct, indirect, and cumulative effects of the proposed project, and the proposed project conservation measures, it is the Service's biological opinion that, while authorization of the proposed project may result in the destruction of plants and seeds, the alteration of existing habitat, and preclusion of new habitat formation, it is not likely to jeopardize the continued existence of seabeach amaranth range-wide.

We have made this conclusion based on the following assumptions:

1) the Corps will not undertake major construction activities from June to November which spans a major portion of the germination and growing period for seabeach amaranth;

2) the Corps does not expect any changes to the habitat downdrift of groin D; and

3) Implementation of all conservation measures dealing with the protection and conservation of seabeach amaranth during initial and subsequent renourishment cycles or other maintenance activities over the life of the project will be implemented.

Sections 7(b)(4) and 7(o)(2) of the ESA do not apply to the incidental take of federally listed plant species, and, therefore, no Incidental Take Statement, and subsequently, no reasonable and prudent measures, nor terms and conditions for seabeach amaranth, will be provided in this Opinion.

PIPING PLOVER

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/Critical Habitat Description

The piping plover was listed pursuant to the ESA on January 10, 1986. Protection of the species under the ESA reflects the species precarious status range-wide. Three separate breeding populations, each with its own recovery plan and recovery criteria, were affirmed in the 2009 5-Year Review (U.S. Fish and Wildlife Service 2009a). Piping plovers that breed on the Atlantic Coast of the United States (U.S.) and Canada are classified as threatened under the ESA. Piping plovers that breed in the Great Lakes watershed are listed as endangered, while the population breeding on Northern Great Plains of the U.S. and Canada is listed as threatened (U.S. Fish and Wildlife Service 1985, 2009a). All piping plovers are classified as threatened on their shared migration and wintering range, which extends along the U.S. Atlantic and Gulf Coasts from North Carolina to Texas and into Mexico, the Bahamas, and West Indies (Elliott-Smith and Haig 2004, Elliott-Smith et al. 2009).

The Atlantic Coast piping plover breeds on sandy, coastal beaches from Newfoundland to North Carolina. No critical habitat, as defined under section 3 of the ESA, has been designated or proposed in the Atlantic Coast breeding area. However, the needs of all three breeding populations were considered in the 2001 Critical Habitat designation for wintering piping plovers (U.S. Fish and Wildlife Service 2001) and in subsequent re-designations (U.S. Fish and Wildlife Service 2008g, 2009c).

Physical Description: Piping plovers are small, sand-colored shorebirds, approximately seven inches long with a wingspread of about 15 inches (Palmer 1967). Named for their plaintive bell-like whistle, piping plovers are often heard before they are seen.

Breeding Chronology: Piping plovers begin returning to their 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 by early April (Cairns 1982). Piping plovers are monogamous during the breeding season, but usually shift mates between years (Wilcox 1959; Haig and Oring 1988; MacIvor 1990), and less frequently, between nesting attempts in a given year (Haig and Oring 1988; MacIvor 1990; Strauss 1990). Plovers are known to breed at one year of age (MacIvor 1990; Haig 1992), but the rate at which this occurs is unknown. Egg-laying and incubation can start as early as mid-April (U.S. Fish and Wildlife Service 1996).

Nest description: Nests are shallow-scraped depressions in substrates ranging from fine-grained sand to mixtures of sand and pebbles, shells, or cobble (Bent 1929; Cairns 1982; Burger 1987; Patterson 1988; Flemming et al. 1990; MacIvor 1990; Strauss 1990). Nests may be very difficult to detect, especially during the six- to seven-day egg-laying phase when the birds generally do not incubate (Goldin 1994). Eggs may be present on the beach from mid-April through late July and clutch size for an initial nest attempt is usually four eggs, with one egg laid every other day. Eggs are pyriforme in shape and variable buff to greenish brown in color, marked with black or brown spots. Full-time incubation usually begins with the completion of the clutch and is shared equally by both sexes for a period lasting from 27 to 28 days (Wilcox 1959; Cairns 1977; MacIvor 1990). Eggs in a clutch usually hatch within four to eight hours of each other, but the hatching period may extend to 48 hours.

<u>Reproduction</u>: Piping plovers generally fledge only a single brood (one or more chicks from a nest) per season, but may re-nest several times if previous nests are lost. Chicks are precocial and are capable of foraging for themselves within several hours of hatching (Wilcox 1959; Cairns 1982) and may move hundreds of feet from the nest site during their first week of life (U.S. Fish and Wildlife Service 1996). Chicks may increase their foraging range up to 3,280 ft (Loegering 1992) or more based on observations in the Fire Island National Seashore in 2008 (Raphael, pers. comm., 2008), and will remain with one or both parents until they fledge (are able to fly) at 25 to 35 days of age. Depending on the 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).

<u>Natural protection</u>: Cryptic coloration is a primary defense mechanism for this species; nests, adults, and chicks all blend in with their beach surroundings. Chicks sometimes respond to ORVs and/or pedestrians by crouching and remaining motionless (Cairns 1977). Adult piping plovers respond to avian and mammalian predators by displaying a variety of distraction behaviors including squatting, false brooding, running, and injury feigning. Distraction displays may occur at any time during the breeding season, but are most frequent and intense around the time of hatching (Cairns 1977).

<u>Foraging/food</u>: Piping plovers feed on invertebrates, such as marine worms, fly larvae, beetles, crustaceans, and mollusks (Bent 1929; Cairns 1977; Nicholls 1989). Important feeding areas may include intertidal portions of ocean beaches, overwash areas, mudflats, sand flats, wrack lines[1], sparse vegetation, and shorelines of coastal ponds, lagoons, or salt marshes (Gibbs 1986; Coutu et al. 1990; Hoopes et al. 1992; Loegering 1992; Goldin 1993; Elias-Gerken 1994; Cohen 2005; Houghton 2005). The relative importance of various feeding habitats may vary by site (Gibbs 1986; Coutu et al. 1990; McConnaughey et al. 1990; Loegering 1992; Goldin 1993; Hoopes 1993; Elias-Gerken 1994) 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 1990).

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

Most time-budget studies reveal that chicks spend a very high proportion of their time feeding. Cairns (1977) found that chicks typically tripled their weight during the first two weeks after hatching; those that failed to achieve at least 60 percent of this weight-gain by day 12 were unlikely to survive. Courtship, nesting, brood-rearing, and feeding territories are generally contiguous to nesting territories (Cairns 1977), although instances when brood-rearing areas are widely separated from nesting territories are common, thus increasing the geographic boundaries of their breeding area. Feeding activities of both adults and chicks may occur during all hours of the day and night (Burger 1994) and at all stages during the tidal cycle (Goldin 1993; Hoopes 1993). Cohen et al. (2009) observed chick foraging rates were highest in bayside intertidal flats and in ocean- and bay-side fresh wrack; chicks also used the bayside more than expected based on percentage of available habitat, and survived better in the bayside habitats.

Migration: Both spring and fall migration routes are believed to occur primarily within a narrow zone along the Atlantic Coast (U.S. Fish and Wildlife Service 1996). Relatively little is known about migration behavior or habitat use within the Atlantic Coast breeding range (U.S. Fish and Wildlife Service 1996). However, the pattern of both spring and fall counts at migration sites along the southeastern Atlantic Coast demonstrates that many piping plovers make intermediate stopovers lasting from a few days up to one month during their migrations (Noel et al. 2006; Stucker and Cuthbert 2006; C. Davis, New Jersey Division of Fish and Wildlife, pers. comm. 2010).

Breeding Habitat: Piping plover nests are situated above the high tide line on coastal beaches, sandflats at the ends of sandspits and barrier islands, gently sloping foredunes, blowout[2] areas behind primary dunes, and washover[3] areas (or overwashes) cut into or between dunes. They may also nest on areas where suitable dredged material has been deposited at a low slope and elevation, but many factors affect their nesting density and success in these areas. Nests are usually found in areas with little or no vegetation although, on occasion, piping plovers will nest under stands of American beach grass (*Ammophila breviligulata*) or other vegetation (Patterson 1988; Flemming et al. 1992; MacIvor 1990).

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[2] Blowouts are distinctive "bowl-like" areas within the interdune area caused by wind erosion behind the primary dune ridge; the ocean view is often obstructed.

[3] Washover areas are created by the flow of water through the primary dune line with deposition of sand on the barrier flats, marsh, or into the lagoon, depending on the storm magnitude and the width of the beach (Leatherman 1979). Nests may be situated on portions of these storm-created areas that are relatively dry during the nesting season, while plovers may feed on any portions that stay moist.

New England recovery unit

At Cape Cod National Seashore in Massachusetts, Jones (1997) found that, although almost two-thirds of piping plover nests occurred on beaches without chick access to bayside foraging, significantly more nests were on beaches accessible to bayside feeding habitat than would have been expected based on availability of such habitat. Two logistic regression models indicated that sparse vegetation and distance from pedestrian access points were important indicators of beach suitability, while one of the models also identified bay access as characteristic of nest habitat selection. Beach slope at nests averaged 5.6 percent, less than the mean slope at random points (8.3 percent). Nest hatching success was significantly greater on beaches without bayside access, while fledging success did not differ significantly. Jones (1997) identified presence of wrack that supports abundant invertebrate fauna as a likely explanation for higher breeding success of piping plovers on ocean beaches at Cape Cod Seashore compared with piping plover study sites further south.

Out of 80 piping plover nests observed by Strauss (1990) at Sandy Neck in Barnstable, Massachusetts, no nests were located seaward of “steep foredunes,” where this habitat constituted 83 percent of the beach front. Much of the beach in Strauss's study that was not used by piping plovers had been artificially plugged with discarded Christmas trees and/or sand fences. Piping plover distribution and foraging rates during the pre-nesting period (during establishment of territories and courtship) on South Monomoy Island, Massachusetts, indicated that sound and tidal-pond intertidal zones were the most important feeding areas in the period before egg-laying (Fraser et al. 2005). Goldin and Regosin (1998) found significantly higher chick survival and overall productivity among chicks with access to salt pond “mudflats” than those limited to oceanside beaches at Goosewing Beach, Rhode Island. Goldin and Regosin (1998) also reported that broods on the pond shore spent significantly less time reacting to human disturbance (1.6 percent) than those limited to the ocean beach (17 percent).

New York-New Jersey recovery unit

A 2-year study of nest site selection on 55.8 mi of beach on Jones Beach Island, Fire Island, and Westhampton Island, New York, found that all one-kilometer beach segments with ephemeral pools or bay tidal flats were used for nesting and brood rearing, whereas less than five percent of beach segments without these habitats were used (Elias et al. 2000). When the amount of time that plover broods used each habitat was compared with its availability, broods preferred ephemeral pools on segments where pools were present. On beach segments with bay tidal flats, broods preferred bay tidal flats and wrack to other habitats. On segments with neither ephemeral pools nor bay tidal flats, wrack was the most preferred habitat, and open vegetation was the second most preferred. Indices of arthropod abundance were highest on ephemeral pools and bay tidal flats. Chick peck rates (defined as pecks/min) were highest on ephemeral pools, bay tidal flats, and the ocean intertidal zone.

Cohen et al. (2008) reported that mean vegetative cover around piping plover nests on Westhampton Island, New York, following a Corps' beach nourishment project was 7.5 percent, and all plovers nested in less than 47 percent vegetation cover. Although almost 60 percent of nests were on bare ground, nests occurred in sparse vegetation more often than expected based on availability of this habitat type. Plovers also exhibited some preference for nest sites with coarse substrate compared to pure sand. At the same study area, piping plover chicks foraged more than expected and exhibited high peck rates in wrack, where arthropod abundance indices were also high (Cohen et al. 2009). Distribution of nests was heavily concentrated on the bayside of the barrier island in proximity to extensive overwash and inlet-created intertidal flats, but bayside nests decreased sharply starting in 2001 and reached zero nests by 2004 as the study area was redeveloped and the bayside revegetated. In most years, density of nesting pairs adjacent to bayside overwash at West Hampton Dunes was 1.5 to 2 times that at an adjacent ocean beach reference site at Westhampton Beach, where beach nourishment in the existing groin field increased nesting habitat, but not foraging habitat (Cohen et al. 2009). Cohen et al. (2009) concluded that local population growth can be rapid where storms create both nesting and foraging habitat in close proximity. However, an increase in local nesting habitat via artificial beach nourishment is not necessarily followed by an increase in the local population if nearby foraging habitat is limiting (Cohen et al. 2009). Cohen et al. (2009) also noted the similarity between their results and observations by Wilcox (1959) of rapid colonization of habitats created on Westhampton barrier beaches by storms in the 1930s and their subsequent decline following revegetation and redevelopment.

Southern recovery unit

Dramatic increases in plover productivity and breeding population on the north end of Assateague Island in Maryland following the overwash events in 1991 and 1992 (Schupp et al. 2013) corroborated earlier findings by Loegering and Fraser (1995) of significantly higher survival rates of piping plover chicks using sparsely vegetated access routes to reach foraging habitats on the island interior and bay beaches compared with those that foraged solely on the ocean beach. Piping plover productivity, which had averaged 0.77 chicks per pair in a five-year period before the overwash, averaged 1.67 chicks per pair from 1992 to 1996 following the overwash events. The nesting population also grew rapidly, doubling by 1995 and tripling by 1996, when 61 pairs nested there. Over the twelve years from 1996 to 2007, the breeding population held steady at approximately 60 pairs (range = 56-66), but increasing vegetation caused, in part, by construction in 1998 of a low foredune that impeded overwash, forced nesting locations further seaward or into atypical vegetated habitats and blocked chick access to bayside foraging habitats (National Park Service 2012, Schupp et al. 2013). The breeding population declined to 49 pairs in 2008, and productivity matched the previous recorded low of 0.41 chicks per pair. Overwash restoration efforts have included the cutting of fourteen notches (i.e., cross-shore depressions with a peak elevation of 2.16 m) in the constructed foredune in 2008 and 2009 (Schupp et al. 2013). Abundance of piping plover declined through 2011, increased modestly in 2012 and 2013, but declined in 2014.

In Virginia, Boettcher et al. (2007) reported that the five islands where piping plover breeding was observed every year from 1986-2005, "… encompass large segments of broad beaches with low discontinuous dunes and expansive sand-shell flats … providing unimpeded access from beach nest sites to the moist-soil ecotones of backside marshes." Cross and Terwilliger (2000) found that chick habitat use, foraging rates, and invertebrate prey abundance on four Virginia barrier islands was highest at moist inner-beach marsh edge and barrier flat habitats.

At Cape Lookout National Seashore, North Carolina, 13-46 pairs of plovers have nested on North and South Core Banks each year since 1992. While these unstabilized barrier islands total 44 mi. in length, nesting distribution is patchy, with all nests clustered on the dynamic ends of the barrier islands, recently closed and sparsely vegetated "old inlets," expansive barrier mudflats, or new ocean-to-bay overwashes (National Park Service 2008b). During a 1990 study, 96 percent of brood observations at Cape Lookout Seashore were on bay tidal flats, even though broods had access to both bay and ocean beach habitats (McConnaughey et al. 1990).

Life History

Piping plovers live an average of five years, although studies have documented birds as old as 11 (Wilcox 1959) and 15 years. Piping plover breeding activity begins in mid-March when birds begin returning to their nesting areas (Coutu et al. 1990; Cross 1990; Goldin et al. 1990; MacIvor 1990; Hake 1993).

Population Dynamics

<u>Designation of Recovery Units</u>: The Service's "Piping Plover (*Charadrius melodus*) Atlantic Coast Population Revised Recovery Plan," (Recovery Plan; U.S. Fish and Wildlife Service 1996) established four recovery units for the Atlantic Coast breeding population: (1) Atlantic (Eastern) Canada; (2) New England; (3) New York-New Jersey; and (4) Southern (Delaware, Maryland, Virginia, and North Carolina). Each of these units is considered essential to the conservation of the piping plover by providing for its reproduction, numbers, and distribution in that portion of its range to an extent necessary to provide for the long-term survival of the breeding population. Each unit is assigned a minimum population level (discussed below) that, when achieved under conditions where the threats to the species have been adequately addressed, the piping plover is eligible for delisting. In other words, the achievement and maintenance of the assigned

population level and the associated habitat conditions necessary to support that population for each of the four recovery units are necessary for the long-term survival and recovery of the piping plover.

Criteria and Strategies: The objective of the Recovery Plan is to assure the long-term viability of the piping plover population in the wild, thereby allowing removal of this population from the Federal List of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12). The piping plover population may be considered for delisting when the following recovery criteria, established in the plan, have been met:

1. Increase and maintain for five years a total of 2,000 breeding pairs, distributed among four recovery units.

Recovery Unit	*Minimum Subpopulation*
Atlantic (Eastern) Canada[4]	*400 pairs*
New England	*625 pairs*
New York-New Jersey	*575 pairs*
Southern (DE-MD-VA-NC)	*400 pairs*

2. Verify the adequacy of a 2,000-pair population of piping plovers to maintain heterozygosity and allelic diversity over the long term.
3. Achieve a 5-year average productivity of 1.5 fledged chicks per pair in each of the four recovery units described in criterion 1, based on data from sites that collectively support at least 90 percent of the recovery unit's population.
4. Institute long-term agreements to assure protection and management sufficient to maintain the population targets and average productivity in each recovery unit.
5. Ensure long-term maintenance of wintering habitat, sufficient in quantity, quality, and distribution to maintain survival rates for a 2,000-pair population.

Attainment of subpopulation targets for each recovery unit provides resiliency and redundancy, thereby increasing the likelihood of survival and recovery of the population as a whole. Extensive efforts to re-sight greater than 1,400 piping plovers color-banded in Virginia, Maryland, Massachusetts, and five Eastern Canadian provinces between 1985 and 2003 documented almost all piping plovers breeding within the recovery unit in which they were banded (U.S. Fish and Wildlife Service files; D. Amirault, Canadian Wildlife Service, pers. comm.). Hecht and Melvin (2009) found significant positive relationships between productivity

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[4] Recent Canadian Wildlife Service documents and published literature refer to piping plovers breeding in Nova Scotia, New Brunswick, Prince Edward Island, Quebec, and Newfoundland as the piping plover *melodus* subspecies or the "eastern Canada population." This subpopulation coincides exactly with the geographic area termed "Atlantic Canada Recovery Unit" in the 1996 Recovery Plan. To reduce confusion, we refer henceforth in this status review to the Eastern Canada recovery unit.

and population growth in the subsequent year for each of the three U.S. recovery units (but not for Eastern Canada). Hence, abundance of piping plovers in each recovery unit population is almost entirely dependent on within-recovery unit productivity. Dispersal of the population across its breeding range serves to protect against stochastic events such as large storms during the breeding season, oil spills, or disease that might depress regional survival and/or productivity. Maintaining robust, well-distributed subpopulations should reduce variance in survival and productivity of the population as a whole and provide connectivity that facilitates within-recovery unit recolonization of any sites that experience declines or local extirpations due to low productivity and/or temporary habitat succession at individual sites (Gilpin 1987; Goodman 1987; Thomas 1994). The recovery units are large enough that their overall carrying capacity should be buffered from stochastic variability in the frequency of storms that naturally maintain habitat at individual nesting sites (i.e., the recovery units represent a fairly coarse distribution requirement), while still assuring a geographically well-distributed population if habitat is not lost or artificially degraded.

Recent genetic analysis found strong genetic structure, supported by significant correlations between genetic and geographic distances in both mitochondrial and microsatellite data sets for piping plovers (Miller et al. 2010). Piping plovers showed evidence of isolation-by-distance patterns, indicating that dispersal, when it occurs, is generally associated with movement to relatively proximal breeding territories. Thus, maintaining geographically well-distributed populations also serves to conserve representation of genetic diversity and adaptations to variable environmental selective pressures. Substantial regional declines in abundance of piping plovers risk loss of genetic diversity that may be important to its long-term survival. In other words, the achievement and maintenance of the assigned population level and the associated habitat conditions necessary to support that population for each of the four recovery units are necessary for both the survival and recovery of the piping plover.

Attainment and maintenance of the minimum population levels for the four recovery units provides resiliency, redundancy, and representation (Schaffer and Stein 2000) that are fundamental to the overall security of the piping plover population. In the event that one recovery unit experiences temporary declines in piping plover productivity or survival that lead to a decline in numbers, the other units can provide near-term security for the species as a whole. In the event that a recovery unit population becomes sparse or is extirpated, the potential for repatriation via dispersal from adjacent recovery unit(s) is possible, but this is likely to be a slow process and any loss of genetic variation and adaptation to the regional environment may be extremely difficult to reverse.

In accordance with the Endangered Species Consultation Handbook (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998), since recovery units have been established in an approved recovery plan, this Opinion considers the effects of the proposed project on piping plovers in the New York-New Jersey recovery unit, as well as the population as a whole. When an action impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. We describe how the proposed action affects not only the New York-New Jersey recovery unit's likelihood of survival and recovery, but the relationship of the recovery unit to both the survival and recovery of the listed species, as a whole.

Population Trends Since Listing: The abundance of piping plovers is reported as numbers of breeding pairs, i.e. adult pairs that exhibited sustained (greater than or equal to two weeks) territorial or courtship behavior at a site or were observed with nests or unfledged chicks (U.S. Fish and Wildlife Service 1996). Annual estimates of breeding pairs of piping plovers are based on multiple surveys of almost all breeding habitat, including many currently unoccupied sites. Sites that cannot be monitored repeatedly in May and June (primarily sites with few pairs or inconsistent occupancy) are surveyed at least once during a standard nine-day count period (Hecht and Melvin 2009). Appendix 1 and 2 summarize nesting pair counts and productivity for the piping plover since listing in 1986 through 2013. Numbers in parentheses are preliminary estimates, but it is not anticipated that final estimates will deviate substantially.

The preliminary 2013 piping plover population estimate was 1,797 pairs, more than double the 1986 estimate of 790 pairs (Appendix 1). Discounting apparent increases in state counts in New York, New Jersey, and North Carolina between 1986 and 1989, which likely were due in part to increased census effort (U.S. Fish and Wildlife Service 1996), the coast-wide population increased 98 percent between 1989 and 2012 (also a preliminary estimate), then declined five percent between 2012 and 2013 for a net increase of 88 percent from 1989 to 2013.

The largest net population increase between 1989 and 2013 occurred in the New England recovery unit (317 percent) where the preliminary population estimate was 858 pairs in 2013. Net growth in the Southern recovery unit population was 80 percent between 1989 and 2013. Most of the Southern recovery unit breeding population increase occurred in 2003-2005 and 2011-2012. There was a net increase of 24 percent in overall abundance in the New York-New Jersey recovery unit between 1989 and 2013, but the population declined sharply from a peak of 586 pairs in 2007 to 397 pairs in 2013 (32 percent reduction). In Eastern Canada, where increases have often been quickly eroded in subsequent years, the population posted a 21 percent net decline between 1989 and 2013; with the highest rate of decline observed between 2007 and 2013 when the population decreased 31 percent.

Within the New York-New Jersey recovery unit, the New Jersey piping plover population has fluctuated at low numbers (1989 – 2013 range = 93 to 144 pairs; mean = 120 pairs), standing at 108 pairs in 2013 (Figure 3). In 2012, more than 70 percent of the State's nesting pairs were concentrated along less than 20 mi of the shoreline that remain unstabilized.

Changes in the Long Island population account for most of the absolute growth in the New York-New Jersey recovery unit population through 2007 and most of the decrease that has occurred in the last six years. On Long Island, the south shore has been the greatest contributor to population changes (both positive and negative). Based on an analysis of the 2000-2013 piping plover census data for Long Island, the Atlantic Ocean beaches supported between 63 and 71 percent of the Long Island-wide population (Figure 4). Abundance levels in the Peconic and Long Island Sound beaches are fairly close, accounting for between 29 and 37 percent of the Long Island-wide population (Figure 5). Overall, the Long Island plover distribution is patchy and reflective of habitat types and quality which is affected by land use patterns driven by shoreline stabilization. The south shore of Long Island supports about 50% of the entire recovery unit population. Low abundance in New Jersey and recent exceptional declines in abundance on Long Island (especially on the south shore) contribute to demographic vulnerability of this recovery unit.

In addition to the on-going declines in the New York-New Jersey and Eastern Canada recovery units, other periodic regional declines illustrate the continuing risk of rapid and precipitous reversals in abundance trends. Examples include a 21 percent decrease in the Eastern Canada population from 2002 to 2005, and a 68 percent decrease in the southern half of the Southern recovery unit from 1995 to 2001. The 64 percent decline in the Maine population between 2002 and 2008, from 66 pairs to 24 pairs, followed only a few years of decreased productivity. Although intensified protection efforts between 2008 and 2012 contributed to high productivity in Maine (range = 1.52 - 2.12 chicks per pair), the breeding population has only rebounded to 44 pairs as of 2013.

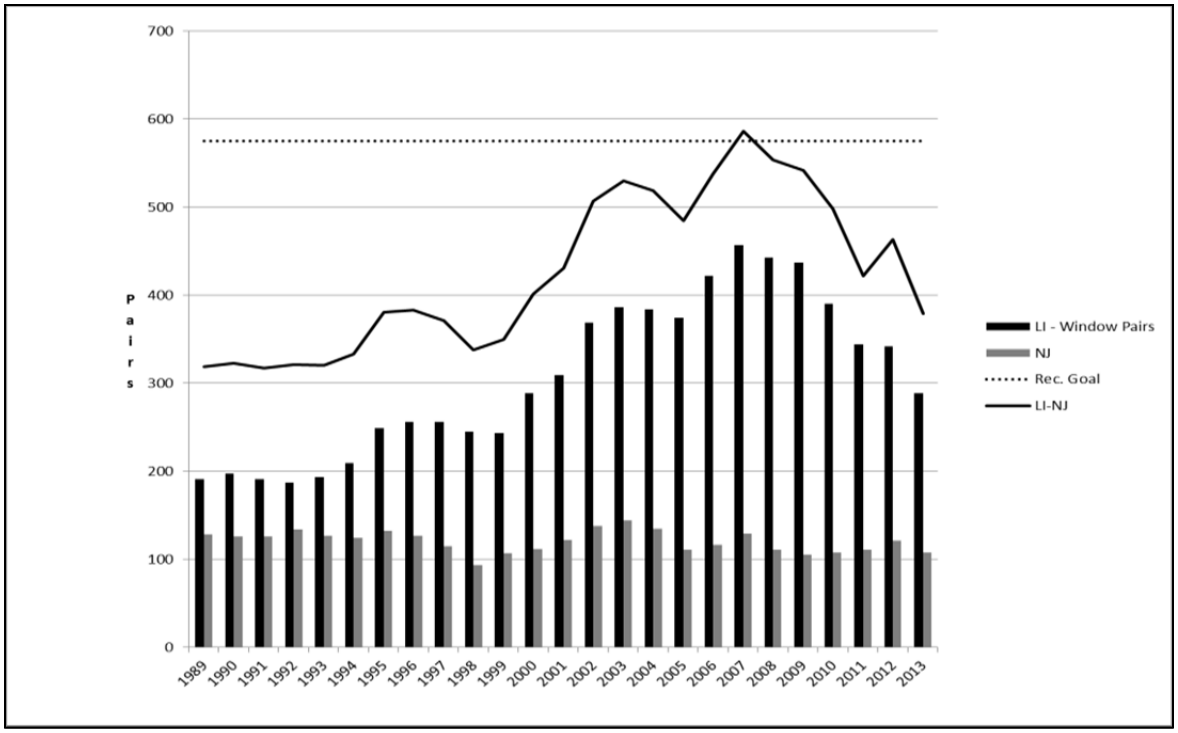

Figure 3. Graph showing Long Island and New Jersey piping plover populations in relation to the New York-New Jersey recovery unit recovery goal of 575 pairs.

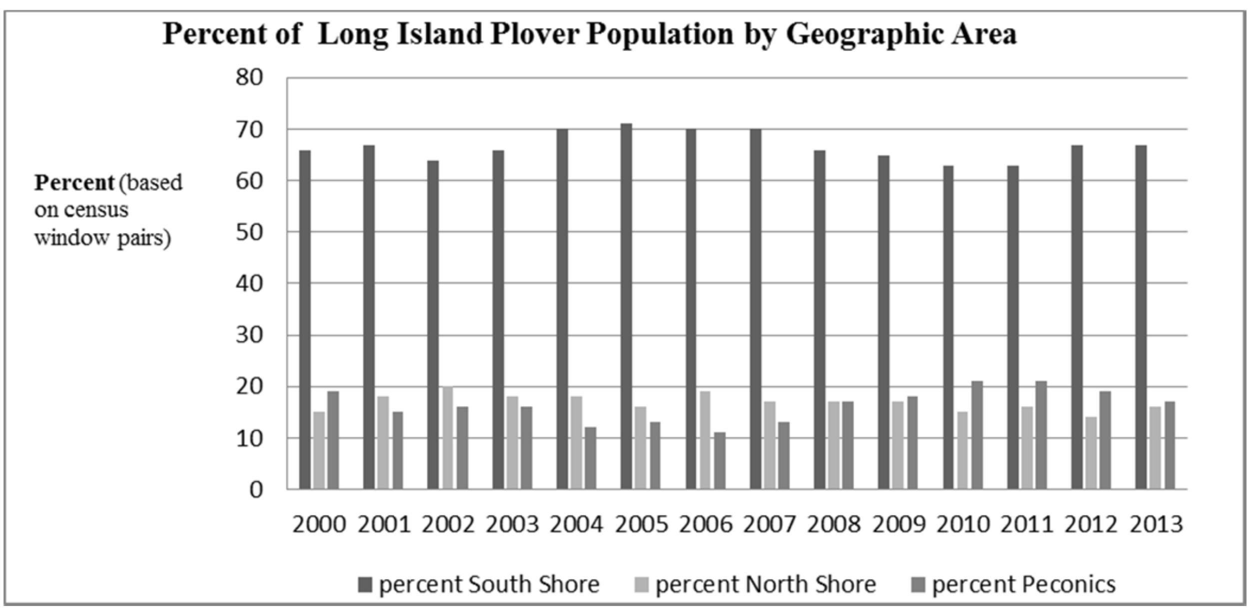

Figure 4. Graph showing percent of Long Island plover population on the South Shore, Long Island Sound, and Peconic Bay regions.

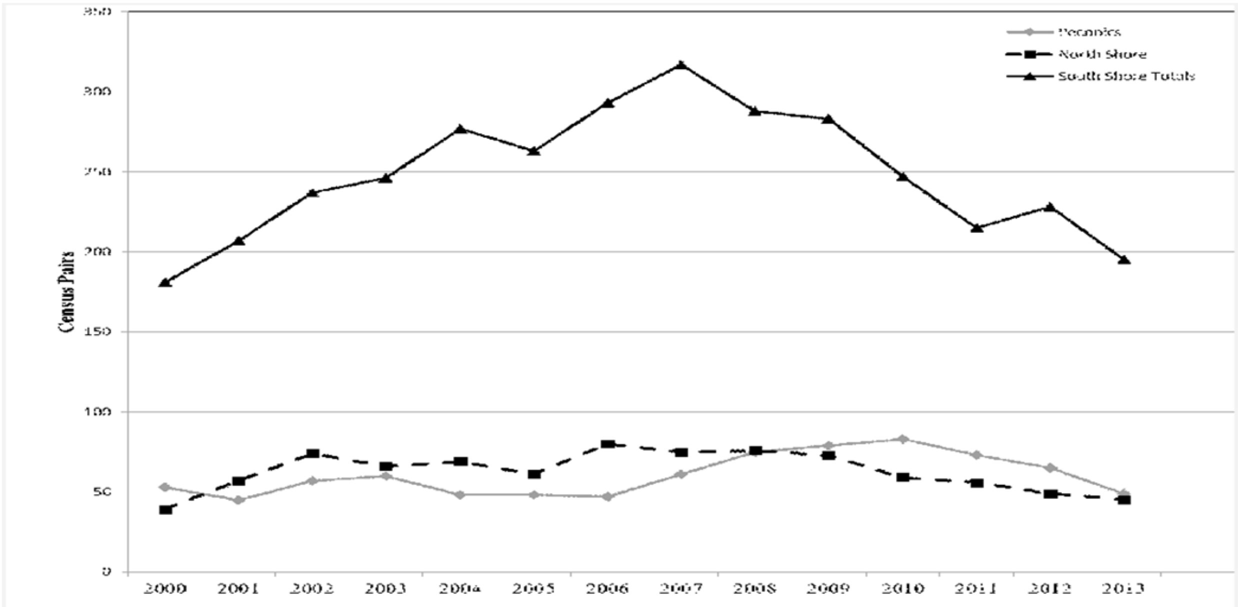

Figure 5. Graph showing population of piping plovers along the South Shore (Atlantic Ocean), North Shore (Long Island Sound), and Peconic Bay area.

Productivity

Piping plover productivity is reported as number of chicks fledged per breeding pair. For purposes of measuring productivity, chicks are counted as fledged if they survived to 25 days of age or were seen flying, whichever occurred first. Productivity is calculated by dividing the number of fledged chicks by the number of pairs that were monitored and for which number of fledglings could be determined. This includes both successful pairs and pairs that fledged no chicks because they failed to nest or because no eggs hatched or no chicks survived to fledging. An accurate assessment of productivity is obtained by repeated visits to nesting beaches to monitor individual nests and broods during May, June, July, and if necessary, August. Annual productivity estimates for 1987-2013 are summarized by recovery unit and state in Appendix 2; numbers in parentheses are preliminary estimates, but final estimates are unlikely to differ substantially.

Hecht and Melvin (2009) evaluated latitudinal trends in piping plover productivity and relationships between productivity and population growth. Overall productivity for the population from 1989 to 2006 was 1.35 chicks fledged per pair (annual range = 1.16-1.54), and overall productivity within recovery units decreased with decreasing latitude: Eastern Canada = 1.61, New England = 1.44, New York-New Jersey = 1.18, and Southern = 1.19 (Hecht and Melvin 2009). Within recovery units, annual productivity was variable and showed no sustained trends. There were significant, positive relationships between productivity and population growth in the subsequent year for each of the three U.S. recovery units, but not for Eastern Canada.

The preliminary 2012 and 2013 U.S. Atlantic Coast productivity estimates of 0.82 and 0.91 chicks per pair were the lowest since the species' 1986 listing. The 2012 estimate was 37 percent below the 1989-2006 average, and 20 percent below the third worst year, 2009. Productivity in 2012 was lowest for the New York-New Jersey recovery unit (0.72 chicks per pair). The preliminary estimate for New England was 0.84 chicks per pair, while the Southern recovery unit had slightly better productivity at 0.89 chicks per pair. In Eastern Canada, productivity in 2012 was higher than in 2011, but below both the 1989-2006 average and the rate needed to maintain a stationary population. Loss of nests due to flooding from an early-June 2012 coastal storm and continuing threats from predation and human disturbance were major factors contributing to the record-low productivity. Productivity estimates in 2013 increased modestly in the New England and Southern recovery units (0.94 and 1.07 chicks per pair, respectively), and the 2013 estimate for the latter recovery unit exceeded the rate needed to maintain a stationary population in that part of the range (Hecht and Melvin 2009). Productivity of piping plovers in the New York-New Jersey recovery unit increased marginally to 0.74 chicks per pair in 2013. New York-New Jersey productivity has been below 1.0 chicks per pair in four out of the last five years, a circumstance that only occurred in two of the previous 20 years. Even in 2010, when productivity in the rest of the U.S. Atlantic Coast range averaged 1.45 chicks per pair, average productivity in New York was 0.79 chicks per pair.

Finally, regression analysis indicated a latitudinal trend in predictions of annual productivity needed to support stationary populations within recovery units, increasing from 0.93 chicks fledged per pair in the Southern unit to 1.44 in Eastern Canada (Hecht and Melvin 2009; Calvert et al. 2006). Relatively small coefficients of determination (r^2 = 0.09-0.59) for the relationships between annual productivity and population increases in the subsequent year indicate that other factors, most likely annual survival rates of both adults and fledged chicks, also had important influences on population growth rates. Regression analysis was used to estimate of productivity needed to maintain a stationary population, showing that a productivity level of 1.21 chicks fledged per pair was need to maintain the New England recovery unit (Hecht and Melvin 2009). This result was similar to the value of 1.24 chicks fledged per pair that was estimated through population modeling based on survival estimates derived from 1985-1988 banding studies in Massachusetts (Melvin and Gibbs 1996).

Breeding Site Fidelity and Dispersal

In New York, Wilcox (1959) recaptured 39 percent of the 744 adult plovers that he banded in prior years (many were recaptured during several successive seasons and all but three of them were re-trapped in the same nesting area), but recaptured only 4.7 percent of 979 plovers that were banded as chicks. Males exhibited greater fidelity to previous nest sites than females (Wilcox 1959). Strauss (1990) observed individuals that returned to nest in his Massachusetts study area for up to six years. Also in Massachusetts, 13 of 16 birds banded on one site were re-sighted the following season, with 11 birds nesting on the same beach (MacIvor et al. 1987). Of 92 adults banded on Assateague Island, Maryland, and re-sighted the following year, 91 adults were seen on the same site, as were 8 of 12 first-year birds (Loegering 1992). R. Cross (unpubl. data) reports that 10 of 12 juveniles banded on Assateague Island, Virginia, and re-sighted one and/or two years later were on the Virginia or Maryland portions of Assateague Island, while the other two were observed on other Virginia barrier islands. Site fidelity of banded adults on Long Island in 2002-2004 was 83 percent (Cohen et al. 2006).

On the Atlantic Coast, almost all observations of inter-year movements of birds have been within the same or adjacent states. Extensive efforts to re-sight greater than 1,400 Atlantic Coast piping plovers color-banded in Virginia, Maryland, Massachusetts, and five Eastern Canadian provinces between 1985 and 2003 have resulted in only four records of plovers breeding outside the recovery unit in which they were banded (U.S. Fish and Wildlife Service files; D. Amirault, CWS, pers. comm.).

Forty percent of 329 eastern Canada piping plovers banded as adults in 1998-2003 exhibited fidelity to their nesting beaches in every year that they were re-sighted, and only 6 of 152 recaptured adults (4 percent) moved to a different province in a subsequent year (Amirault et al. 2005, updated by D. Amirault-Langlais and F. Shaffer, CWS, pers. comm. 2009). By contrast, five percent of 95 plovers banded in their hatch year nested at their natal beaches and 84 percent nested in their natal province. Only one of 888 banded birds, however, was detected breeding outside of Eastern Canada. That bird, banded as a chick on Prince Edward Island, fledged a chick in Massachusetts after unsuccessfully breeding on Long Island, New York, the previous season.

Survival

Population viability analyses (PVAs) conducted for piping plovers (Ryan et al. 1993; Melvin and Gibbs 1996; Plissner and Haig 2000; Wemmer et al. 2001; Larson et al. 2002; Amirault et al. 2005; Calvert et al. 2006; Brault 2007) indicate that even small declines in adult and juvenile survival rates will cause very substantial increases in extinction risk. A banding study conducted between 1998 and 2004 in Atlantic Canada found lower return rates of juvenile (first year) birds to the breeding grounds than was documented for Massachusetts (Melvin and Gibbs 1994, cited in Appendix E, U.S. Fish and Wildlife Service 1996), Maryland (Loegering 1992), and Virginia (Cross 1996) breeding populations in the mid-1980s and very early 1990s. This is consistent with failure of the Atlantic Canada population to increase in abundance despite very high productivity (relative to other breeding populations) and extremely low rates of dispersal to the

U.S. over the last 15 plus years (Amirault et al. 2005). This suggests that maximizing productivity does not ensure population increases.

Estimates of annual adult survival on Long Island (70 percent; Cohen et al. 2006) and eastern Canada (73 percent; Calvert et al. 2006) were similar to those reported in Massachusetts (74 percent; Melvin and Gibbs 1996) and Maryland (71 percent; Loegering 1992). However, apparent survival (34 percent) for the first year after fledging in eastern Canada (Calvert et al. 2006) was much lower than that from earlier Massachusetts banding studies (48 percent; Melvin and Gibbs 1996). Population viability analyses conducted by Melvin and Gibbs (1996), Calvert et al. (2006), and Brault (2007) have consistently found that extinction risk is highly sensitive to small declines in adult and/or juvenile survival rates.

Population Response to Habitat Changes

The carrying capacity of a species in the environment is the population that the environment can sustain (Ricklefs 1983). The carrying capacity of plover habitat is subject to fluctuation with the dynamic coastal formation processes that affect topography, vegetation, foraging resources, and other habitat characteristics. As described below, these fluctuations demonstrate the positive effect of storms and other natural factors in creating and maintaining new habitats and negative effects due to shoreline development and stabilization projects.

Wilcox (1959) described the effects on piping plovers from hurricanes in 1931 and 1938 that breached the Long Island’s eastern barrier islands, forming Moriches and Shinnecock Inlets and creating overwash corridors from bay to ocean on Westhampton Island (Figure 6). Only three to four pairs of piping plovers nested on 17 mi of barrier beach along Moriches and Shinnecock Bays in 1929; however, following the creation of Moriches Inlet in 1931, plover numbers increased to 20 pairs along a 2-mile stretch of beach by 1938. The hurricane of 1938 opened Shinnecock Inlet and also flattened dunes along both Fire Island and Westhampton Island. Subsequently, in 1941, plover abundance along the same 17-mi stretch of beach increased to 64 pairs and then gradually decreased, owing to beach renourishment, dune building, planting of beach grass, and construction of roads and summer homes (Wilcox 1959). Analysis of aerial photographs of Fire Island, immediately west of Wilcox' (1959) study area, by Leatherman and Allen (1985), showed that during the same time period as Wilcox' study, coverage of Fire Island by overwash declined from 26 percent in 1938 to 11 percent in 1954 and two percent in 1960.

In 1965 to 1970, the Corps built a series of groins in the center of Westhampton Island to curb beach erosion and protect houses (Dean 1999). During the 1980s, erosion lowered and narrowed the beach west of the groins, and a storm in December 1992 substantially altered the habitat by creating a breach in the island in the vicinity of West Hampton Dunes. Following breach closure by the Corps and natural habitat creation of extensive overwash and intertidal flats, the plover population grew at this site from 0 pairs in 1992 to 39 pairs in 2000, and then declined to 18 pairs by 2004 concurrent with habitat losses from human development and accelerated plant succession associated with construction of the Corps' Westhampton Interim Storm Damage Protection Project (Cohen et al. 2009). The plover population has continued to decline since 2004. In 2014, the preliminary abundance estimate is 10 pairs (Cashin Associates, electronic correspondence, August 8, 2014) (Figure 7).

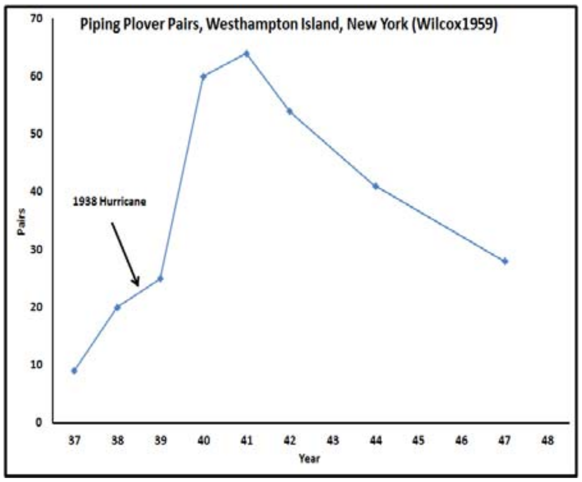

Figure 6. Response of piping plovers to habitat changes on Westhampton Island, NY. Adapted from Wilcox (1959).

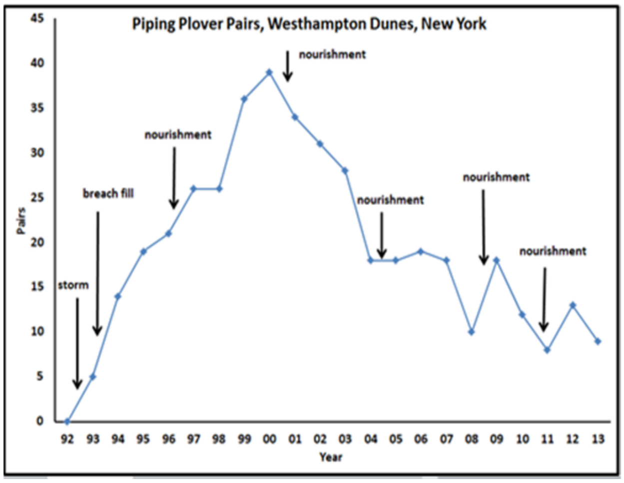

Figure 7. Response of piping plovers to storm-created and human changes to habitat on Westhampton Island, NY from 1992 to 2013.

Northern Assateague Island, Maryland, provides an example of an area where rapid response to habitat formed and maintained by a series of strong storms during the period from 1991 to 1998 and a relatively delayed decline following shoreline stabilization in the form of a low foredune in 1998 was observed. The foredune was designed to overwash at least once per year to preclude the growth of woody plants and maintain sparse herbaceous vegetation (U.S. Army Corps of Engineers 1998). However, the artificial foredune did not meet this design criteria and overwash habitat was lost to vegetation succession (Schupp et al. 2013). The project was redesigned and 14 notches were created through the foredune in 2008 and 2009. Overwash was restored, resulting in increased island stability by increasing interior island elevation, an increase of areas with sparse vegetation. This new foraging habitat was utilized by breeding pairs during the 2010 breeding season (Schupp et al. 2013), but the extent, duration, and overwall success of habitat restoration at this site remains uncertain. Abundance of breeding piping plovers continued to decline through 2011, increased modestly in 2012 and 2013 (Figure 8), and declined in 2014.

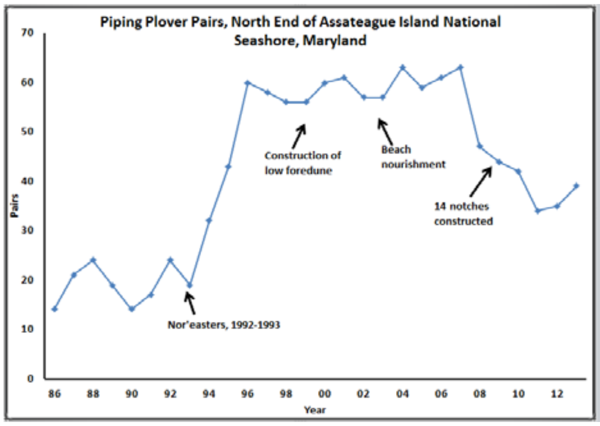

Figure 8. Response of piping plovers to habitat creation and subsequent degradation at Assateague Island National Seashore, Maryland.

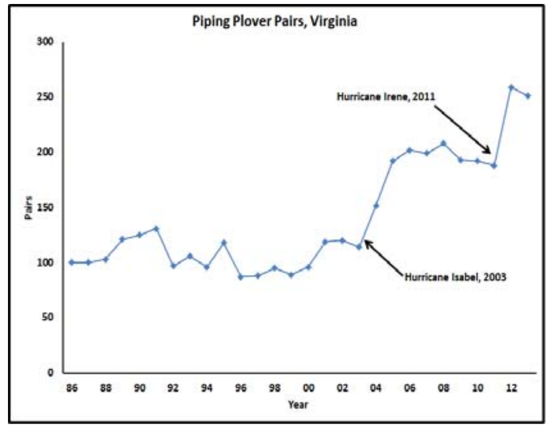

Figure 9. Response of piping plovers to habitat creation and subsequent degradation in Virginia**.**

The largely undeveloped Virginia barrier islands illustrate a more sustained population response to major storm events in the absence of human stabilization efforts. A period of relative population stability followed the rapid increase after Hurricane Isabel in 2003, until the population increased substantially again after Hurricane Irene in 2011 (Figure 9).

The examples above illustrate the rapid response of piping plovers to habitat creation, as well as steep population declines that may follow artificial barrier island stabilization. The Assateague Island project highlights the uncertainty associated with efforts to preserve habitat maintenance via overwash processes in the context of a relatively small dune design profile. As stated in the Recovery Plan, "While it is expected that carrying capacity will fluctuate locally, and perhaps even within a state over time, it is anticipated that long-term carrying capacity of the Atlantic Coast's piping plover habitat (and that of regional subpopulations, which correspond to the recovery units laid out on page 55) will be maintained if natural coastal habitat formation processes are not interrupted. *Shoreline development and stabilization projects may, however, erode carrying capacity locally and regionally (see pages 34-37) and, therefore, have potential to compromise the survival and recovery of the population* (emphasis in original)."

Vulnerability to Extinction

Although population growth, from approximately 790 pairs in 1986 to an estimated 1,763 pairs in 2013, has decreased the piping plover's vulnerability to extinction since ESA listing, the distribution of population growth remains uneven. Since completion of the 2009 5-Year Review (U.S. Fish and Wildlife Service 2009a), the New York-New Jersey and Eastern Canada recovery units have experienced declines of 28 percent and 27 percent, respectively, and there is no evidence that these downward trends will be reversed soon. The overall security of the piping plover is fundamentally dependent on even distribution of population growth, as specified in the recovery units' subpopulation targets, to protect a sparsely-distributed species with strict biological requirements from detrimental stochastic events (including catastrophes), and provide connectivity that facilitates within-recovery unit recolonization of any sites that experience declines or local extirpations due to low productivity and/or temporary habitat succession (U.S. Fish and Wildlife Service 1996).

Strong genetic structure within the piping plovers further supports the importance of maintaining geographically well-distributed populations that conserve representation of genetic diversity, including possible adaptations to local environmental selective pressures that may be important to long-term survival of the entire population. In the rest of this subsection, we discuss how the demographic factors and threats affect the status and vulnerability of each recovery unit and then summarize their collective implications for the coast-wide population.

Eastern Canada recovery unit - The piping plover population estimate in the Eastern Canada recovery unit in 2013 was 184 pairs, only five pairs more than the lowest-ever estimate of 179 pairs in 2012 and 23 percent below the 240 pair estimate in 1986. Although the Eastern Canada population has fluctuated over that period, the decline since 2007 has been the largest (31 percent) and most prolonged, despite much higher overall productivity than in the other recovery units. In-depth evaluation of population and productivity trends and environmental factors by the Wildlife Research Division of the Wildlife and Landscape Science Directorate, Environment Canada, concluded that the limiting factors now impeding recovery are primarily occurring outside Canada during migration or on the wintering grounds (Gratto-Trevor et al. 2013). Efforts to identify these factors have been initiated, but the difficulties inherent to discerning links between environmental factors in the non-breeding range and vital demographic rates mean that rapid results are unlikely. Furthermore, the availability of measures to ameliorate causal factors that may be identified is completely unknown. In the meanwhile, Canadian Wildlife Service and other conservation partners continue on-going intensive efforts to protect habitat and breeding activity in order to maximize productivity and reverse or slow the population decline. The Canadian Committee on the Status of Endangered Wildlife recognizes piping plovers breeding in Eastern Canada as belonging to the subspecies *C. m. melodus* and designates them as "Endangered" (Department of Justice Canada 2002). Low abundance, a sharply declining population trend, and lack of identified causal factors that can be remedied, make the likelihood of survival and recovery of the Eastern Canada recovery unit highly uncertain.

New England recovery unit - The largest and most sustained population increase has occurred in the New England recovery unit which has exceeded (or been within three pairs of) its 625-pair recovery unit target population goal since 1998, attaining preliminary estimates of 879 and 858 pairs, respectively, in 2012 and 2013. Effects from past habitat loss and modification have diminished the piping plover's habitat base in this recovery unit, but many high quality habitats remain, and piping plovers breed productively on a wide range of microhabitats. Limited adverse effects (e.g., to provide small amounts of flexibility for beach recreation) in this recovery unit may be possible without appreciably reducing the likelihood of survival and recovery (especially if they are accompanied by mitigation) because they do not diminish the carrying capacity of habitat and are quickly reversible. Notwithstanding the relatively robust status of piping plovers in the New England recovery unit, continued vigilance is warranted. Preliminary New England recovery unit productivity estimates in 2012 and 2013 were the lowest since ESA listing and far below the long-term average. The 64 percent decline in the Maine subpopulation between 2002 and 2008, following only a few years of decreased productivity, provides an example of the continuing risk of rapid and precipitous reversals in population growth.

New York-New Jersey recovery unit - Loss and degradation of habitat due to development and shoreline stabilization has been, and continues to be, a serious and widespread threat to piping plovers in the New York-New Jersey recovery unit. Past permanent habitat losses have irrevocably diminished the available habitat, continuing shoreline stabilization projects perpetuate many low quality habitats, and proposals for new or larger shoreline stabilization projects threaten the few remaining areas where natural habitat processes have the potential to create and maintain preferred habitats. Widespread shoreline stabilization also exacerbates conflicts with human beach recreation by constraining nests and chicks to narrow, dry ocean-front habitats. This, in turn, increases the costs and effort required to manage threats to plovers from human and pet disturbance to the point where the sustainability of these efforts may be compromised.

Relative optimism about the survival and recovery of piping plovers in the New York-New Jersey recovery unit, based on attainment of the subpopulation goal in 2007, has proved transitory as the population has declined 32 percent and now stands at the lowest abundance since 2000. Record-low productivity in this recovery unit in recent years indicates that substantial increases in breeding numbers are unlikely in the near-term. Actions that further diminish the habitat's carrying capacity pose the greatest potential for additional reductions in the probability of persistence of the recovery unit population and will be the most difficult to reverse.

Southern recovery unit - The narrow habitat tolerances of piping plovers in the Southern recovery unit have been a major (but not the sole) factor in its slow recovery and continuing precariousness. However, the Southern recovery unit population continues to respond positively to habitat creation events, most recently to habitat improvements following Hurricane Irene in 2011. Despite a gradual dip in population abundance between 2007 and 2011, the population attained a post-listing record high of 377 pairs in 2012. As in the rest of the range, security of the population in this recovery unit is fundamentally tied to maintaining newly improved habitats and habitat formation processes, while minimizing threats from human disturbance, predation, oil spills, and other contaminants.

Summary and conclusion - Concerns regarding an increasingly uneven distribution of Atlantic Coast piping plovers (U.S. Fish and Wildlife Service 2009a/2009 5-Year Review) have partially shifted with respect to their geographic focus, and they have increased with regard to overall population status. The ability of both the Eastern Canada and New York-New Jersey recovery units to provide redundancy, resiliency, and representation that are essential to the survival and recovery of the population are particularly at risk. Although abundance has remained high in the New England recovery unit, no noticeable movements of piping plovers between recovery units have occurred, nor are they likely in the future. The survival and recovery of piping plovers remain highly dependent on the conservation of remaining habitats and the ability of coastal planners and land managers to incorporate habitat-formation processes into the design and implementation of shoreline resiliency projects, as well as annual implementation of management actions to minimize the effects of threats from predation and disturbance by humans and pets. Reversals of major on-going declines in the Eastern Canada and New York-New Jersey recovery units are urgent.

Threats

Continuing threats to piping plovers in the breeding portion of their range identified in the Recovery Plan include:

(a) habitat loss and degradation,
(b) disturbance by humans and pets,
(c) increased predation, and
(d) oil spills.

U.S. Fish and Wildlife Service (2009a) updated information regarding these breeding range threats, as well as new threats of climate change and wind turbine generators. Threats to piping plovers in the Eastern Canada recovery unit are summarized in Environment Canada's "2012 Recovery Strategy for the Piping Plover (*Charadrius melodus melodus*) in Canada" (Environment Canada 2012), and they are further assessed in a 2013 Scientific Review of the Recovery Program for Piping Plovers (*melodus* subspecies) in Eastern Canada (Gratto-Trevor et al. 2013). Threats in the plover's migration and wintering range, where piping plovers spend more than two-thirds of its annual cycle, were recognized in the Recovery Plan and were substantially elaborated in the 2009 5-Year Review (U.S. Fish and Wildlife Service 2009a), and the *"2012 Comprehensive Conservation Strategy for the Piping Plover in its Coastal Migration and Wintering Range in the Continental United States"* (U.S. Fish and Wildlife Service 2012). We first discuss threats to piping plovers in the three U.S. recovery units and then provide summaries of threats in the Eastern Canada recovery unit and in the wintering range.

Habitat Loss and Degradation

The 1985 final rule listing the piping plover under the ESA specifically cited loss of sandy beaches and other littoral habitats due to recreational and commercial developments and dune stabilization as a factor contributing to the species' decline on the Atlantic Coast. The Recovery Plan states that discouraging new structures or other developments, discouraging interference with natural inlet processes, and discouraging beach stabilization projects are "priority 1" actions (those that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future).

Studies and reports completed since the Recovery Plan reinforce the continued importance of protecting preferred piping plover breeding habitats and the natural coastal processes that form and maintain them. Scientific research conducted on Long Island explicitly recommended avoiding shoreline stabilization (e.g., jetty construction, breach filling, dune building, beach nourishment) that typically inhibit natural renewal of ephemeral pools, overwash, bay tidal flats, and open vegetation (Elias et al. 2000) and allowing natural storm processes that create habitat to act unimpeded (Cohen et al. 2009). The magnitude of threats from habitat loss and degradation vary across the three U.S. recovery units.

Since completion of the Recovery Plan, one formal section 7 consultation has been completed for a project involving habitat modification or degradation in New England (U.S. Fish and Wildlife Service 2008a). Informal consultations[5] with the Corps have resulted in project modifications to avoid direct and indirect adverse effects (including project-induced beach recreation) of beach nourishment or inlet dredging. Although effects from past habitat loss and modification have diminished the piping plover's habitat base in New England, many high quality habitats remain, and piping plovers breed productively on a wide range of microhabitats (Jones 1997). Continued efforts to conserve high quality habitats are warranted, but overall threats to habitat from existing or proposed projects are low in the New England recovery unit.

The continued loss and degradation of habitat remains a prominent threat to piping plovers in the New York-New Jersey recovery unit. Within the New York Bight, which includes the species' entire range in New Jersey and the southern Long Island shoreline, more than half the beaches are classified as "developed" (U.S. Fish and Wildlife Service 1997). The remaining beaches in the New York Bight, classified as "natural and undeveloped." However, many of these areas are also subject to extensive stabilization activities that promote the formation of high elevation dunes and beaches, thus preventing overwash, inlet migration, and other natural coastal processes that create and maintain preferred plover habitats.

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[5] Examples of projects for which consultation has been concluded informally include dredging of Ellisville Harbor channel in Plymouth, Massachusetts (M. Bartlett, U.S. Fish and Wildlife Service, in litt. 2003) and navigation improvements in Westport Harbor and disposal of dredged material on Westport Beach, Massachusetts (S. von Oettingen, U.S. Fish and Wildlife Service, in litt. 2007).

In major areas across the species' breeding range on Long Island, shoreline stabilization has resulted in loss and degradation of suitable plover and seabeach amaranth habitats and is a major contributing factor to the range-wide decline of the piping plover (U.S. Fish and Wildlife Service 1996). These activities are undertaken by both federal and non-federal entities and include, but are not limited to, inlet maintenance dredging with upland beach disposal, dune and beach construction, groin construction, jetty construction and rehabilitation, beach grass planting, and sand fence installation. Non-federal entities that undertake projects impacting navigable waters, such as dredging and beach nourishment, of the U.S. are required to obtain a federal permit from the Corps pursuant to the Clean Water Act of 1977, as amended. Virtually all of these are implemented to raise the elevation of the beach and dunes in order to substantially reduce the probability of natural inlet creation and overwash that would otherwise form optimal piping plover and seabeach amaranth habitats. Since listing of the species under the ESA, 12 formal section 7 consultations on Long Island have been completed for federal projects or applications involving species' disturbance, habitat modification, loss, or degradation (Table 3).

Table 3. Biological opinions issued for all shoreline stabilization project between Jones Inlet and Montauk Point, Long Island, New York.

Project	**Year and Duration**	**Section 7 Consultation Status**	**Habitat Impacted (miles and/or acres)/Effects/Incidental Take level**	**Project Status**
Breach Contingency Plan	1995/3 years	Expired/Biological Opinion issued for 3 year project in 1995; FWS requested reinitiation	50 miles of ocean beach habitat/loss of natural habitats and processes	Active
Fire Island to Montauk Point Westhampton Interim Project	1994/30 years	Biological Opinion issued in 1994	4 miles/loss of natural habitats and processes/loss of 4 nests and 4 chicks during 2-year construction	Active – renourishment Phase
Fire Island to Montauk Point West of Shinnecock Inlet Project	200/6 years	Expired/Biological Opinion issued for 6-year project in 2001	4,000 ft/loss of natural habitats and processes/loss of productivity is 85 plover chicks	Active – renourished by Corps under Public Law 84-99
Shelter Island Erosion Control Project	1997	Biological Opinion issued for project		
Fire Island Inlet Navigation Jetty	1986	Expired/Requested reinitiation		Active
Moriches Inlet Navigation Jetty	1986	Expired/FWS requested reinitiation		Active
Shinnecock Inlet Navigation Project		Expired/FWS requested reinitiation		Active
Fire Island to Moriches Inlet Stabilization Project	2014/10 years	Active	19 miles/16 pairs of plovers due to habitat modification	Active/Awaiting Construction

Piping plovers in the Southern recovery unit are almost completely restricted to low-lying, unstabilized barrier island flats and spits. Piping plovers remain absent from barrier beaches adjacent to roads along most of the Delaware coast. With very few exceptions, breeding piping plovers have not yet recolonized sections of Assateague Island, Maryland, and Virginia south of Maryland State Road 611, where artificial "dunes" were constructed in the 1960s (U.S. Fish and Wildlife Service 2007; National Park Service 2008a). This increases sensitivity of Southern recovery unit populations to frequency and magnitude of storms overwashing the remaining undeveloped habitats.

Boettcher et al. (2007) credited Hurricane Isabel in 2003 with creating favorable habitat conditions that facilitated expansion of the Virginia population. Conversely, piping plover habitat on the northern section of Assateague Island National Seashore has declined in recent years due to the lack of sufficient washover events. In 2003, the Secretary of Homeland Security declared a new inlet that formed during Hurricane Isabel between Frisco and Hatteras Village in North Carolina to be a national security issue and instructed Federal Emergency Management Agency (FEMA) and the Corps to fill the inlet (U.S. Fish and Wildlife Service 2006). Piping plovers in North Carolina remain confined to undeveloped and unstabilized portions of barrier islands, most notably within the Cape Lookout National Seashore, Lea and Hutaff Islands, and spits adjacent to inlets (and Cape Point) in the Cape Hatteras National Seashore and Pea Island National Wildlife Refuge. Reductions in habitat quality due to recent revegetation of habitat created by Hurricane Isabel were noted at Cape Lookout National Seashore in 2008, but this was at least partially offset by formation of new habitats elsewhere within that Seashore (National Park Service 2008b).

<u>Beach Nourishment and Breach Closure Projects</u>: In the wake of episodic storm events, managers of lands under public and private ownership often protect coastal development using emergency storm berms; this is frequently followed by beach nourishment or renourishment activities. Berm placement and beach nourishment deposit substantial amounts of sand along Atlantic beaches to protect local property in anticipation of preventing erosion and what otherwise will be considered natural processes of overwash and island migration (Schmitt and Haines 2003).

Past and on-going stabilization projects fundamentally alter the naturally dynamic coastal processes that create and maintain beach strand and bayside habitats, including those habitat components on which piping plovers rely. Although impacts may vary depending on a range of factors, stabilization projects may directly degrade or destroy piping plover breeding and foraging habitat in several ways. Front beach habitat may be used to construct an artificial berm and dune that is densely planted in grass, which can directly reduce the availability of breeding habitat. Over time, if the beach narrows due to erosion, additional breeding habitat between the berm and the water can be lost. Berms can also prevent or reduce the natural overwash that creates breeding habitats by converting vegetated areas to open sand areas. The vegetation growth caused by impeding natural overwash can also reduce the maintenance and creation of bayside intertidal feeding habitats. In addition, stabilization projects may indirectly encourage further development of coastal areas and increase the threat of disturbance.

On Long Island, Pilkey and Clayton (1985) estimated that between 1926 and 1984 over 70 million cubic yards (cy) of dredged material were used to stabilize the south shore barrier islands. Over 50 percent of this material was used as road base for a 15-mile span of the New York State Ocean Parkway on Jones Island. That effort started in 1926 and effectively stabilized the island and prevented the formation of overwash and breach habitats. Other massive public works projects, such as the creation of Robert Moses and Jones Beach State Parks, transformed the barrier island landscape through development of roads, buildings, and other infrastructure. It is estimated that a total of 6.9 million cy of beachfill was placed along Fire Island from 1933-1989 (Gravens et al. 1999). It is not clear if estimates of beach nourishment in Gravens et al. (1999) includes the more than five million cy of sand placed on Fire Island by the Suffolk County Department of Public Works between the 1940s and mid 1980s (Suffolk County Planning Department 1985). Further, at least another 4.5 million cy of sand were used as beach nourishment on Fire Island from 1990 to the present as part of Moriches and Fire Island Inlet Navigation Project maintenance activities which resulted in shoreline stabilization at Smith Point County Park, Robert Moses State Park, and within some communities in the Fire Island National Seashore.

Over the last 76 years, the response to barrier island breaching has been artificial closure or stabilization using jetties. This practice continued on Long Island following Hurricane Sandy in 2012 when breaches formed on Fire Island at Old Inlet and Smith Point County Park, and on Westhampton Island in Cupsogue County Park. Old Inlet remains open due to governing policies in the National Park Service Fire Island Wilderness Management Plan (National Park Service 1983), which requires public meetings and preparation of an Environmental Impact Statement (EIS) to evaluate the alternatives for breach management.

In November and December of 2012, the Corps closed the Cupsogue and Smith Point County Park breaches under the authority of the Corps' Breach Contingency Plan (BCP) (U.S. Army Corps of Engineers 1996). The Cupsogue breach was1,500 ft wide and included associated sand flats and overwash fans. The Smith Point breach was 500 ft wide and included extensive overwash habitat, and did not appear to flow at low tide (S. Papa, pers. observation). Due to the failure of the Corps and local cost share sponsor (Suffolk County) to satisfy habitat maintenance requirements of the BCP at both the Smith Point and Cupsogue County Park breaches, the Service notified the Corps in letters dated March 23 and June 19, 2013, that their protective coverage of section 9 take prohibitions had lapsed due to these faults. As a result of the Corps failure to ensure implementation of the BCP project description, the Service believes that take occurred in both the 2013 and 2014 breeding seasons.

Groins: Groins (structures made of concrete, riprap, wood, or metal built perpendicular to the beach in order to trap sand) are typically found on developed beaches with severe erosion. Although groins can be individual structures, they are often clustered along the shoreline. Groins act as barriers to longshore sand transport and cause downdrift erosion, which prevents piping plover habitat creation by limiting sediment deposition and accretion (Hayes and Michel 2008). On Long Island, these structures are found on Rockaway Island (>70), Long Beach Island (>40), Fire Island (2), Westhampton Island (16), and Easthampton (4) across the south shore of Long Island.

Seawalls and revetments: Seawalls and revetments are vertical hard structures built parallel to the beach in front of buildings, roads, and other facilities to protect them from erosion. However, these structures often accelerate erosion by causing scouring in front of and downdrift from the structure (Hayes and Michel 2008) which can eliminate intertidal foraging habitat and adjacent roosting habitat. Physical characteristics that determine microhabitats and biological communities can be altered after installation of a seawall or revetment, thereby depleting or changing composition of benthic communities that serve as the prey base for piping plovers. At four California study sites, each comprised of an unarmored segment and a segment seaward of a seawall, Dugan and Hubbard (2006) found that armored segments had narrower intertidal zones, smaller standing crops of macrophyte wrack, and lower shorebird abundance and species richness. Geotubes (long cylindrical bags made of high-strength permeable fabric and filled with sand) are softer alternatives, but act as barriers by preventing overwash. We did not find any sources that summarize the linear extent of seawall, revetment, and geotube installation projects that have occurred across the piping plover's breeding habitat.

Human Disturbance

Recreational disturbance: Disturbance, i.e., human and pet presence that alters bird behavior, disrupts piping plovers as well as other shorebird species. Disturbance can cause shorebirds to spend less time roosting or foraging and more time in alert postures or fleeing from the disturbances (Johnson and Baldassarre 1988; Burger 1991; Burger 1994; Elliott and Teas 1996; Lafferty 2001a, 2001b; Thomas et al. 2002), which limits the local abundance of piping plovers (Zonick and Ryan 1995; Zonick 2000). Shorebirds that are repeatedly flushed in response to disturbance expend energy on costly short flights (Nudds and Bryant 2000).

Shorebirds are more likely to flush from the presence of dogs than people, and birds react to dogs from farther distances than people (Lafferty 2001a, 2001b; Thomas et al. 2002). Dogs off leash are more likely to flush piping plovers from farther distances than are dogs on leash; nonetheless, dogs both on and off leashes disturb piping plovers (Hoopes 1993). Pedestrians walking with dogs often go through flocks of foraging and roosting shorebirds; some even encourage their dogs to chase birds.

Off-Road Vehicles: Off-road vehicles (ORVs) can significantly degrade piping plover habitat (Wheeler 1979) or disrupt the birds' normal behavior patterns (Zonick 2000). The Recovery Plan cites tire ruts crushing wrack into the sand, making it unavailable as cover or as foraging substrate (Hoopes 1993; Goldin 1993). The Recovery Plan also notes that the magnitude of the threat from ORVs is particularly significant, because vehicles extend impacts to remote stretches of beach where human disturbance will otherwise be very slight. Godfrey et al. (1980 as cited in Lamont et al. 1997) postulated that ORVs may compact the substrate and kill marine invertebrates that are food for the piping plover. Zonick (2000) found that the density of ORVs negatively correlated with abundance of roosting piping plovers on the ocean beach. Cohen et al. (2008) found that radio-tagged piping plovers using ocean beach habitat at Oregon Inlet in North Carolina were far less likely to use the north side of the inlet where ORV use is allowed, and recommended controlled management experiments to determine if recreational disturbance drives roost site selection. Ninety-six percent of piping plover detections were on the south side of the inlet even though it was farther away from foraging sites (1.8 km from the sound side foraging site to the north side of the inlet versus 0.4 km from the sound side foraging site to the north side of the inlet; Cohen et al. 2008).

Predation

The 1985 final rule identified predation by pets, feral dogs and cats, skunks, and raccoons as threats on the plover's Atlantic Coast range. The Recovery Plan provides a more thorough discussion of predation threats and recommends specific tasks to be implemented in an integrated approach to predator management employing a full range of management techniques (see task 1.4 and related sub-tasks in that report). Recent research and reports indicate that predation poses a continuing (and perhaps intensifying threat) to Atlantic Coast piping plovers. Erwin et al. (2001) found a marked increase in the range of raccoons and foxes on the Virginia barrier islands between the mid-1970s and 1998, and concurrent declines in colonies of beach-nesting terns and black skimmers. Boettcher et al. (2007) identified predation as "the primary threat facing plovers in Virginia." Review of egg losses from natural and artificial nests at Breezy Point, New York, found that gulls, crows, and rats were major predators (Lauro and Tanacredi 2002). Recommendations included removal of crow nests to complement on-going removal of gull eggs and nests. Modeling by Seymour et al. (2004) using red fox movement data from northern England indicated that risk of fox predation on ground nesting bird species in long, linear habitats increased with narrowing habitat width, and was sensitive to changes in habitat width of even a few meters. Free-roaming domestic and feral cats, particularly those associated with human subsidized feral cat colonies, appear to be an increasing threat to piping plovers and other beach nesting birds.

Although predator numbers are undiminished or increasing, effectiveness of predator exclosures (wire cages placed around nests, a key management tool in the early years of the recovery program) has declined. Episodes of systematic harassment of incubating piping plovers (primarily by foxes, coyotes, and crows) and depredation at exclosures, elevated rates of nest abandonment and incidents of adult mortalities associated with exclosed nests on the Atlantic Coast (U.S. Fish and Wildlife Service 1996, Mostello and Melvin 2002, Melvin and Mostello 2003, 2007) and elsewhere (Murphy et al. 2003) have caused managers to use exclosures more selectively. Cohen et al. (2009) found that exclosures improved nest survival, but not overall reproductive output on Westhampton Island, New York, study sites, a result that has been echoed by studies of other plover species and of piping plovers in their Northern Great Plains breeding range (e.g., Neuman et al. 2004). As effectiveness of exclosures has declined, managers have increased selective predator removal activities at many sites throughout the U.S. Atlantic Coast range (e.g., U.S. Department of Agriculture 2006, National Park Service 2007, Cohen et al. 2009).

Oils Spills

Contaminants have the potential to cause direct toxicity to individual birds or negatively affect their invertebrate prey base (Rattner and Ackerson 2008). Depending on the type and degree of contact, contaminants can have lethal and sub-lethal effects on birds, including behavioral impairment, deformities, and impaired reproduction (Rand and Petrocelli 1985; Gilbertson et al. 1991; Hoffman et al. 1996).

Petroleum products are the contaminants of primary concern, as opportunities exist for petroleum to pollute intertidal habitats that provide foraging substrate. Impacts to piping plovers from oil spills have been documented throughout their life cycle (Chapman 1984; U.S. Fish and Wildlife Service 1996; Burger 1997; Massachusetts Audubon 2003; Amirault-Langlais et al. 2007; Amos 2009 pers. comm.). This threat persists due to the high volume of shipping vessels (from which most documented spills have originated) traveling offshore and within connected bays along the Atlantic Coast and the Gulf of Mexico.

Lightly oiled piping plovers have survived and successfully reproduced (Chapman 1984; Amirault-Langlais et al. 2007; A. Amos pers. comm. 2009). Chapman (1984) noted shifts in habitat use as piping plovers moved out of spill areas. This behavioral change was believed to be related to the demonstrated decline in benthic infauna (prey items) in the intertidal zone and may have decreased the direct impact to the species. To date, no plover mortality has been attributed to oil contamination outside the breeding grounds, but latent effects would be difficult to prove. The U.S. Coast Guard, the states, and responsible parties form the Unified Command, which, with advice from federal and state natural resource agencies, has prepared contingency plans to deal with petroleum and other hazardous chemical spills for each state's coastline. The contingency plans identify sensitive habitats, including all federally listed species' habitats, that receive a higher priority for response actions. The plans allow immediate habitat protective and clean-up measures in response to large contaminant spills, thus ameliorating this threat to piping plovers.

Accelerating Sea-level Rise

Over the past 100 years, the globally-averaged sea level has risen approximately 10-25 centimeters (Rahmstorf et al. 2007), a rate that is an order of magnitude greater than that seen in the past several thousand years (Douglas et al. 2001 as cited in Hopkinson et al. 2008). The International Panel on Climate Change (IPCC) suggests that by 2080, sea-level rise could convert as much as 33 percent of the world's coastal wetlands to open water (Internal Panel on Climate Change 2007). Although rapid changes in sea level are predicted, estimated time frames and resulting water levels vary due to the uncertainty about global temperature projections and the rate of ice sheets melting and slipping into the ocean (International Panel on Climate Change 2007; CCSP 2008).

Inundation of piping plover habitat by rising seas could lead to permanent loss of habitat if natural coastal dynamics are impeded by numerous structures or roads, especially if those shorelines are also armored with hardened structures. Without development or armoring, low undeveloped islands can migrate toward the mainland, pushed by the overwashing of sand eroding from the seaward side and being re-deposited in the bay (Scavia et al. 2002). Overwash and sand migration are impeded on developed portions of islands. Instead, as sea-level increases, the ocean-facing beach erodes and the resulting sand is deposited offshore. The buildings and the sand dunes then prevent sand from washing back toward the lagoons, and the lagoon side becomes increasingly submerged during extreme high tides (Scavia et al. 2002), diminishing both barrier beach shorebird habitat and protection for mainland developments. Modeling for three sea-level rise scenarios (reflecting variable projections of global temperature rise) at five important U.S. shorebird staging and wintering sites predicted loss of 20-70 percent of current intertidal foraging habitat (Galbraith et al. 2002). These authors estimated probabilistic sea-level changes for specific sites partially based on historical rates of sea-level change (from tide gauges at or near each site); they then superimposed this on projected 50 percent and 5 percent probability of global sea-level changes by 2100 of 34 cm and 77 cm, respectively.

ENVIRONMENTAL BASELINE

Description of the Action Area

The *Action Area* includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR §402.02). As further defined in 50 CFR §402.02, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole, or in part, by federal agencies in the United States or upon the high seas. Overall, the environmental baseline includes the past and present impacts of all federal, State, or private activities in the Action Area, the anticipated impacts of all proposed Federal projects in the Action Area that have already undergone formal or early consultation, and the impact of State or private actions that are occurring in the Action Area. The current piping plover reproduction, numbers, and distribution on Long Beach Island are reflective of all of these impacts which are described below.

Given that the proposed action has effects ranging from nearly immediate, direct losses of habitat due to the footprint of the groins, dune, sand fences, vehicle access routes, and dune walkovers and longer-term morphologic habitat changes in distant sites, the species will be affected over varying temporal and spatial scales.

Temporally, the potential impacts resulting from the proposed action encompass all the activities associated with construction, maintenance, and use of the project area. The proposed project has a 50-year life and will take over three years to construct, after which, periodic beach nourishment will take place every five years, along with continual maintenance of other project features such as groins, sand fences, dune walkovers, and vehicle access points.

The Corps' BA defined an ephemeral pool area that extended from Malibu Town Park to Lido Beach East Town Park. Within this area, the Corps delineated a main plover nesting area from the western portion of Nickerson Beach to the Sands at Lido Beach Park. However, this did not account for observed plover breeding activities at Nickerson Beach East, Malibu Town Beach, Point Lookout, and from Lido Beach East Town Park to Lido Beach West Town Park. Therefore, the Service has delineated the Action Area to extend from Jones Inlet west to the Lido Beach West Town Park, a distance of about 3 mi, and encompassing 74 hectares (ha) of beach habitat. This area corresponds to Corps' plan sheets numbered 8-14 found in U.S. Army Corp of Engineers (2014b). However, within this zone, the Service does recognize that most plover nests from 2003 -2014 were observed in an area extending from Point Lookout to the Lido Beach Town Park East for a distance of 2 mi of beach habitat.

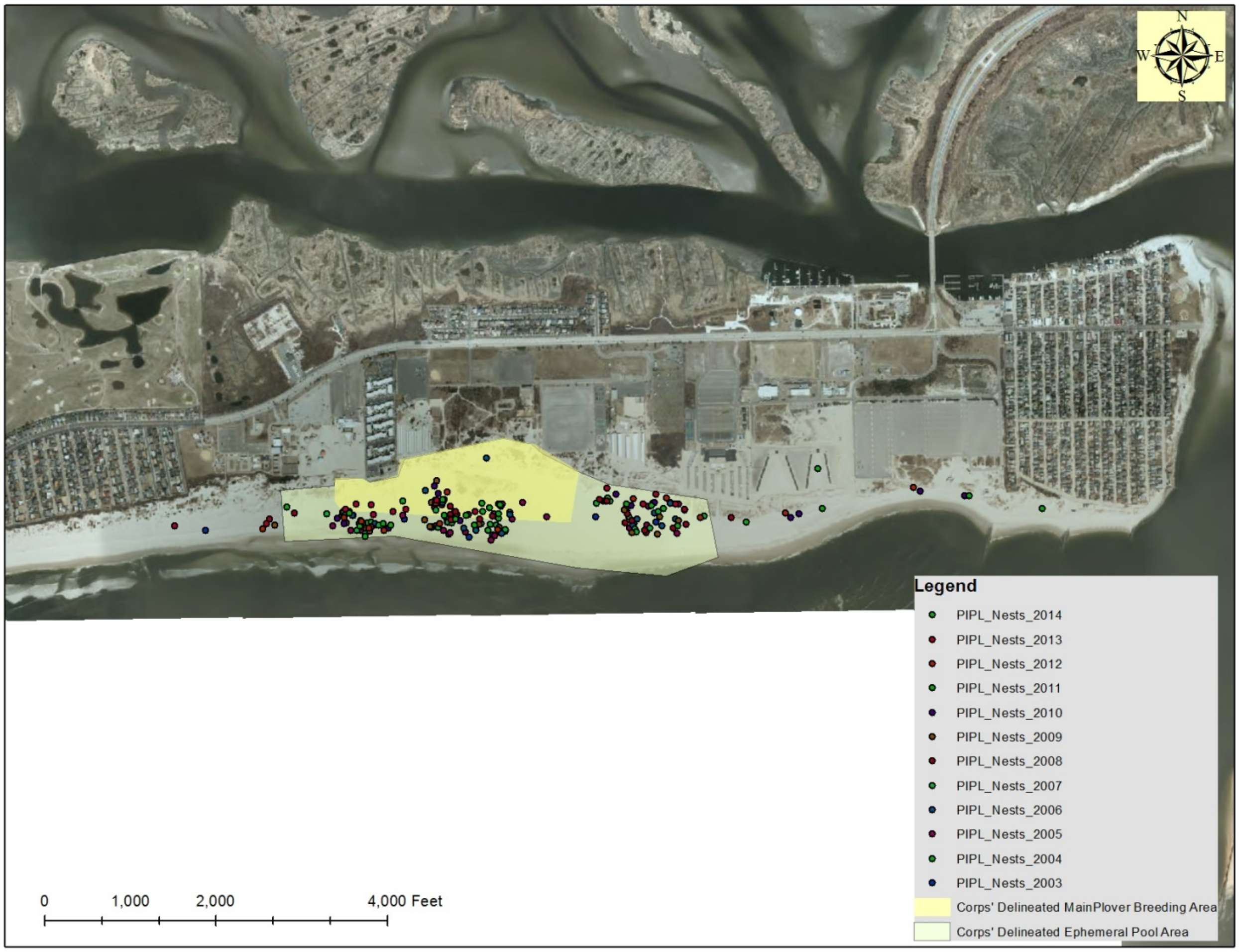

Figure 30. Map showing location of Corps' delineated main plocver area and ephemeral pool area in realtion to piping plover nests from 2003-2014.

The Action Area beaches and coastal dunes are part of a complex and dynamic coastal system that continually respond to inlets, tides, waves, erosion and deposition, longshore sediment transport and depletion, fluctuations in sea level, and weather events. It includes the intertidal zones, upper beach areas, wrack lines, and ephemeral ponds. The location and shape of the coastline perpetually adjusts to these physical forces. Winds move sediment across the beach, forming and eroding dunes and the landscape. The natural communities contain plants and animals that are subject to shoreline erosion and deposition, salt spray, wind, drought conditions, and sandy soils. Vegetative communities include foredunes, primary and secondary dunes, and expanses of moist open sandy habitats. During storm events, sand is deposited across the beaches, clearing vegetation and increasing the amount of open, sandflat habitat ideal for shoreline-dependent shorebirds such as the piping plover. However, the protection or persistence of these important natural land forms, processes, and wildlife resources is often in conflict with shoreline stabilization projects and their indirect effects. For example, increases in residential development, infrastructure, and public recreational uses, along with decreased formation of ephemeral pools and preclusion of overwash, all limit the creation or quality of piping plover habitat.

The Action Area contains extensive areas of parkland managed by the Town of Hempstead and Nassau County (Figure 11), and several developments at Point Lookout, Lido Beach Towne House Condominiums, and Lido Beach. Point Lookout residential development fronts about 1,850 ft of ocean beach while commercial development is found along Lido Boulevard and the bayside areas. The Lido Beach Towne House Condominiums front about 400 ft of ocean beach. Lido Beach residential development fronts about 2,700 ft of ocean beach.

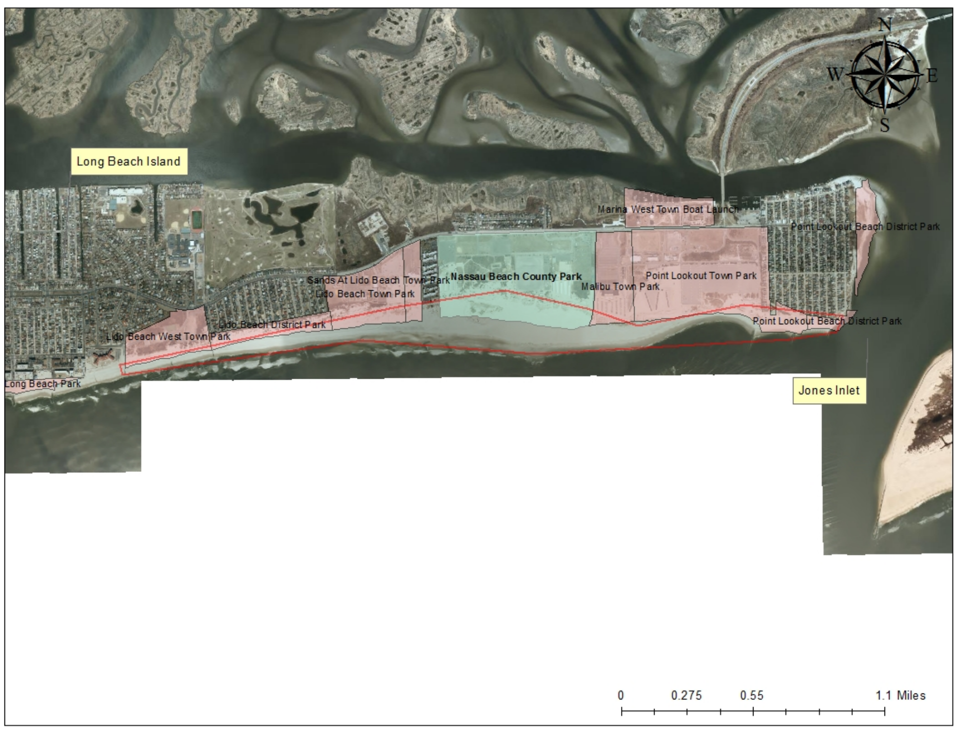

Figure 11. Map showing the Action Area (outlined in red). Land use patterns in the Action Area also depicted. Red - Town of Hempstead park property; Green - Nassau County park property.

Long Beach Island can be accessed from the east via the Loop Parkway Bridge, Island Park Bridge, and Atlantic Beach Bridge. The scope of land uses in the Action Area includes recreational, commercial, residential, and administrative activities undertaken by Nassau County and the Town of Hempstead. Recreational activities that occur in the Action Area include swimming, surfing, sunbathing, beach-combing, clamming, nature viewing, walking, running, and fishing.

Role of the Action Area in the Survival and Recovery of Piping Plovers

The Action Area is situated in the New York-New Jersey recovery unit where shoreline stabilization has resulted in a landscape where habitat formation is significantly constrained. Loss and degradation of habitat has resulted in loss of carrying capacity and increases in disturbance from beach recreation and predation.

The current Long Island shoreline management regime provides limited opportunities for formation and preservation of preferred overwash habitats (Figure 12). For example, the Service reported on the recent losses of habitat to shoreline stabilization, including about 4 mi of preferred habitats and an additional 15 mi of barrier island habitat due to the Corps' Fire Island Inlet to Moriches Inlet, Fire Island Stabilization Project (U.S. Fish and Wildlife Service 2014).

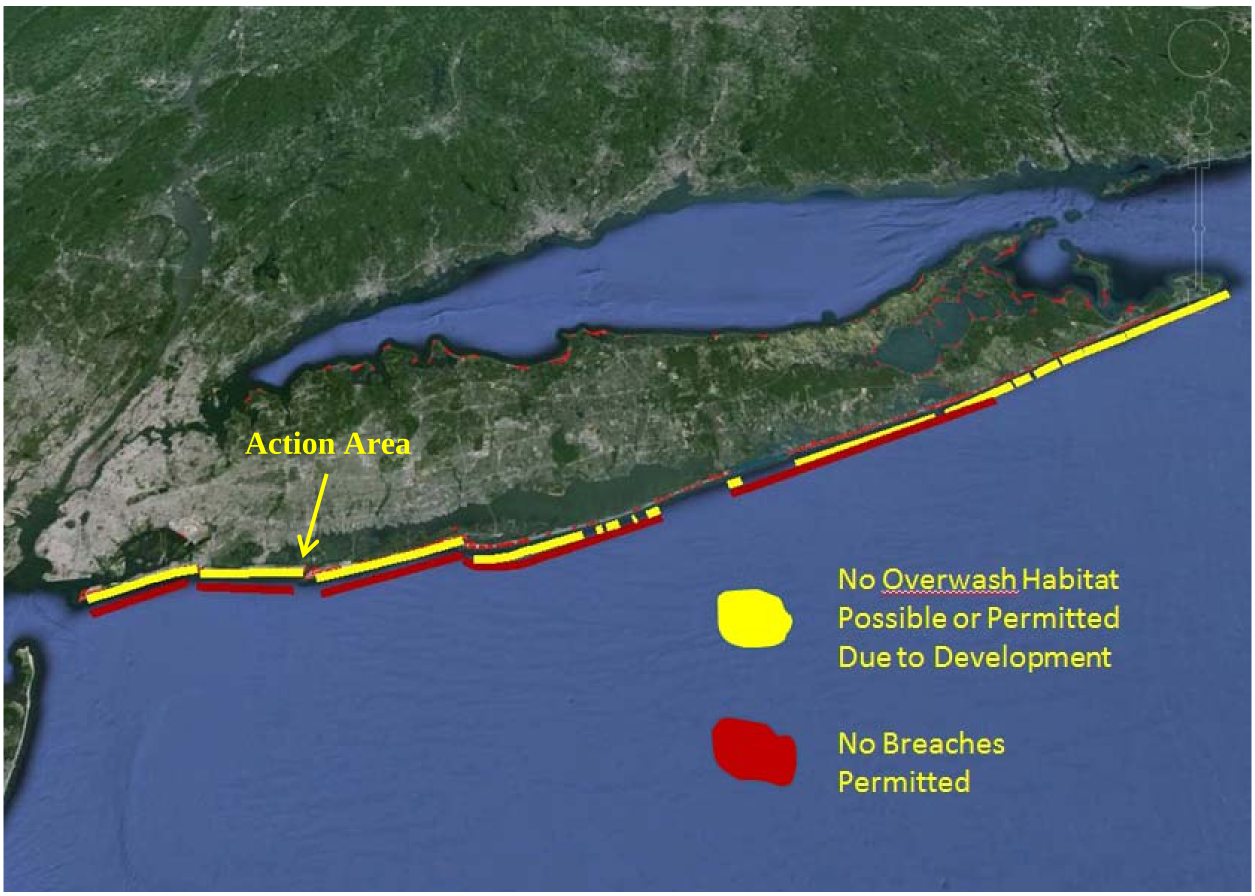

Figure 12. Long Island shoreline management regime depicting extremely limited opportunities for formation and maintenance of bay to ocean overwash habitat.

The susceptibility of the project area to partial overwash during future storms (U.S. Army Corps of Engineers 2014b) creates the likelihood of natural habitat maintenance and formation on the ocean beaches in the Action Area within a defined area. An increase in plover productivity in the Action Area can create potential future breeders, however, habitat availability will be the primary determinant of whether this breeding subpopulation can reach carrying capacity, be productive, and contribute to the recovery unit.

Status of the Species in the Action Area

Piping plovers breed on the ocean beaches stretching from Jones Inlet to the Lido Beach West Town Park. This area corresponds to the New York State Department of Environmental Conservation's (NYSDEC) Long Beach Island Lido Beach LICWA (Long Island Colonial Waterbird and Piping Plover Survey) site (Lido Beach LIWCA site) and is monitored and managed by the Town of Hempstead's Department of Conservation and Waterways and Nassau County. The Lido Beach LICWA site is the largest and most productive of the two piping plover breeding sites on Long Beach Island and corresponds to the Action Area. The other breeding site, which is outside of the Action Area, is the Long Beach Island Atlantic Beach LICWA site. Due to the developed nature of Long Beach Island, both breeding areas are confined to the ocean beach.

Abundance estimates from 2000-2013 for Long Beach Island are shown in Figure 13. Over this time, the total population on Long Beach Island ranged from 15-27 pairs. From 2000 to 2013, the plover population in the Action Area ranged from 8 to 19 pairs and averaged close to 70 percent of the total Long Beach Island population, and supported an average of 13.4 pairs. The population declined from 15 pairs in 2013 to 12 pairs in 2014 (T. Schneider-Moran, pers. comm., 2014), but increased its reproductive output.

From 2000 to 2013, productivity has ranged from 0.20 to 2.2 chicks fledged per pair in the Action Area. The maximum productivity level in the Action Area was reached in 2004; the lowest productivity was reached in 2013. The average productivity from 2001 to 2014 (preliminary data) was 1.34 chicks fledged per pair. Factors affecting productivity include habitat loss, fragmentation, beach stabilization, wrack removal and beach cleaning, avian and mammalian predators, recreation, and administrative ORV use and are all factors affecting the distribution, abundance, and productivity of plovers in the Action Area.

Figure 14 shows the distribution of plover breeding activity within the Action Area. The area between Jones Inlet and the proposed groin D has supported up to four pairs of piping plovers in 2008, 2009, 2010, 2012, and 2014, which represents about 30 percent of the plover pairs that breed in the Action Area. The remaining 70 percent of the population is located immediately downdrift of the proposed groin D.

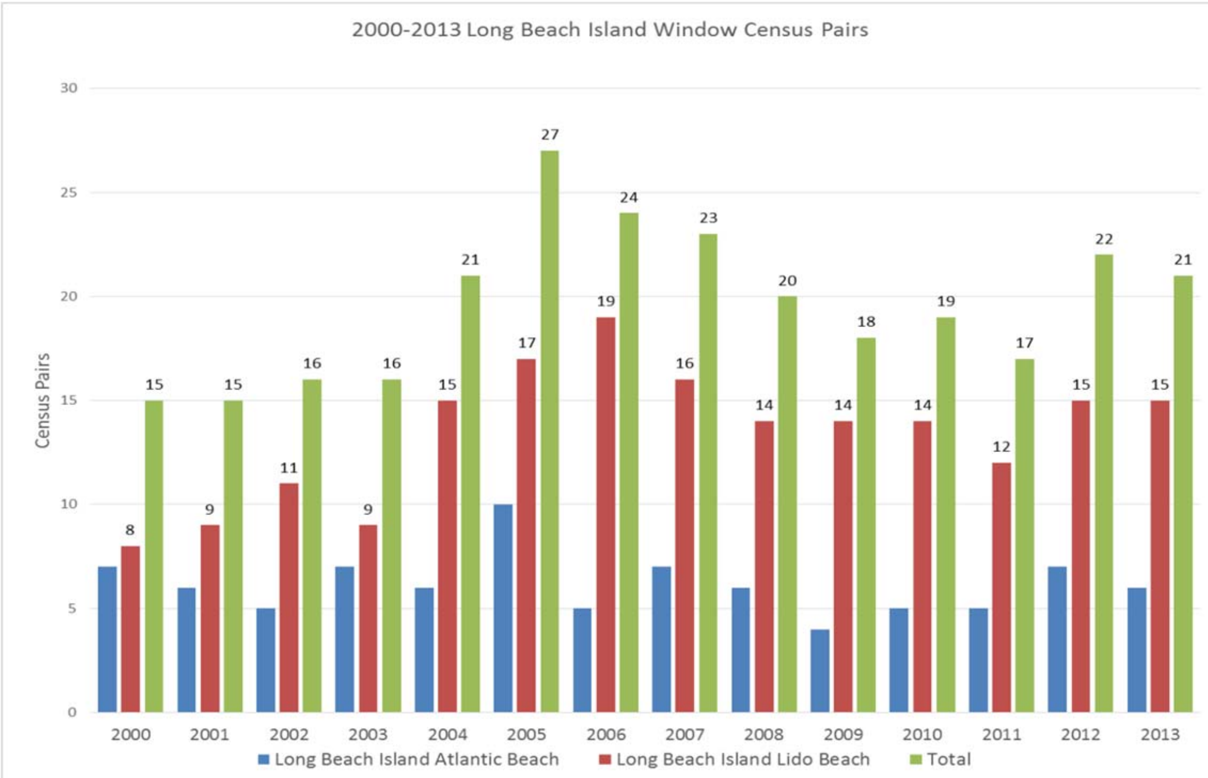

Figure 13. Piping plover abundance estimates 2000-2013.

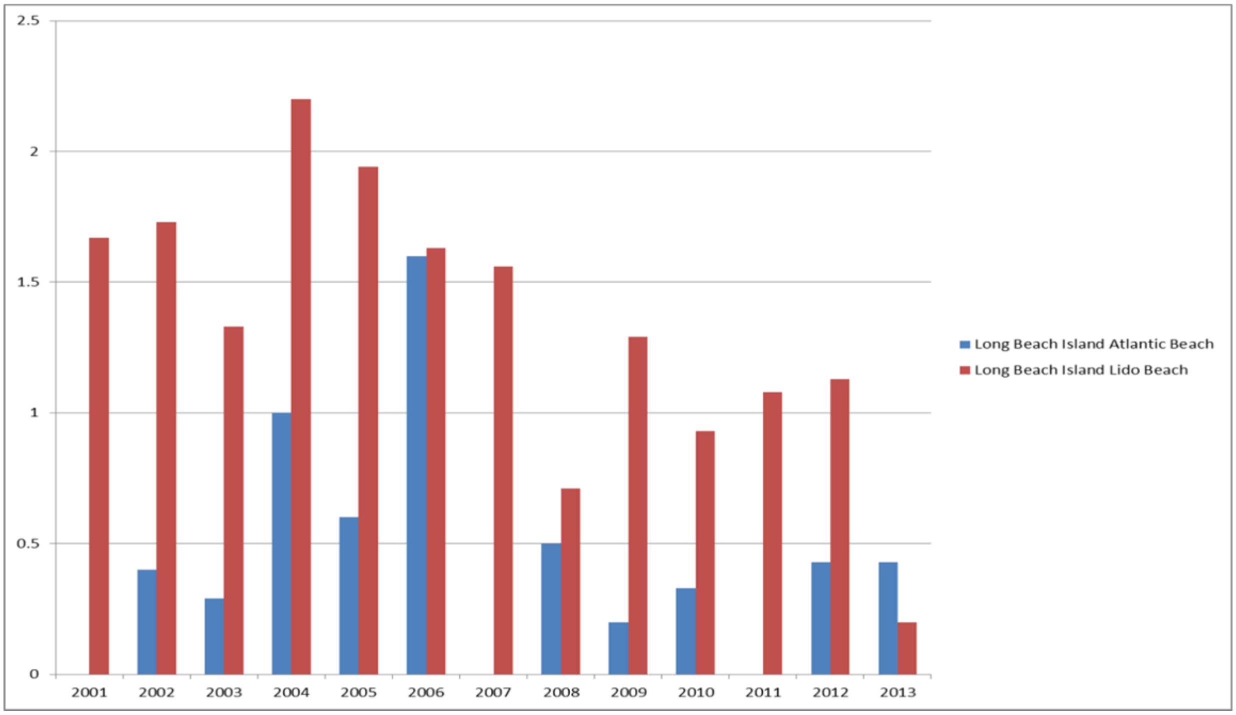

Figure 14. Piping plover productivity on Long Beach Island from 2001-2013.

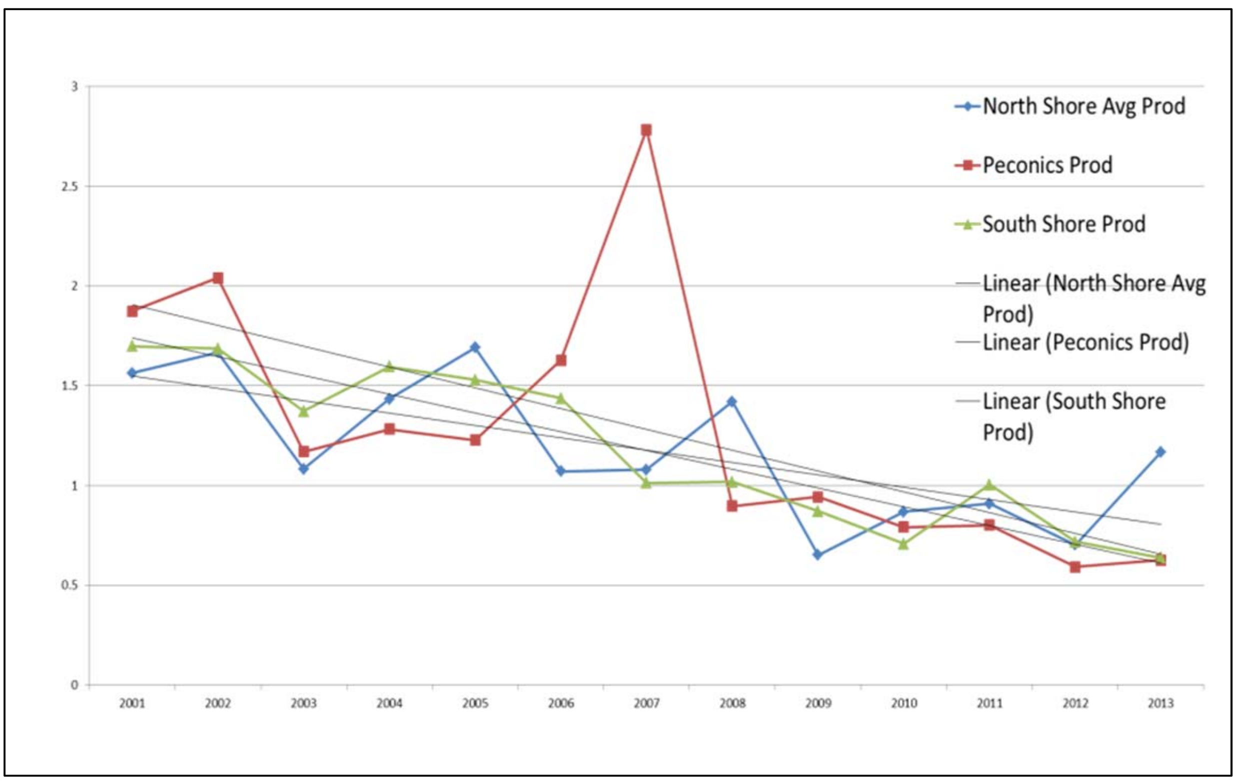

Figure 15. Declines in productivity (chicks fledged per pair) on Long Island.

Figure 16. Map showing piping plover nest locations (multi-colored points) in the Action Area. Years: 2003-2014.

Factors Affecting Species' Environment in the Action Area

As noted above, habitat loss, fragmentation, beach stabilization, wrack removal and beach cleaning, avian and mammalian predators, recreation, and administrative ORV use are all factors negatively affecting the species' environment, distribution, reproduction and abundance in the Action Area. Beneficial actions are undertaken by the Town of Hempstead and Nassau County in the Action Area and include seasonal monitoring and protection, as well as vegetation and topographic management to promote early successional habitat.

Habitat Loss and Fragmentation:

The eastern end of the Action Area has been affected by extensive stabilization activities undertaken to prevent overwash, inlet migration, and other natural coastal processes that create and maintain optimal plover habitat. Land use development patterns spurred by past shoreline stabilization activities have resulted in the loss and fragmentation of habitat. Residential development and infrastructure, including roadways, parking lots, municipal buildings, and shoreline stabilization structures, have all constrained and prevented the expansion of suitable habitat in the Action Area, as overwash processes are limited to the ocean beaches due to upland development and infrastructure. Bay to overwash habitat is non-existent. The distribution of plovers is concentrated where beaches have accreted at the ebb tidal shoal weldment area (U.S. Army Corps of Engineers 2014a; 2014b) and where the Town has undertaken vegetation management and created ephemeral pools.

Long Beach Island is more armored than the New York oceanfront shoreline as a whole, with 67 percent of the shoreline armored with hard stabilization structures (not including the jetty at East Rockaway Inlet) as compared to 20 percent armoring for the entire state oceanfront shoreline. Fifty groins have already been constructed on the island (Coastal Planning and Engineering 2009).

Portions of Long Beach Island have received beach fill since the 1950s, with over 3.43 million cy of sediment placed on the island's beaches from 1956 to 2009 (Coastal Planning and Engineering 2009). Most of the sediment has been placed at the eastern end of the island in Point Lookout and Hempstead, although Lido Beach received fill in 1956 and 1962 (Greene 2002; Coastal Planning and Engineering 2009).

The easternmost beach fill segment of the proposed project would overlap with areas within Point Lookout that receive dredged spoil placement from Jones Inlet Federal Navigation Channel under the Corps' Section 933 project. Approximately 1.591 million cy of sediment was placed in four episodes from 1982 to 2008 (Coastal Planning and Engineering 2009). Previous sediment placement projects have deposited fill along an estimated 15 percent of the island's beaches.

<u>Beach Raking</u>: Wrack removal is undertaken in select areas throughout the Action Area by Nassau County and/or the Town of Hempstead at Point Lookout, Malibu, Nickerson, and Lido Town Park East beaches on a regular basis, including during the piping plover season which coincides with recreational beach use. The motorized rakes can also directly affect the species' breeding, feeding, and sheltering behaviors.

Beach raking removes shell fragments, sparse vegetation, and wrack material, all of which characterize habitat favored by piping plovers. It can also affect beach morphology such as topographic depressions and sparse vegetation nodes used by roosting and foraging piping plovers. Wrack on beaches provides important foraging habitat for piping plovers (Drake 1999; Smith 2007; Maddock et al. 2009; Lott et al. 2009) and many other shorebirds on their winter, breeding, and migration grounds. Because shorebird numbers are positively correlated with wrack cover and biomass of their invertebrate prey that feed on wrack (Tarr and Tarr 1987; Hubbard and Dugan 2003; Dugan et al. 2003), grooming will lower bird numbers (Defreo et al.

2009). Beach raking vehicles can disturb adult and chick foraging behaviors and pose a mortality threat to chicks.

Other Beach Management Activities

Off-road vehicle (ORV) use is limited to municipal activities and can negatively impact piping plovers both directly and indirectly. Vehicles can run over small, camouflaged piping plover chicks (U.S. Fish and Wildlife Service 1996a). Vehicles also create tire ruts that can trap flightless chicks, or become an impediment to chick foraging and predator avoidance (U.S. Fish and Wildlife Service 1996a). Current management measures implemented by the Town and County include driving at 5 miles per hour through chick foraging areas in adherence to the Service's piping plover recreational management guidelines (U.S. Fish and Wildlife Service 1996a). However, a dead plover chick was found crushed in a tire track on Nickerson Beach during the 2014 breeding season, which will necessitate review of this program by the Service, Town of Hempstead, and Nassau County. Overall, motorized vehicles reduce habitat suitability for both the piping plover in many parts of the Action Area.

Predation: Piping plover predators in the Action Area include gull species (*Larus* spp.), American crow (*Corvus brachyrhynchos*), feral cats, dogs, and possibly ghost crabs (*Ocypode quadrata*). Aggressive interactions between plovers and American oystercatchers (*Haematopus palliatus*) have also been observed in the Action Area. Feral cats have been identified as a likely source of harassment and predation of plovers at this site by the Town (Schneider 2013, electronic correspondence to the Service). There are no dedicated Town of Hempstead or Nassau County programs to remove feral cats from piping plover breeding grounds in the Action Area. Predator exclosures are used by the Town of Hempstead to increase hatching success in the Action Area, but do not guarantee reproductive success as measured by the number of chicks fledged per pair of the species.

Although most municipalities have ordinances prohibiting pets on the beach, leashed and unleashed dogs are commonly encountered. Municipal enforcement of these laws is lacking.

Recreation Impacts: There are numerous potential sources of recreational disturbance to plovers in the Action Area including, but not limited to, recreational fishing, kite-flying, bird-watching, surfing, dog-walking, and large fireworks events.

Beneficial Actions: Efforts to create and maintain nesting and foraging habitat have been undertaken by the Town of Hempstead in the Action Area (Figure 16), including vegetation removal or thinning, regrading to remove insipient dunes, and the ephemeral pools creation in several areas west of the proposed groin D. The Service recognizes these efforts as potentially beneficial actions, but scientific studies are needed to determine the overall effectiveness of these efforts in maintain carrying capacity of the habitat.

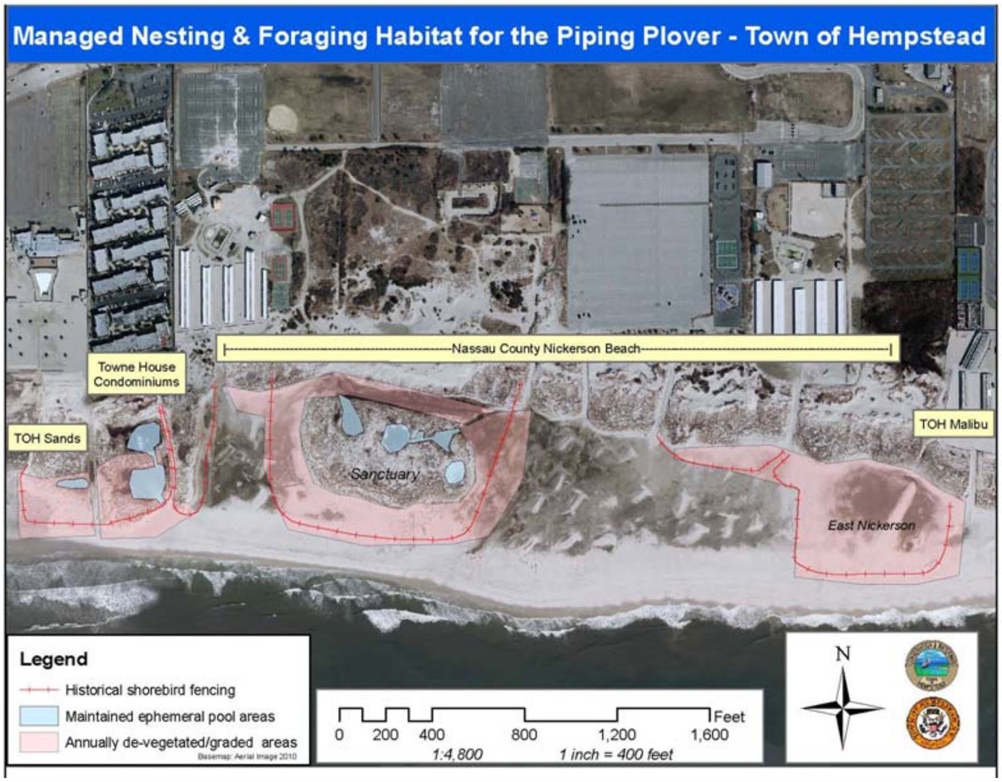

Figure 16. Map showing location of Town of Hempstead habitat manipulation efforts in the Action Area. Prepared by Town of Hempstead Department of Conservation and Waterways.

EFFECTS OF THE ACTION

Factors to be considered

In evaluating the effects of the federal action under consideration in this consultation, 50 CFR §402.2 and 402.13(g)(3) requires the Service to evaluate both the "...direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The *Status of the Species and Environmental Baseline* sections of the Opinion describe the many factors that affect piping plover population dynamics and distribution, including beach nourishment, breach closures, shoreline development, shoreline stabilization, beach raking, oil spills, environmental contaminants, avian and mammalian predator species, recreational impacts, ORV use, climate change, and habitat suitability. The extent to which many of these factors adversely affect piping plover is related in large part to habitat conditions along Long Island's ocean and bay beaches.

The proposed 50-year project includes construction and rehabilitation of groins, dunes, beaches, walkovers, and vehicle access points, as well as sand fence installation and beach grass planting, along with 5-year beach renourishment cycles, and continual maintenance of the project features within habitat that is used by piping plovers. Initial construction and maintenance periods of the proposed project will overlap with portions of piping plover breeding season. Initial construction activities related to the terminal groin (groin 58) in Point Lookout will be undertaken with inadequate buffer zones to avoid harassment of the species; however, a time of year restriction (April 1 to September 1) and 1,000 m buffer will be applied throughout the rest of the Action Area. Long-term and permanent impacts will likely include habitat loss, degradation, and fragmentation. As outlined in the BA and in the following sections, reduced prey resources, increased human disturbance, and increases in predation will also occur. Shorter term impacts from construction activities, which will be limited to the terminal groin construction activities, will occur if the birds are present during construction and include disruption of breeding, feeding, and sheltering behaviors.

The geomorphic characteristics of barrier islands, peninsulas, beaches, dunes, ephemeral pools, overwash fans, and inlets are critical to a variety of plants and animals and influence a barrier beach's ability to respond to wave action, including storm overwash and sediment transport. However, the protection or persistence of these important natural land forms, processes, and wildlife resources are often in conflict with shoreline projects. The proposed project may impede overwash, thereby delaying, causing, or sustaining successional advances in the habitat that will reduce plover habitat formation, and therefore, its use by piping plovers in the project area.

Conservation measures have been proposed by the Corps that may minimize some of the potential impacts of the project to the piping plover.

<u>Discussion</u>

The Long Beach Island Project is one of the largest civil works projects proposed by the Corps for the south shore of Long Island. It is designed to substantially stabilize the barrier island in and around the Action Area for at least 50 years. The proposed project would perpetuate stabilization of beach habitats in the piping plover breeding areas with likely negative consequences to the piping plover.

The Service has determined that the effects of the action include:

(a) Direct adverse effects due to construction activities;
(b) Indirect adverse effects due to destruction, degradation, and fragmentation of plover breeding and foraging habitats on ocean beach habitats;

(c) Indirect adverse effects due to the destruction of plover prey resources on oceanside beaches;
(d) Indirect adverse effects due to increased predation; and
(e) Indirect adverse effects due to increased recreational disturbance.

Direct Effects Due to Construction Activities

Project Activities during the breeding season

The Corps has indicated that it will not undertake construction activities of any kind during the plover season in the Action Area, with the exception that it will work in the area of the terminal groin 58 on the west side of Jones Inlet and use a 1,000-m buffer to protect breeding plovers in the western portion of the Action Area. The Corps will establish a 200-m construction zone around the terminal groin area using temporary fencing.

Proposed 1,000-m buffer zone

The Corps has agreed to implement a 1,000-m buffer zone around adult nesting and brood foraging areas during construction of the proposed project, except in regard to reconstruction of the terminal groin (Peter Weppler, pers. comm. November 21, 2014). The Service believes that the 1,000-m buffer, along with construction monitoring provided in the proposed Conservation Measures, will substantially reduce the potential for adverse effects to breeding plovers and their chicks. Patterson (1988), Cross (1990), Coutu et al. (1990), Strauss (1990), and Loegering (1992) observed that plover chicks may move up to 1,000 m from their nest sites, commonly traveling more than 200 m in the first week post hatching, so a 1,000-m buffer zone would put activities at what may be considered an outer limit of movement based on these studies. Greater movements of plover broods have been observed by National Park Service (NPS) staff on Fire Island, but the Service believes this buffer will be fairly effective in minimizing potential threats to the species when coupled with the construction monitoring plan.

Reconstruction of the terminal groin 58 will place activities within less than 500 ft of currently known piping plover breeding areas at Point Lookout Town Park and will result in the potential for harassment. Harassment may lead to nest site abandonment, disruption of feeding, and potential mortality of eggs due to construction activities. Over the last four years, up to three pairs (2 pairs in 2014 and 1 pair in 2010) have nested within 2,000 ft of the terminal groin. As of the writing of this Opinion, the Service has not been informed as to the accessways the Corps will use to reach the terminal groin or the work area needed around the terminal groin for machinery and equipment. Access from Point Lookout Park along the beach will place construction activities in close proximity to breeding plovers on a frequent basis throughout the construction period. Since information on the work area and access roads is lacking at this time, we cannot determine exactly how close construction activities will be to recently observed breeding areas.

Specifically, potential direct adverse effects that are likely to up to three pairs of plovers and 2,000 ft of habitat due to the construction of the terminal groin 58 include:

1) If terminal groin construction starts prior to the beginning of the breeding season, then arriving plovers will likely be harassed to the point that they do not colonize the habitat that is proximal to the construction activities; and

2) If terminal groin construction is initiated during the plover season, it may result in site abandonment, or significantly affect their sheltering, breeding, or feeding behaviors. Specifically, impacts may include territory abandonment, disruption of pair bonds, nest abandonment, elevated predation of eggs and chicks due to adults being less attentive, and increased chick mortality due to reduced foraging opportunities. These effects will adversely affect piping plover productivity and recovery.

Disturbance can cause shorebirds to spend less time roosting or foraging and more time in alert postures or fleeing from the disturbances (Johnson and Baldassarre 1988; Burger 1991; Burger 1994; Elliot and Teas 1996; Lafferty 2001a, 2001b; Thomas et al. 2002), which limits the local abundance of piping plovers (Zonick and Ryan 1995; Zonick 2000). Shorebirds that are repeatedly flushed in response to disturbance expend energy on costly short flights (Nudds and Bryant 2000) which could otherwise be reserved for tending nests or young.

As noted in Valente and Fischer (2011)

> "Birds may exhibit a variety of behavioral and physiological responses to disturbance events, the results of which are virtually always negative (Blanc et al. 2006; Gill 2007). Increased heart rates (Wilson et al. 1991, Weimerskirch et al. 2002, Ackerman et al. 2004) or core body temperature alterations (Regel and Pütz 1997) result in loss of energy that could be used for other life-history requisites, while elevated concentrations of stress hormones in the body (Romero and Romero 2002) can impair breeding success (Silverin 1986, Saino et al. 2005). Birds may also respond by increasing vigilance or anti-predatory behaviors and ultimately fleeing, which expends more energy and decreases the amount of time available for feeding and resting (Galicia and Baldassarre 1997, Peters and Otis 2005; Blanc et al. 2006; Fernandez-Juricic et al. 2007). During the breeding season, disturbances can also disrupt incubation patterns (McGowan and Simons 2006), increasing the number of nest failures due to predation (Ellison and Cleary 1978, Hand 1980, Bolduc and Guillemette 2003), solar radiation (Hunt 1972), and abandonment (Ellison and Cleary 1978, Tremblay and Ellison 1979, Safina and Burger 1983, Blackmer et al. 2004).

Indirect Effects Due to Soft and Hard Beach Stabilization

The only significant areas of beach on Long Beach Island without armoring exist at Malibu Town Park, Nickerson Beach, Lido Beach East Town Park, and the western end of Atlantic Beach (which is within the zone of influence of the East Rockaway Inlet jetty). Construction of proposed groins A-D would increase the proportion of the island that is armored from 67 to 79 percent, not including the jetty at East Rockaway Inlet. The proposed project would also increase the proportion of the island's beaches modified by beach fill and/or dune construction from 15 percent to 71 percent.

At the current time, about 23 percent of the shoreline in the Action Area contains hard stabilization features consisting of three existing groins south of the Point Lookout development (groins 55, 56, and 58), a stone revetment south of the Town of Hempstead's Point Lookout Park, and three groins (groins 52, 53, and 54). Groins 55, 56, and terminal groin 58 are located on 1,700 ft of beach, and groins 52-54 stretch over about 2,000 ft of beach. The proposed project would increase the percentage of shoreline that is stabilized via groins to 43 percent, an increase of about 20 percent above the existing conditions in the Action Area. Therefore, the proposed project would also include 10,640 ft of beach nourishment, 15,840 ft of dune building or augmentation, sand fence installation, and beach grass planting with the provision that no beach nourishment occurs from proposed groin D west for a distance of about 4,965 ft, which represents the area the Corps delineated as an existing ephemeral pool and nesting areas.

The Service recognizes that the concentration of existing stabilization structures in the Action Area have been in place for many years in the Point Lookout area, and have prevented barrier island processes from shaping and forming the island and creating additional plover habitat beyond the current baseline conditions. Economic consideration of the extensive upland infrastructure at Point Lookout further suggests that abandonment of the existing structures is unlikely in the foreseeable future, irrespective of the proposed project. However, the proposed construction of groins A-D and the deferred construction of groins E and F on Long Beach Island is not typical of shoreline protection strategies employed by the Corps along the East Coast from New York south, as well as the Gulf Coast, over the last two decades, where soft stabilization projects are the norm (see U.S. Army Corps of Engineers 2006). Ultimately, these project features will permanently change the landscape by influencing barrier island dynamics in a manner that is not completely understood nor well forecasted.

The proposed groin field will be constructed in areas used by piping plover for breeding, feeding, and chick-rearing. About 3,100 ft of beach between existing groin 55 and the proposed groin D, which encompasses 16 ha of plover breeding habitat, will be fragmented and degraded by the construction of these new groins and associated artificial dunes, beaches, vegetation planting, and sand fence installation. One vehicle access point and two timber dune walkovers will also be constructed in this stretch and contribute to the fragmentation, loss, and degradation of habitat.

From groin D to the eastern end of Lido Beach West Town Park, the Corps proposes dune enhancement by filling in gaps in the dunes, planting of vegetation, and installation of sand fences. From Lido Beach East Town Park to the western boundary of Lido Beach West Town Park, the Corps would resume beach nourishment along with construction of the other project elements. Cumulatively, these activities would also degrade habitat by eliminating features such as dune blow outs and gently sloping foredunes, increasing the density of vegetation that is non-conducive to plover use, and accelerating dune growth via sand fence installation and beach grass planting. In addition, the construction of seven timber dune walkovers, the rehabilitation of seven existing timber dune walkovers, and construction of seven vehicle access points west of the proposed groin D, are also planned which would further degrade habitats via the facilitation of recreation and ORV use of the area.

The Service does not fully concur with the modelling results presented in U.S. Army Corps of Engineers (2014b) that predicted no negative effects to the shoreline or main plover breeding habitat due to the construction of proposed groins A-D. The SBEACH (Storm-induced BEAch CHange Model) and GENESIS (GENEralized Model for SImulating Shoreline Change) models which were used to evaluate these effects, are constrained by numerical uncertainty and undemonstrated predictive powers in the coastal setting; additional model shortcomings have been described in the literature (e.g., Young et al. 1995; Pilkey et al. 1999). Our lowered level of confidence in these results is also influenced by the Corps' plan to construct groins E and F, in the area west of proposed groin D if, or when, erosion occurs there. Our reservations are also influenced by the knowledge that groins can act as barriers to longshore sand transport (U.S. Army Corps of Engineers 2006), and, in this particular case, can have unintended consequences of causing downdrift erosion should the weldment area migrate eastward (U.S. Army Corps of Engineers 2014b). The Corps' *Coastal Engineering Manual* (U.S. Army Corps of Engineers 2006) describes the widely accepted downdrift impact of groins and states that even when filled with beach fill, groins will still cause some amount of downdrift erosion. The magnitude of the erosion may be somewhat minimized by the placement of beach fill within the new groin compartments and the fact that they will be tapered in length from east to west. Berm construction west of Lido Beach East Town Park may act as a source of sediments to beaches to the east during periods of reverse littoral drift.

The Corps notes that erosion of habitat downdrift of the proposed groin D could be precipitated by several factors such as weldment dissipation, effects of the new groins, and updrift changes in sediment transport (U.S. Army Corps of Engineers 2014b). As part of their monitoring and mitigation plan to evaluate shoreline change, the Corps established a 250-ft wide berm as a threshold trigger for undertaking a new decision document that would evaluate the economic and technical feasibility of constructing groins E and F and added beach fill to mitigate the erosion (U.S. Army Corps of Engineers 2014b). Should erosion at this scale occur, then significant loss of habitat in this area would be likely. This would be extremely detrimental to plovers and their habitats in the Action Area and on Long Beach Island, as a whole. Our concern is illustrated by noting the distributional trends of plovers in the Action Area from 2003 -2014, which indicate most plovers in the Action Area use habitat that is west of the proposed groin D and seaward of the 250 ft threshold line (shown as red line in Figure 17). The magnitude of habitat loss would be significant, translating to a potential loss of up to 600 ft of beach width from groin D to Lido Beach East Town Park encompassing 26 ha before any monitoring activities in support of a new decision document are undertaken. If the deferred groins E and F were constructed on this much narrower beach, the additional groins and additional beach fill are not likely to replicate the habitat features that have been lost. In fact, their presence may prevent the wide, sparsely vegetated, low elevation habitat from reforming and the habitat value would then be permanently diminished or lost, resulting in a significant reduction or even possible extirpation of plovers from this site.

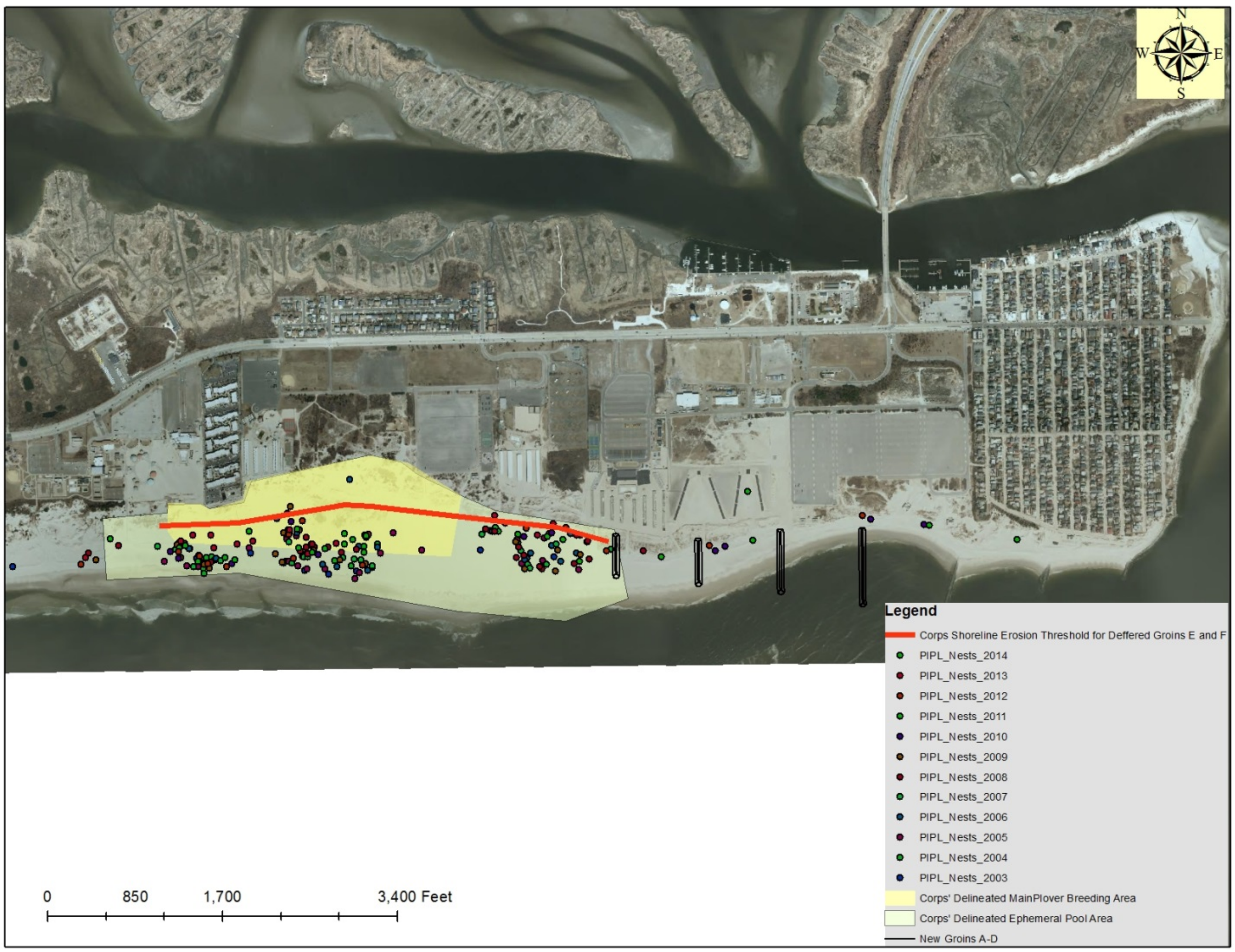

Figure 17. Map showing proposed new groins and proposed 250 ft shoreline width threshold line for construction of deferred groins E and F. Plover nests and extent of ephemeral pool area as delineated by the Corps are also shown.

Overall, it seems reasonable to conclude, based on the uncertainty of the models and the complex nature of the inlet dynamics and longshore transport in this area, that deferred groins E and F and/or beach fill could very well be proposed for construction at some point during the 50-year lifespan of the project which would require a separate consultation under the ESA. Factored into this assumption is the additive effects of continued dredging at Jones Inlet, potential use of Jones Inlet ebb shoal sediments as a source for renourishment fill, delays in renourishment cycle maintenance due to insufficient funding, and sea level rise impacts to an island that is highly armored and stabilized, preventing its migration.

The dredging of Jones Inlet, its related flood and ebb shoals, and the updrift fillet at Jones Beach, for navigation and sediment sources for beach nourishment could represent another mechanism of destabilization of the weldment area that would adversely affect the quantity and quality of plover habitat. Navigation maintenance activities will continue and Jones Inlet may be used as a source of sediments to maintain the design profile of the dunes and beach in the Action Area (U.S. Army Corps of Engineers 2014b). Cialone and Stauble (1998, p. 539) state, "Any removal of sand from an inlet system lowers the elevation of that portion of the system, resulting in a flow of sand to restore local equilibrium." Dean (1993) also found that the dredging of deepened navigational channels causes erosion on adjacent shorelines and faster deposition within the dredged channel; the alteration of one element that contributes to an inlet's equilibrium will affect all the other elements and disrupt the dynamic equilibrium. Dabees and Kraus (2008) describe the impacts of ebb shoal mining, explaining that the mining of ebb shoals disrupts the dynamic equilibrium of the inlet and its natural processes and can alter tidal currents and circulation, increase erosion of adjacent shorelines, expose adjacent shorelines to higher wave energy, modify the longshore sediment transport system, impair sediment bypassing across the inlet, and result in migration of tidal channels and shoals (see also Cialone and Stauble 1998).

The stability of the weldment of the ebb shoal is also influenced by the volume of sediment that enters the inlet from its updrift side at Jones Beach (U.S. Army Corps of Engineers 2014b). The updrift sand fillet of the eastern jetty at Jones Inlet appears to be near or at capacity, which would allow for more effective bypassing of sediment around the inlet onto the ebb shoal complex, and contribute to the natural replenishment of sand in the main plover area, but any dredging of the inlet would delay or disrupt this process.

In addition to inlet and shoal dredging and groin construction, dune and beach construction planned in the Action Area would present a large-scale perturbation to the dynamic shoreline until equilibrium can be achieved (Dean 1993). Features such as beach scarps, which are sharp discontinuities of slopes between the upper beach and the intertidal zone are common after beach nourishment(Alegria-Arzaburu et al. 2013). These can inhibit the movement of piping plovers, especially chicks, into intertidal foraging areas. By steepening the intertidal slope, scarping may reduce the size of the intertidal foraging area, inhibit adult and chick movement into the intertidal zone, and possibly delay the formation of a wrack line.

The introduction of large volumes of sand via beach nourishment may also influence the downcoast beach morphology (*e.g.*, Kratzmann and Hapke 2012). The increased sediment supply on the upper beach could be reworked by aeolian processes and transported to other portions of the Action Area, leading to an incremental increase in elevation of the bird nesting and foraging area, filling in low areas where ephemeral pools tend to form.

Without the project and with sand by-passing by natural or man-made means, the Service would expect the breeding area west of Jones Inlet from terminal groin 58 to groin 55 to be an erosive environment due to the effects of the existing groins and stabilization of Jones Inlet. Habitat in this area would be characterized by narrow beaches that may or may not have stable and persistent dunes. Habitat west of Point Lookout Town Park would most likely persist as stable or accreting (U.S. Army Corps of Engineers 2014b) and likely continue to support a substantial percentage of breeding plovers in the Action Area.

<u>Dune grass planting and sand fence installation</u>: Activities that accelerate the formation of heavily vegetated berms and dunes that block overwash and replace gently sloping and sparsely vegetated foredunes adversely affect piping plovers and their habitats. Jones (1997) stated that the use of sand fencing or discarded Christmas trees will degrade piping plover nesting habitat if these installations create dune slopes greater than ten percent. Cohen et al. (2008) noted that once beach grass becomes dense, it may have to be thinned each growing season to retain characteristics of suitable piping plover nesting habitat. Maslo et al. (2011) conclude that recovery and persistence of piping plovers will depend on conservation and restoration of breeding habitats with very low slopes, dune heights, and vegetative cover. Sand fences and vegetation plantings similarly accelerate loss of sparsely vegetated foredune habitats, forcing piping plovers and human beach-goers to compete for the same narrowing swath of seaward beach.

The Corps proposes to plant 34 ac of beach grass and install 75,000 ft of sand fences throughout the project area. The exact acreages of beach grass planting in the Action Area were not provided by the Corps in their plans. Additionally, the Corps was unable to provide an estimate of the area of beach habitat that would be affected by sand fencing, but the linear length of beach habitat affected by this element of construction is 3 mi, or the entire Action Area.

Both beach grass planting and sand fence installation are intended to artificially accelerate growth of dense vegetation and dune growth in order to further stabilize the barrier island (e.g., Bocomazo et al. 2011). Sand fencing can affect dune topography and promote the formation of steep, uniform dunes. Replicate treatments using sand fences oriented parallel to the shore, parallel with perpendicular additions, and zigzag (also termed oblique or diagonal) and vegetation plantings at Timbalier Island, Louisiana, and Santa Rosa Island, Florida, demonstrated appreciable vertical height and volume accumulation over controls (Mendelssohn et al. 1991, Miller et al. 2001). Fences filled rapidly, with half the accumulation over three years occurring in the first six months in Florida, 64 percent in the first 14 months in Louisiana.

Cessation of sand fence installation and beach-raking in Avalon, New Jersey, resulted in greater dune volume and beach volume, but lower dune crests compared with "managed" sites with sand fences and beach-raking (Nordstrom et al. 2012). Suspension of raking and sand fence installation allowed the dunes to build seaward creating greater and more natural topographic variability as well as diversity of plant species. Furthermore, the new fences at "managed" sites had to be placed close to the dune to retain space for beach recreation (Nordstrom et al. 2012). Vegetation does serve to trap sand (U.S. Army Corps of Engineers 1967), but initially it plays a smaller role than sand fences in sand accumulation (Mendelssohn et al. 1991; Miller et al. 2001). Over time, however, vegetation will continue to accumulate sand through upward and lateral growth (Miller et al. 2001).

Dune Walkover and Vehicle Access Points

Within the Action Area, a total of 20 access ways over the dune in the Town of Hempstead will be constructed. This includes construction of six ADA compliant and nine non-ADA compliant new timber dune walkovers, and five gravel surface vehicle and pedestrian access ways. A total of six access ways over the dune for Nassau County at Nickerson Beach will be constructed, including two gravel surface vehicle and pedestrian access ways, one ADA compliant dune walkover, and three timber Non-ADA walkovers (U.S. Army Corps of Engineers 2014b). The Corps did not provide any detailed accounting of the extent of habitat that may be lost or impacted as a result of these project features, but these will be constructed at designated locations throughout the entire Action Area.

Creation of a Potential Piping Plover Population Sink

The proposed project will increase and extend the berm height and widths, respectively, in the eastern (Point Lookout area) and western (Lido Beach area) portions of the Action Area. This may have a potentially beneficial affect to plovers by creating additional nesting habitat. However, plover colonization of a such areas may actually be detrimental if indirect adverse effects are sufficient to result in reproductive rates below those needed for stable or recovering populations and as the beaches start to erode, as is expected during the five year intervals between renourishment episodes (U.S. Army Corps of Engineers 2014b). Habitat that is initially wide enough to support plovers may create a "population sink" by recruiting individuals to the area each season, only to yield reproduction below replacement levels or fail to successfully breed entirely (see Cohen 2005; Citizens Environmental Research Institute 2006; and Cashin Associates, Inc. 2007). This was evidenced following beach nourishment of highly eroded beaches on Fire Island. After nourishment, those beaches continued to erode and supported low numbers of breeding pairs with limited to no reproductive output, which was attributed to diminishing habitat area and concomitant increases in high levels of recreational disturbance (Land Use Ecological Service 2009; National Park Service 2012). Additional research is needed to assist the Corps and Service in better quantifying the effects of this on population demographics and dynamics.

Destruction of Plover Prey Resources

Habitats which provide a prey base for plovers on ocean beaches will be impacted by beach construction and periodic renourishment planned in the areas between Jones Inlet and groin D, and then between Lido Beach East Town Park and the western limit of the Action Area. These habitats include the intertidal zone, wracklines, and sparsely vegetated areas. The Service expects that intertidal infaunal prey resources will be covered by sand placement during initial construction and each 5-year renourishment cycle. During each sand placement event, the Corps predicts that temporal impacts to benthic invertebrate species are expected to occur for six months to two years after project completion (U.S. Army Corps of Engineers 2014a). The recovery rates of these resources will vary depending on the timing of the fill activity relative to the periods of highest biological activity in these zones of the beach, as well as compatibility of the dredged material with the existing beach substrate. Renourishment which ends close to March 15 would probably have the most severe adverse effects on piping plovers from depression of the intertidal prey resource. Based on this scenario, the Service anticipates that over the life of the project, there is the possibility of up to nine full nesting seasons (as a consequence of nine renourishment cycles) of reduced prey availability along 9,300 ft of beach in the Action Area, causing reduced productivity and/or nesting area abandonment in each instance.

Chicks frequently move between the upper berm or foredune to access wrack lines to feed (U.S. Fish and Wildlife Service 2002), as these features are a source of many invertebrate prey species. These foraging habitats will likely be temporally impacted by beach nourishment activities (U.S. Fish and Wildlife Service 2002). While the recovery rates of the terrestrial insect prey resource associated with the wrack line are unknown, they may be expected to be low during the winter period of low invertebrate activity and more rapid during warmer weather. Studies are needed to evaluate the recovery rates of the terrestrial insect prey resource associated with the wrack line following beach nourishment, but the Service expects that the wrack line prey resource within each reach mentioned above will not be depressed for more than one nesting season following the initial berm construction or periodic nourishment cycle, except where curtailed by mechanical beach raking or delayed by scarping. This assumption is based upon the close proximity of both reaches to un-nourished beaches within the main plover breeding area which contain wrack and can, therefore, serve as a potential source of prey fauna to colonize new wrackline which are formed in the nourished areas (see Kluft and Ginsberg 2009).

Areas of the beach that are currently sparely vegetated may be converted to dense vegetation as a result of the Corps' dune beach grass planting efforts and sand fencing efforts. These activities will likely induce the southern expansion of the dune reducing sparsely vegetated areas in the process. Sparsely vegetated areas provide breeding, feeding and sheltering areas for adults and chicks (Cohen et al. 2009; Elias et al. 2000), and reduction of spare vegetation habitats would negatively affect the species.

The continuation of ORV use within the Action Area following implementation of the proposed project would also suppress wrack fauna via mortality from crushing and displacement, or by , by contributing to a lowered total amount of wrack, but additional research is needed to evaluate recolonization rates under varying driving conditions (Kluft and Ginsburg 2009).

Increased Predators

Piping plovers appear to be more susceptible to predation when they are limited to nesting on linear beaches backed by sand fences and dense vegetation. The installation of sand fences and other elevated features, such as the proposed dune, may be used as perches for avian predators and increase their search efficiency (*e.g.*, Andersson et al. 2009). The proposed project would potentially create predator habitat, affect the movements and search behaviors of mammalian (raccoon and feral cats) and avian predators (crows, raptors, gulls). In contrast, wider irregular barrier island features may allow piping plovers to be more efficient in eluding predators, by reducing the degree of spatial overlap of their habitats.

We would expect predator activity to result in some territory desertion, delayed or interrupted courtship, disturbance to incubation with some loss of nests or delayed hatch times, disturbance to foraging chicks with delayed fledging, and lower productivity. Therefore, these effects will contribute to the anticipated lowered productivity levels attendant with creating suboptimal habitats within the Action Area, resulting in mortality of eggs and chicks over the life of the project.

Human Disturbance

The proposed project will expose the species to indirect adverse effects from recreation, including, but not limited to, dog walking, fireworks, and kite-flying. Initially, a wider beach would most likely facilitate and increase recreational activities on the ocean beaches within occupied piping plover breeding areas (U.S. Army Corps of Engineers 2014a). However, over time, the nourished beaches would erode, resulting in less available habitat for plovers and recreation users, setting up a situation for increased human disturbance to the species. Moderate levels of human use can create sufficient disturbance to cause abandonment of nests, interfere with foraging, cause broods to be separated from adults, or attract predators. A negative correlation between the number of people present within 160 ft of piping plovers and time spent foraging and habitat was reported in Burger (1991) and (1994). Plovers may spend only 50 percent of their foraging time actually feeding in habitats with many people present compared to 90 percent in less disturbed areas (Burger 1994).

Flemming et al. (1988) found productivity correlated to level of disturbance, with 1.8 chicks fledged per pair in areas of low disturbance compared to 0.5 chicks fledged per pair in areas of high disturbance. However, Hoopes et al. (1992) found no correlation between rates of disturbance and productivity rates, and attributed this to intensive management of recreation within their study area, including restrictions on dogs and ORVs and use of symbolic fences to protect nests and provide refuge areas for chicks. Preliminary data from monitoring at Smith Point and Cupsogue County Parks, Suffolk County, New York, in 2013 and 2014, suggests that plovers experienced reduced productivity and mortality due to lack of foraging resources and human disturbance stemming from the Corps' breach closures activities at these sites (Derose-Wilson et al. 2013 and 2014).

Elliot and Teas (1996) found a significant difference between sections where piping plovers encountered pedestrians and those not encountering pedestrians. Piping plovers encountering pedestrians spend proportionately more time in non-foraging behavior. This study suggests that interactions with pedestrians on beaches cause birds to shift their activities from calorie acquisition to calorie expenditure. Human disturbance continues to decrease the amount of undisturbed habitat and appears to limit local piping plover abundance (Zonick and Ryan 1996).

In addition to the above, beach users may bring unleashed pets, such as dogs and cats. Both can prey on piping plovers (Houghton 2005). Kite flying is also a popular recreational activity leading to disturbance of plovers, as it is believed that plovers perceive kites as avian predators, such as hawks, gulls, or crows (Hoopes 1993). Plovers may respond by abandoning their nest site entirely, be flushed off their nest, and therefore, be unable to defend the nest or chicks from actual predators (U.S. Fish and Wildlife Service 1996a).

With increased recreation comes the need for increased administrative use of ORVs, which can significantly degrade piping plover habitat (Wheeler 1979) or disrupt the birds' normal behavior patterns (Zonick 2000). The Recovery Plan cites tire cuts crushing wrack into the sand, making it unavailable as cover or as foraging substrate (Hoopes 1993; Goldin 1993) and also notes that the magnitude of the threat from ORVs is particularly significant, because vehicles extend impacts to remote stretches of beach where human disturbance will otherwise be very slight. Godfrey et al. (1980 as cited in Lamont et al. 1997) postulated that vehicular traffic along the beach may compact the substrate and kill marine invertebrates that are food for the piping plover. Zonick (2000) found that the density of ORVs negatively correlated with abundance of roosting piping plovers on the ocean beach.

Species response to the proposed action

The Action Area has supported an average abundance of 13.4 pairs, with relatively high level of productivity over the last 14 years. The population is probably at carrying capacity based on the current shoreline and recreational management regimes, suggesting that any first year birds would have to colonize new habitats on other beaches to successfully breed. Due to the effects of the action outlined above, the destruction and modification of both foraging, nesting, and brood-rearing habitats resulting from the proposed action is likely to contribute to short- and long- term (1) reductions and displacement of plovers; (2) higher mortality rates, delayed breeding, reduced nesting success, and lower survivorship of fledglings as a result of displacement; (3) the loss of potential "source" breeding populations that may maintain, in part, through emigration, other plover populations; and (4) increased habitat loss, and fragmentation on a local and regional scale.

Because of the small number of breeding sites on Long Beach Island, the fragmented distribution, and vulnerability of small populations to stochastic processes (oil spills, storms, disease, etc.), the Service is concerned about the degradation or loss of any breeding site in the Action Area, as well as its effect on the Long Island New York-New Jersey recovery unit.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to the ESA.

Cumulative effects are expected from non-federal projects to stabilize beaches and expand recreational areas. Local entities are expected to continue to stabilize their beaches by installing sand fences and planting beach grass, and utilizing upland sources of sand material for dune construction and augmentation. These actions are expected to destroy or degrade plover habitats, disturb plover adults and chicks, and increase vulnerability to predation, ultimately curtailing plover population expansion.

The NYSDEC would be expected to continue to issue tidal wetland permits for ocean- and bay-side stabilization activities, such as bulkhead construction, dune stabilization, and beach scraping.

CONTRIBUTIONS OF CONSERVATION MEASURE IMPLEMENTATION TOWARD MINIMIZING ADVERSE EFFECTS

The Corps has proposed the following conservation measures:

1) Conduct surveys during the spring/summer, and prior to construction activities to identify nesting plover in the project area and to document all known location of plovers. In addition, the Corps will document any other federal or state listed wildlife species observed in the project area during the survey and will initiate consultation with the appropriate state and federal agencies;

2) Erect symbolic fencing and signs around all plover nests and brood rearing areas located in the construction area to deter human use of the area and to protect sites from incidental disturbance from construction activities;

3) Limit construction activities near known plover nesting areas to the period between September 2 through March 31 to avoid the key shorebird nesting period;

4) Avoid all delineated locations of the species during the breeding season and undertake all practicable measures to avoid incidental taking of the species;

5) Reinitiate consultation with the Service to identify acceptable alternatives should any plover nest sites be identified within the direct construction footprint;

6) Monitor the project area before, during, and after construction;

7) Educate residents, landowners, beach visitors, and beach managers on the piping plover;

8) Encourage local agencies to place time restrictions on beach use by vehicles to avoid key nesting and fledging periods;

9) Conduct follow up surveys of plover habitat within the project area. Surveys will be conducted for three consecutive nesting seasons post construction and a summary report regarding habitat use and nesting will be provided annually to the Service; and

10) Beach fill would not be placed within 1,000 m of known populations of piping plover or other state or federally-listed shorebirds/seabirds during the breeding season, except in the area of the terminal groin at Point Lookout.

11) Implement a 200 m work zone around terminal groin 58, delineated by fencing that is impenetrable to plover chicks to minimize impacts plovers as a result of groin reconstruction activities.

It is not clear how the Corps' proposed measures 1, 2, 6, and 9, will supplement the existing seasonal monitoring efforts undertaken by the Town of Hempstead Department of Conservation and Waterways and Nassau County. Measures 3 and 4 are proposed to avoid adverse direct effects that would otherwise occur if construction occurred during the plover season, and would be expected to reduce adverse effects to plovers breeding in the western portion of the Action Area. But, they do not comport with measure 10, which will not provide a suitable buffer to protect against adverse effects in the area of the Point Lookout terminal groin. Measures 5, 7, and 8 deal with reinitiation triggers, educating locals, and working with local governments to address ORV use in the area. The Corps has not adequately described how these measures would reduce adverse effects of the project, including increased human disturbance, habitat degradation, fragmentation and loss, and predation. Measure 10 will minimize project impacts for plovers nesting in the western half of the Action Area. Measure 11 will not provide adequate buffers between project construction activities and plover breeding areas.

CONCLUSION

After reviewing the current status of the threatened Atlantic Coast population of the piping plover, the environmental baseline for the Action Area, the effects of the proposed action and cumulative effects, as well as the role of the New York-New Jersey recovery unit in the survival and recovery of the threatened Atlantic Coast population of the piping plover, it is the Service's Opinion that the Corps' action, as proposed, is not likely to jeopardize the continued existence of the threatened Atlantic Coast population of the piping plover.

No critical habitat has been designated for piping plover; therefore, none will be affected.

The Service reached this conclusion based on the following considerations:

Implementation of the proposed project may reduce the likelihood that plovers will successfully breed between Jones Inlet and proposed groin D in the future. But, we expect lesser effects of the project in the main plover breeding areas downdrift of proposed groin D, based on the results of the Corps' modelling efforts and their determination that the proposed groins will have minimal impacts to habitat in that area.

The Corps will implement a 1,000-m buffer zone and time of year restrictions that will protect most pairs that breed in the Action Area.

This proposed project will have a localized effect on the amount and functional value of available nesting habitat, and has the potential to significantly reduce carrying capacity in the Action Area.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps and become binding conditions of any grant or permit issued to the (applicant), as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 CFR §402.14(i)(3)).

The Service notes that the quantification of anticipated take is extremely complicated. In part, this is due to the confounding factors that affect plover breeding site selection and productivity (e.g., weather, predation, etc.). However, the Service anticipates that the Corps' project would result in incidental take in the form of harm and harassment leading to the death or injury of piping plovers. Death and injury of adult and chicks could be in the form of losses of nests, chick production, and recruitment due to indirect effects of habitat degradation, fragmentation, and loss of nesting and foraging habitat; decreases in oceanside intertidal and subaerial beach prey resources; disturbances due to increased recreational activities; and predation.

The Corps' has concluded that take of piping plovers due to habitat loss is unlikely west of the proposed groin D, and consequently, we are not authorizing incidental take of plovers in this area. However, there is uncertainty associated with the reliability of the predictive value of the Corps' modelling results,. The Corps also appears to recognize some probability, albeit low, of some level of downdrift erosion west of groin D, which would result in take due to loss of habitat, as evidenced by their preparation of a plan to constructed two additional groins if such loss occurs. Therefore, we have established a trigger for reinitiation in the Reinitiation Notice at the end of this Opinion, which identifies the physical parameters for further consultation under the ESA should additional adverse effects to plovers occur.

AMOUNT OR EXTENT OF ANTICIPATED TAKE

As discussed in the Environmental Baseline and Effects of the Action sections of this Opinion, piping plovers have been incidentally taken as a result of past Corps projects and it is anticipated that there will be incidental take as a result of the proposed action.

As a result of the proposed project, it is anticipated that loss and degradation of habitat, increased recreation, and predation will result in incidental take of piping plover in the Action Area. Habitat will change with the introduction of four new groins, and construction of a dune and beach, and their fortification due to sand fence installation and beach grass planting. Incidental take will also occur due to increases in human disturbances due to construction of dune walkovers and vehicle access points across the Action Area. The amount of take that is anticipated to result from this project is specified in the following sections.

Incidental Take from Direct Effects

Direct effects on plovers during the initial construction of the terminal groin 58 in Point Lookout is likely to include:

(1) Harassment of plovers engaged in territory establishment and courtship behavior, causing abandonment of territories and/or disruption of pair bonds; plovers may delay egg-laying, with an attendant loss of renesting opportunities or may not nest at all.

(2) Harassment of incubating plovers, causing nest abandonment. Disturbance may also increase time adult plovers spend off the nest engaged in defensive behaviors such as distraction displays, thereby increasing opportunities for nest predation and arrest of embryo development due to exposure to cold or heat.

(3) Harassment and direct mortality of unfledged plover chicks. Inadequate buffer distances will create a likelihood that broods in the vicinity of moving equipment may be accidentally crushed. Adults may also spend increased time engaged in disturbed behaviors and less time brooding chicks, increasing the chicks' vulnerability to predation and decreasing their foraging opportunities during critical growth periods.

Jones Inlet to Groin D

<u>Incidental take from direct effects of terminal groin 58 construction</u>

Incidental take from terminal groin reconstruction is anticipated in the form of harassment of adult plovers and direct mortality of their eggs and chicks.

The Corps has not indicated the duration of construction of the terminal groin, or access routes necessary for reconstruction of the terminal groin. However, the Corps has defined a 200-m work zone around the terminal groin.

Based on this information, the Service anticipates that harassment due to construction activities will prevent establishment of two nests and delay establishment or lead to abandonment of a third nest over one full season and that this will result in the potential loss of 12 eggs.

The Service also anticipates that there will be incidental take due to harassment of adults and chicks, leading to the mortality of two chicks due to starvation or predation. Finally, the Service anticipates incidental take in the form of direct mortality of up to four eggs and one chick from construction related activities.

Groin D to Lido Beach West Town Park

Incidental take from direct effects of the initial construction activities

Since the Corps is not proposing any initial construction, renourishment, or maintenance activities during the plover season from Groin D to the western limit of Lido Beach West Town Park, the Service does not anticipate any incidental take due to direct effects from construction activities.

Incidental Take from Indirect Effects

Jones Inlet to Groin D

Incidental take due to habitat loss, degradation, or modification

Incidental take due to habitat loss, degradation, or modification from terminal groin 58 reconstruction, groin rehabilitation, the construction of groins A-D, dune and berm construction, beach grass planting, and sand fence installation is anticipated in the form of harassment and harm. Over the 50-year project life, the Service anticipates that plover carrying capacity in this portion of the Action Area will likely decrease by up to 50 percent or two pairs, and will include the loss of reproductive output of these pairs over that time period. This is anticipated due to the footprint of the dunes and groins and maintenance activities that will maintain these structures. Dunes will be maintained in a fixed position which eliminate habitat currently used by the species and will prevent formation of wider, flatter beaches. Sand fences and beach grass planting will likely promote the southern expansion of the dune at the expense of berm habitat. It is also anticipated that the nourished beach, while initially providing some additional beach nesting habitat, will erode back over time during the 5-year intervals for renourishment.

Incidental take due to reductions in infauna in the intertidal zone and subaerial beaches

Take due to effects of reductions in foraging resources as a result of dune, beach, and groin construction is anticipated, but there is no data to predict the extent of take that might occur due to such effects. The Service also anticipates elevated mortality of unfledged chicks due to lower quality brood foraging opportunities from Jones Inlet to proposed groin D. We anticipate these effects will lead to the incidental take of three chicks in this portion of the Action Area during initial construction and each renourishment cycle.

Proposed Groin D to western limit of Action Area

Incidental take due to habitat loss, degradation, or modification

Incidental take due to habitat loss, degradation, or modification from new groin construction, dune and berm construction, beach grass planting, and sand fence installation is anticipated in the form of harassment and harm is anticipated. Over the 50-year project life, the Service anticipates that plover carrying capacity in this portion of the Action Area will decrease by up to three pairs and will include the loss of reproductive output of these pairs. This is anticipated due to the footprint of the dune and maintenance efforts to maintain its fixed position which eliminate habitat currently used by the species and will prevent formation of dune microhabitats as well as wider, flatter beaches. Sand fences and beach grass planting will likely promote the southern expansion of the dune at the expense of berm habitat. It is also anticipated that the nourished beach, while initially providing some beach nesting habitat, will erode back over time during the 5-year intervals for renourishment. Aeolian transport of dredged sand material from points east and west may also result in topographical changes that negatively affect foraging areas and breeding sites.

Incidental take due to reductions in intertidal and terrestrial invertebrates

Incidental take due to effects of reductions in foraging resources as a result of berm and groin construction is anticipated. The Service anticipates this take will be in the form of elevated mortality of unfledged chicks due to lower quality brood foraging opportunities. These effects will likely lead to the incidental take of three chicks in this portion of the Action Area during initial construction and each renourishment cycle.

Entire Action Area

Incidental take due to enhancement of predator habitat

Incidental take due to increased predation is anticipated. The BA did not describe the effects of the proposed project on predation of plovers or propose any conservation measures that they would undertake to address enhancement of predator habitat. However, the continuous, heavily vegetated dune line that the proposed project will create will likely lead to conditions that exacerbate predation. The proposed project will result in less habitat hetereogeneity which, in turn, will reduce the plover’s ability to detect and then avoid predators. The Service anticipates that incidental take in the form of loss of one nest and three chicks every year over the life of the project as a result of this adverse effect.

Incidental take due to increased recreation and ORV activities

Take due to effects of increased recreation on the oceanside is anticipated. While the Corps' project description includes general statements about the protection measures that would be implemented over the project life, specific details related to the implementation of these protection measures, which would assist the Service in predicting the extent of take, was not included in the project description. The Service anticipates that incidental take in the form of the delayed establishment of nests, nest abandonment, and the mortality of chicks. Specifically, we believe that incidental take may result in abandonment of one nest each year over the life of the project and the death of one chick every five years over the life of the project will occur.

The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended, if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

The reasonable and prudent measures presented below, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

EFFECT OF THE TAKE

The Service has determined that the level of take anticipated, as described above, from the proposed action is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Corps has indicated that absent the proposed project, the project area will become increasingly vulnerable to overwash and breaching (U.S. Army Corps of Engineers 2014b). Habitats formed by these processes are important to the survival and recovery of piping plovers in the New York-New Jersey Recovery Unit. Regulations (50 CFR §402.14) implementing Section 7 of the ESA specify that the biological opinion shall include reasonable and prudent measures (RPMs), if any. Reasonable and prudent measures are actions, identified during formal consultation, that are necessary or appropriate to minimize the amount or extent of anticipated incidental take of the species.

The measures described below are non-discretionary and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the NYSDEC (e.g., Project Cost-Sharing Agreement) or any other applicant, as appropriate, in order for the exemption in Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. In order to retain protective coverage of Section 7(o)(2), the Corps must implement the RPMs and their implementing terms and conditions in this biological opinion. Relative to this, the Corps must ensure that their contractors or co-operators adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to contracts or permits, and retain oversight to ensure compliance with these terms and conditions. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement.

Reasonable and Prudent Measures:

1) Reduce adverse effects to piping plovers from terminal groin 58 construction;
2) Protect, maintain, and mitigate losses of piping plover foraging and nesting habitat and assess species population and behavioral responses to habitat loss or change;
3) Monitor habitat conditions in the Action Area; and
4) Monitor implementation of conservation measures and report to our office.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the Corps must comply with the following terms and conditions. Overall, the terms and conditions are non-discretionary, and must be implemented by the Corps within the Action Area so that they become binding conditions, as appropriate, in order for the exemption in Section 7(o)(2) to apply:

Term and Condition for Reasonable and Prudent Measure 1

1) Construction activities shall not occur on the beach or back dune areas in the Point Lookout area. Equipment staging areas shall not be on the beach outside of the 200 m work zone.

2) By April 1 of each breeding season that construction activities are underway, the Corps shall set up a temporary work fence that is impenetrable to flightless chicks within a 200 m radius around terminal groin 58.

3) The Corps shall provide the Service with maps and drawings showing the extent of the work zones and all access routes prior to initial construction.

Terms and Conditions for Reasonable and Prudent Measure 2

1) The footprint of the artificial dune west of groin D shall not overlap ephemeral ponding areas, leading to loss of this habitat type.

2) To ensure that the ephemeral pool habitat continues to be a productive area for plovers, and not adversely affected by impacts other than erosion, the Corps shall survey beach elevations prior to construction to establish baseline conditions and then annually over the life of the project using Light Detection and Ranging (LIDAR) as described below. Survey results shall be submitted each year to the Service in digital form and be able to be utilized in GIS software applications.

3) The Corps shall coordinate with the Service to establish target elevations for maintenance of ephemeral pool habitats and that these are met by April 1 of each year of the project.

4) Construction of the artificial dune west of groin D shall not use any sediment from the beach or ponding areas such as by beach scraping. Heavy equipment shall avoid the ephemeral pool areas to prevent any compaction of the sediment and crushing of the invertebrate fauna that are the prey base for birds.

5) Vegetation planting of the artificial dune from Jones Inlet to proposed groin D, and then from Lido Beach Town Park East to the western extent of the Action Area, shall incorporate a mix of native dune plant species and not be limited to a single grass species. Plantings should be made in a random manner and not rows with uniform spacing. The plantings should mimic natural dune vegetation in the region in species diversity, density, and spacing.

6) The Corps shall not erect sand fences on or adjacent to the artificial dune west of groin D through Lido Beach East Town Park West. Sand fencing is permitted in front of the Lido

Beach Towne House Condominiums and from Prescott Street to Allevard Street in Lido Beach. Elimination of federal participation in sand fencing would minimize impacts to the highly dynamic and ephemeral mosaic of habitat features in those areas. The creation of additional dunes through sand fencing seaward of the artificial dune could lead to future conflicts over which dune toe is utilized to measure the berm width, thereby triggering construction of the two deferred groins and/or beach fill in the bird nesting and foraging area.

7) The Corps shall not plant beach grass west of groin D, except in the front of the residential areas noted above. Beach grass planting may lead to increases in the berm elevation and reduce the potential for ephemeral ponding and the frequency at which it occurs.

8) In order to address habitat loss, degradation, and fragmentation in the Action Area, the Corps shall undertake habitat restoration (vegetation removal and topographical management), west of proposed groin D. The Corps shall devise a restoration plan in coordination with the Town, Nassau County, and the Service. The plan shall be finalized prior to initial construction of the project.

9) In order to address take associated with decreases in prey resources on the oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm, and backshore is conducted based on a sampling program that has been devised in consultation with, and agreed to by, the Service prior to its implementation. The information collected during this monitoring program shall be used to adaptively manage the operation and maintenance phases of the project to further avoid and minimize take. The plan shall be finalized prior to initial construction of the project.

10) To reduce the anticipated level of take due to increases in disturbances from recreational activities, the Corps shall, over the life of the project, utilize their project authorities and authorities under Section 7(a)(1) of the ESA to work with local landowners to ensure the full implementation of the Service's Section 9 Guidelines in the project area.

11) In order to reduce take associated with the increased predation due to the formation of dune habitat used by feral cats and other mammalian and avian predators, the Corps shall coordinate with the Service on a predator management program, to be undertaken by the Service, or Service approved entity in the Action Area. The plan shall be finalized prior to initial construction of the project.

12) The Corps shall develop a biological monitoring program for the Action Area, to be approved by the Service and implemented by the Service or Service-approved entity. The monitoring program shall, at a minimum, evaluate plover population and behavioral

responses to habitat changes in the Action Area resulting from construction of hard stabilization features, as well as dune and berm construction in and adjacent to, the most significant plover breeding site on Long Beach Island. This study will assist the agencies in also better understanding the fate of chicks due to disruptions in foraging resources, such as wrack and intertidal fauna, and the role of continuous, vegetated dune lines on predation rates. The plan shall be finalized and implemented prior to initial construction of the project.

13) The Corps shall ensure that the subaerial extent of the proposed groins A-D during are covered during the construction and maintenance phases of the project to minimize habitat fragmentation and ensure plover chicks are able to traverse nesting and foraging areas.

Terms and Conditions for Reasonable and Prudent Measure 3

1) Seasonal surveys of the area west of proposed groin D shall be undertaken using Light Detection and Ranging (LIDAR) to monitor the microtopography of the area in order to best capture habitat features including ephemeral ponding areas. LIDAR is non-intrusive, does not disturb the habitat or its wildlife, and allows for complete coverage of the area to be monitored. If these areas are documented to be filling in with an increase in sediment supply to the area (via aeolian sediment transport) from the beach fill both to the east and west, habitat features shall be restored.

Terms and Conditions for Reasonable and Prudent Measure 4

1) In order to determine if the amount of take due to harm from indirect impacts on habitat is approached or exceeded, the Corps shall ensure the implementation of the monitoring programs outlined above.

2) In the event of take, a system of notification shall be implemented following the guidelines:

    Exercise care in handling any specimens of dead piping plover adults, young, or non-viable eggs to preserve biological material in the best possible state. In conjunction with the preservation of any specimens, the finder is responsible for ensuring that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. Finding dead or non-viable specimens does not imply enforcement proceedings pursuant to the ESA. Reporting dead specimens is required for the Service to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective.

Upon locating a dead piping plover, initial notification must be made to the following Service Law Enforcement office:

Resident Agent in Charge
U.S. Fish and Wildlife Service
Office of Law Enforcement
70 East Sunrise Highway, Ste. 419
Valley Stream, NY 11581
516-825-3950

and

U.S. Fish and Wildlife Service
Long Island Field Office
340 Smith Road
Shirley, NY 11967

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent

measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Corps should identify areas on Long Island within their Civil Works program where natural process can form bay to overwash habitat and promote optimal plover habitat formation. The focus should be on areas outside of sites that already provide opportunities for these types of habitat development.

The Corps should identify mechanisms to contribute to plover protection measures, either by providing equipment, personnel, or funds, to local land managers within areas affected by their Civil Works projects.

The Corps should work with the Service, State, local municipalities, and non-governmental organizations to develop an outreach program to promote the recovery of piping plover.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the BA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Due to the importance of the breeding habitat west of the Corps' proposed groin D and the inherent uncertainty regarding the effect of the Corps' new groin field on this habitat, the Service **has established** the following condition that would trigger reinitiaiton of formal consultation, in addition to those identified above.

The Corps should reinitiate consultation if the habitat area west of groin D fall**s** below 30 ha. Specifically, this is the area of habitat is bounded by the Corps' 250 ft threshold line to the north, the 2013 improved/existing mean high water line to the south as presented in U.S. Army Corps of Engineers (2014b), the proposed groin D to the east and a shore perpendicular line beginning at 40.5888 N and -73.616 W to the west.

CONFERENCE OPINION

RUFA RED KNOT
Conference Opinion for the Proposed Red Knot and its Proposed Critical Habitat

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/Critical Habitat Description

The red knot (*Calidris canutus*) was added to the list of Federal candidate species in 2006. A proposed rule to list the rufa subspecies (*C. c. rufa*), the subject of this Opinion, as threatened under the Endangered Species Act (ESA) was published on September 30, 2013, and a final decision is expected in late 2014. Red knots are federally-protected under the Migratory Bird Treaty Act, and are New Jersey State-listed as endangered. The red knot is currently not listed as endangered or threatened in the state of New York.

The Service is proposing red knot critical habitat designations for several parcels on Long Island, due to their importance in providing important stop-over/roosting and forage habitats during spring and fall migrations. This proposed critical habitat is outside the action area and is updrift (of the east-to-west littoral drift) of any proposed action beach nourishment activities. As such, the Service has determined that the proposed action will not adversely modify any proposed red knot critical habitat. Red knot critical habitat will, therefore, not be considered further in this Conference Opinion.

Taxonomy

Calidris canutus is classified in the Class Aves, Order Charadriiformes, Family Scolopacidae, Subfamily Scolopacinae (American Ornithologists Union [AOU] 2012). Six subspecies are recognized, each with distinctive morphological traits (*i.e.*, body size and plumage characteristics), migration routes, and annual cycles. Each subspecies is believed to occupy a distinct breeding area in various parts of the Arctic (Buehler and Baker 2005; Tomkovich 2001; Piersma and Baker 2000; Piersma and Davidson 1992; Tomkovich 1992), but some subspecies overlap in certain wintering and migration areas (Conservation of Arctic Flora and Fauna [CAFF] 2010).

Calidris canutus canutus, *C. c. piersma*, and *C. c. rogersi* do not occur in North America. The subspecies *C.c. islandica* breeds in the northeastern Canadian High Arctic and Greenland, migrates through Iceland and Norway, and winters in Western Europe (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2007). *C. c. rufa* breeds in the central Canadian Arctic (just south of the *C. c. islandica* breeding grounds) and winters along the Atlantic coast and the Gulf of Mexico coast (Gulf coast) of North America, in the Caribbean, and along the north and southeast coasts of South America including the island of Tierra del Fuego at the southern tip of Argentina and Chile.

Life History

<u>Species Description</u>: The rufa red knot is a medium-sized shorebird about 9 to 11 inches (in.) in length. The red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the Southeast United States (Southeast), the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. During

both the northbound (spring) and southbound (fall) migrations, red knots use key staging and stopover areas to rest and feed.

The red knot is a large, bulky sandpiper with a short, straight, black bill. During the breeding season, the legs are dark brown to black, and the breast and belly are a characteristic russet color that ranges from salmon-red to brick-red. Males are generally brighter shades of red, with a more distinct line through the eye. When not breeding, both sexes look alike – plain gray above and dirty white below with faint, dark streaking. As with most shorebirds, the long-winged, strong-flying knots fly in groups, sometimes with other species. Red knots feed on invertebrates, especially small clams, mussels, and snails, but also crustaceans, marine worms, and horseshoe crab eggs. On the breeding grounds, knots mainly eat insects.

Small numbers of red knots may occur in New Jersey year-round, while large numbers of birds rely on New Jersey's coastal stopover habitats during the spring (mid-May through early June) and fall (late-July through November) migration periods. Smaller numbers of knots may spend all or part of the winter in New Jersey. Red knots also rely on New York's coastal stopover habitats during the spring and fall migration periods. As stated above, several stopover habitats in New York are being proposed for critical habitat designations.

<u>Breeding</u>: Based on estimated survival rates for a stable population, few red knots live for more than about 7 years (Niles et al. 2008). Age of first breeding is uncertain, but for most birds is probably at least 2 years (Harrington 2001). Red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation. Breeding territories are located inland, but near arctic coasts, and foraging areas are located near nest sites in freshwater wetlands (Niles et al. 2008; Harrington 2001). On the breeding grounds, the red knot's diet consists mostly of terrestrial invertebrates such as insects (Harrington 2001). Breeding occurs in June (Niles et al. 2008). Breeding success of High Arctic shorebirds such as *Calidris canutus* varies dramatically among years in a somewhat cyclical manner.

<u>Population Dynamics and Demographic Status</u>: In the United States, red knot populations declined sharply in the late 1800s and early 1900s due to excessive sport and market hunting, followed by hunting restrictions and signs of population recovery by the mid-1900s (Urner and Storer 1949; Stone 1937; Bent 1927). However, it is unclear whether the red knot population fully recovered its historical numbers (Harrington 2001) following the period of unregulated hunting.

Red knots were heavily hunted for both market and sport during the 19th and early 20th centuries (Harrington 2001) in the Northeast and the mid-Atlantic. Red knot population declines were noted by several authors of the day, whose writings recorded a period of intensive hunting followed by the introduction of regulations and at least partial population recovery. As early as 1829, Wilson (1829) described the red knot as a favorite among hunters and bringing a good market price. Giraud (1844) described red knot hunting in the South Bay of Long Island. Noting confusion over species common names, Roosevelt (1866) reported that hunting of "bay snipe" (a name applied to several shorebird species including red knot) primarily occurred from Cape Cod to New Jersey, rarely south of Virginia. Specific to red knots, Roosevelt (1866) noted they were "killed indiscriminately . . . with the other bay-birds." Hinting at shorebird population declines, Roosevelt (1866) found that "the sport [of bay snipe shooting] has greatly diminished of late . . . a few years ago . . . it was no unusual thing to expend 25 pounds of shot in a day, where now the sportsman that could use up 5 would be fortunate."

More recently, long-term survey data from two key areas (Tierra del Fuego wintering area and Delaware Bay spring stopover site) both show a roughly 75 percent decline in red knot numbers since the 1980s (Dey, pers. comm., October 12, 2012; Morrison, *pers. comm.*, August 31, 2012; Dey et al. 2011; Clark et al. 2009; Morrison et al. 2004; Morrison and Ross 1989; Kochenberger 1983; Dunne et al. 1982; Wander and Dunne 1982). Survey data is also available for the Brazil, Northwest Gulf of Mexico, and Southeast-Caribbean wintering areas, but are insufficient to infer trends.

<u>Migratory Patterns</u>: The primary wintering areas for the rufa red knot include the southern tip of South America, northern Brazil, the Caribbean, and the southeastern and Gulf coasts of the U.S. The rufa red knot breeds in the tundra of the central Canadian Arctic. Some of these robin-sized shorebirds fly more than 9,300 miles (mi.) from south to north every spring and reverse the trip every autumn, making the rufa red knot one of the longest-distance migrating animals. Migrating red knots can complete non-stop flights of 1,500 mi. or more, converging on critical stopover areas to rest and refuel along the way. Large flocks of red knots arrive at stopover areas along the Delaware Bay and New York/New Jersey's Atlantic coast each spring, with many of the birds having flown directly from northern Brazil. The spring migration is timed to coincide with the spawning season for the horseshoe crab (*Limulus polyphemus*). Horseshoe crab eggs provide a rich, easily digestible food source for migrating birds. Mussel beds on New Jersey's southern Atlantic coast and intertidal/wrack line areas on New York's coast are also important forage habitats for migrating knots. Birds arrive at stopover areas with depleted energy reserves and must quickly rebuild their body fat to complete their migration to Arctic breeding areas.

During their brief 10- to 14-day spring stay in the mid-Atlantic, red knots can nearly double their body weight.

Spring Distribution and Timing, Atlantic Coast: Major spring stopover areas along the Atlantic coast include Río Gallegos, Península Valdés, and San Antonio Oeste (Patagonia, Argentina); Lagoa do Peixe (eastern Brazil, State of Rio Grande do Sul); Maranhão (northern Brazil); the Virginia barrier islands (United States); and Delaware Bay (Delaware, New Jersey, and New York, United States) (Cohen et al. 2009; Niles et al. 2008; González 2005). However, large and small groups of red knots, sometimes numbering in the thousands, may occur in suitable habitats all along the Atlantic and Gulf coasts from Argentina to Massachusetts (Niles et al. 2008, p. 29). In Massachusetts, red knots use sandy beaches and tidal mudflats during fall migration. In New York and the Atlantic coast of New Jersey, knots use sandy beaches during spring and fall migration (Niles et al. 2008).

From geolocators, examples of spring migratory tracks are available for three red knots that wintered in South America. One flew about 4,000 mi over water from northeast Brazil in 6 days. Another flew about 5,000 mi. from the southern Atlantic coast of Brazil (near Uruguay) over land and water (the eastern Caribbean) in 6 days. Both touched down in North Carolina, and then used Delaware Bay as the final stopover before departing for the arctic breeding grounds (Niles et al. 2010). A third red knot, which had wintered in Tierra del Fuego, followed an overland route through the interior of South America, departing near the Venezuela-Colombia border. This bird then flew over the Caribbean to Florida, and finally to Delaware Bay (Niles 2011).

In Delaware Bay, red knots preferentially feed in microhabitats where horseshoe crab eggs are concentrated, such as at horseshoe crab nests (Fraser et al. 2010), at shoreline discontinuities (e.g., creek mouths) (Botton et al. 1994), and in the wrack line (Nordstrom et al. 2006; Karpanty et al. 2011). (The wrack line is the beach zone just above the high tide line where seaweed and other organic debris are deposited by the tides.) Wrack may also be a significant foraging microhabitat outside Delaware Bay, for example where mussel spat (i.e., juvenile stages) are attached to deposits of tide-cast material. Wrack material also concentrates invertebrates such as amphipods, insects, and marine worms (Kluft and Ginsberg 2009), which are secondary prey species for red knots).

For many shorebirds, the supra-tidal (above the high tide) sandy habitats of inlets provide important areas for roosting, especially at higher tides when intertidal habitats are inundated (Harrington 2008). Along the Atlantic coast, dynamic and ephemeral features are important red knot habitats, including sand spits, islets, shoals, and sandbars, often associated with inlets (Harrington 2008; Winn and Harrington *in* Guilfoyle et al. 2006; Harrington in Guilfoyle et al. 2007). From South Carolina to Florida, red knots are found in significantly higher numbers at inlets than at other coastal sites (Harrington 2008).

The Service is not aware of comprehensive monitoring of red knots on Long Island, New York. Some data is available from individual birders or associated with horseshoe crab monitoring. Individual birders have documented red knot presence at sites along the south shore of Long Island, and on the eastern end of Long Beach Island.

Threats

Current threats to the red knot include sea level rise; coastal development; shoreline stabilization; dredging; reduced food availability at stopover areas; disturbance by vehicles, people, dogs, aircraft, and boats; and climate change.

The remainder of this section (Threats) is excerpted from Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for the Rufa Redknot (*Calidris canutus rufa*); Proposed Rule (U.S. Fish and Wildlife Service 2013b).

U.S. Shoreline Stabilization and Coastal Development

Much of the U.S. coast within the range of the red knot is already extensively developed. Direct loss of shorebird habitats occurred over the past century as substantial commercial and residential developments were constructed in and adjacent to ocean and estuarine beaches along the Atlantic and Gulf coasts. In addition, red knot habitat was also lost indirectly, as sediment supplies were reduced and stabilization structures were constructed to protect developed areas.

Sea level rise and human activities within coastal watersheds can lead to long-term reductions in sediment supply to the coast. Damming of rivers, bulkheading highlands, and armoring coastal bluffs have reduced erosion in natural source areas and, consequently, the sediment loads reaching coastal areas. Although it is difficult to quantify, the cumulative reduction in sediment supply from human activities may contribute substantially to the long-term shoreline erosion rate. Along coastlines subject to sediment deficits, the amount of sediment supplied to the coast is less than that lost to storms and coastal sinks (inlet channels, bays, and upland deposits), leading to long-term shoreline recession (Coastal Protection and Restoration Authority of Louisiana 2012; Florida Oceans and Coastal Council 2010; U.S. Climate Change Science Program [CCSP] 2009; Defeo et al. 2009; Morton et al. 2004; Morton 2003; Herrington 2003; Greene 2002).

In addition to reduced sediment supplies, other factors such as stabilized inlets, shoreline stabilization structures, and coastal development can exacerbate long-term erosion (Herrington 2003). Coastal development and shoreline stabilization can be mutually reinforcing. Coastal development often encourages shoreline stabilization because stabilization projects cost less than the value of the buildings and infrastructure. Conversely, shoreline stabilization sometimes encourages coastal development by making a previously high-risk area seem safer for development (U.S. Climate Change Science Program [CCSP] 2009). Protection of developed areas is the driving force behind on-going shoreline stabilization efforts. Large-scale shoreline stabilization projects became common in the past 100 years with the increasing availability of heavy machinery. Shoreline stabilization methods change in response to changing new technologies, coastal conditions, and preferences of residents, planners, and engineers. Along the Atlantic and Gulf coasts, an early preference for shore-perpendicular structures (e.g., groins) was followed by a period of construction of shore-parallel structures (e.g., seawalls), and then a period of beach nourishment, which is now favored (Morton et al. 2004; Nordstrom 2000).

Past and ongoing stabilization projects fundamentally alter the naturally dynamic coastal processes that create and maintain beach strand and bayside habitats, including those habitat components of which red knots rely. Past loss of stopover and wintering habitat likely reduces the resilience of the red knot by making it more dependent on those habitats that remain, and more vulnerable to threats (e.g., disturbance, predation, reduced quality or abundance of prey, increased intraspecific and interspecific competition) within those restricted habitats.

<u>Shoreline Stabilization – Hard Structures</u>: Hard structures constructed of stone, concrete, wood, steel, or geotextiles have been used for centuries as a coastal defense strategy (Defeo et al. 2009). The most common hard stabilization structures fall into two groups: structures that run parallel to the shoreline (e.g., seawalls, revetments, bulkheads) and structures that run perpendicular to the shoreline (e.g., groins, jetties). Groins are often clustered in groin fields and are intended to protect a finite section of beach, while jetties are normally constructed at inlets to keep sand out of navigation channels and provide calm-water access to harbor facilities (U.S. Army Corps of Engineers (2002). Descriptions of the different types of stabilization structures can be found in Rice (2009), Herrington (2003), and U.S. Army Corps of Engineers (2002).

Prior to the 1950s, the general practice in the United States was to use hard structures to protect developments from beach erosion or storm damages (U.S. Army Corps of Engineers 2002). The pace of constructing new hard stabilization structures has since slowed considerably (U.S. Army Corps of Engineers 2002). Many states within the range of the red knot now discourage or restrict construction of new, hard oceanfront protection structures, although hardening of bayside shorelines is generally still allowed (Kana 2011; Greene 2002; Titus 2000). Most existing hard oceanfront structures continue to be maintained and some new structures continue to be built. Eleven new groin projects were approved in Florida from 2000 to 2009 (U.S. Fish and Wildlife Service 2009b). Since 2006, a new terminal groin has been constructed at one South Carolina site, three groins have been approved, but not yet constructed in conjunction with a beach nourishment project, and a proposed new terminal groin is under review (Bimbi, pers. comm., January 31, 2013). The state of North Carolina prohibited use of hard erosion control structures in 1985, but 2011 legislation authorized an exception for construction of up to four new terminal groins (Rice 2012).

While some states have restricted new construction, hard structures are still among the alternatives in the federal shore protection program (U.S. Army Corps of Engineers 2002). Hard shoreline stabilization projects are typically designed to protect property (and its human inhabitants), not beaches (Kana 2011; Pilkey and Howard 1981). Hard structures affect beaches in several ways. For example, when a hard structure is put in place, erosion of the oceanfront sand continues, but the fixed back-beach line remains, resulting in a loss of beach area (U.S. Army Corps of Engineers 2002). In addition, hard structures reduce the regional supply of beach sediment by restricting natural sand movement, further increasing erosion problems (Morton et al. 2004; Morton 2003; Greene 2002). Through effects on waves and currents, sediment transport rates, Aeolian (wind) processes, and sand exchanges with dunes and offshore bars, hard structures change the erosion-accretion dynamics of beaches and constrain the natural migration of shorelines (U.S. Climate Change Science Program [CCSP] 2009; Defeo et al. 2009; Morton 2003; Scavia et al. 2002; Nordstrom 2000). There is ample evidence of accelerated erosion rates, pronounced breaks in shoreline orientation, and truncation of the beach profile downdrift of perpendicular structures—and of reduced beach widths (relative to unprotected segments) where parallel structures have been in place over long periods of time (Hafner 2012; U.S. Climate Change Science Program [CCSP] 2009; Morton 2003; Scavia et al. 2002; U.S. Army Corps of Engineers 2002; Nordstrom 2000; Pilkey and Wright 1988). In addition, marinas and port facilities built out from the shore can have effects similar to hard stabilization structures (Nordstrom 2000).

Structural development along the shoreline and manipulation of natural inlets upset the naturally dynamic coastal processes and result in loss or degradation of beach habitat (Melvin et al. 1991).

As beaches narrow, the reduced habitat can directly lower the diversity and abundance of biota (life forms), especially in the upper intertidal zone. Shorebirds may be impacted both by reduced habitat area for roosting and foraging, and by declining intertidal prey resources, as has been documented in California (Defeo et al. 2009; Dugan and Hubbard 2006). In an estuary in England, Stillman et al. (2005) found that a 2 to 8 percent reduction in intertidal area (the magnitude expected through sea level rise and industrial developments including extensive stabilization structures) decreased the predicted survival rates of 5 out of 9 shorebird species evaluated (although not of *Calidris canutus*).

In Delaware Bay, hard structures also cause or accelerate loss of horseshoe crab spawning habitat (U.S. Climate Change Science Program [CCSP] 2009; Botton et al. *in* Shuster et al. 2003; Botton et al. 1988), and shorebird habitat has been, and may continue to be, lost where bulkheads have been built (Clark *in* Farrell and Martin 1997). In addition to directly eliminating red knot habitat, hard structures interfere with creation of new shorebird habitats by interrupting the natural processes of overwash and inlet formation. Where hard stabilization is installed, the eventual loss of the beach and its associated habitats is virtually assured (Rice 2009), absent beach nourishment, which may also impact red knots as discussed below. Where they are maintained, hard structures are likely to significantly increase the amount of red knot habitat lost as sea levels continue to rise.

In a few isolated locations, however, hard structures may enhance red knot habitat, or may provide artificial habitat. In Delaware Bay, for example, Botton et al. (1994) found that, in the same manner as natural shoreline discontinuities like creek mouths, jetties and other artificial obstructions can act to concentrate drifting horseshoe crab eggs and, thereby, attract shorebirds. Another example comes from the Delaware side of the bay, where a seawall and jetty at Mispillion Harbor protect the confluence of the Mispillion River and Cedar Creek. These structures create a low energy environment in the harbor that seem to provide highly suitable conditions for horseshoe crab spawning over a wider variation of weather and sea conditions than anywhere else in the bay (Breese, *pers. comm*., March 25, 2013). Horseshoe crab egg densities at Mispillion Harbor are consistently an order of magnitude higher than at other bay beaches (Dey et al. 2011) and this site consistently supports upwards of 15 to 20 percent of all the knots recorded in Delaware Bay (Lathrop 2005). In Florida, Schwarzer (*pers. comm*., March 25, 2013) observed multiple instances of red knots using artificial structures such as docks, piers, jetties, causeways, and construction barriers; we have no information regarding the frequency, regularity, timing, or significance of this use of artificial habitats.

Beach Nourishment: Several types of sediment transport are employed to stabilize shorelines, protect development, maintain navigation channels, and provide for recreation (Gebert 2012; Kana 2011; U.S. Army Corps of Engineers 2002). The effects of these projects are typically expected to be relatively short in duration, usually less than 10 years, but often these actions are carried out every few years in the same area, resulting in a more lasting impact on habitat suitability for shorebirds. Mechanical sediment transport practices include beach nourishment, sediment backpassing, sand scraping, and dredging. Beach nourishment is an engineering practice of deliberately adding sand (or gravel or cobbles) to an eroding beach, or the construction of a beach where only a small beach, or no beach, previously existed (National Research Council [NRC] 1995). Since the 1970s, 90 percent of the federal appropriation for shore protection has been for beach nourishment (U.S. Army Corps of Engineers 2002), which has become the preferred course of action to address shoreline erosion in the United States (Kana 2011; Morton and Miller 2005; Greene 2002). Beach nourishment requires an abundant source of sand that is compatible with native beach material. The sand is trucked to the target beach or hydraulically pumped using dredges (Hafner 2012). Sand for beach nourishment operations can be obtained from dry land-based sources; estuaries, lagoons, or inlets on the backside of the beach; sandy shoals in inlets and navigation channels; nearshore ocean waters; or offshore ocean waters, with the last two being the most common sources (Greene 2002).

Where shorebird habitat has been severely reduced or eliminated by hard stabilization structures, beach nourishment may be the only means available to replace any habitat for as long as the hard structures are maintained (Nordstrom and Mauriello 2001), although such habitat will persist only with regular nourishment episodes (typically on the order of every two to six years). In Delaware Bay, beach nourishment has been recommended to prevent loss of spawning habitat for horseshoe crabs (Kalasz 2008; Carter et al. *in* Guilfoyle et al. 2007; Atlantic States Marine Fisheries Commission [ASMFC] 1998), and is being pursued as a means of restoring shorebird habitat in Delaware Bay following Hurricane Sandy (Niles et al. 2013; U.S. Army Corps of Engineers 2012). Beach nourishment was part of a 2009 project to maintain important shorebird foraging habitat at Mispillion Harbor, Delaware (Kalasz, *pers. comm.*, March 29, 2013; Siok and Wilson 2011). However, red knots may be directly disturbed if beach nourishment takes place while the birds are present. On New Jersey's Atlantic coast, beach nourishment has typically been scheduled for the fall when red knots are present because of various constraints at other times of year. In addition to causing disturbance during construction, beach nourishment often increases recreational use of the widened beaches that, without careful management, can increase disturbance of red knots. Beach nourishment can also temporarily depress, and sometimes permanently alter, the invertebrate prey base on which shorebirds depend.

In addition to disturbing the birds and impacting the prey base, beach nourishment can affect the quality and quantity of red knot habitat (Bimbi, *pers. comm*., November 1, 2012; Greene 2002). The artificial beach created by nourishment may provide only suboptimal habitat for red knots, as a steeper beach profile is created when sand is stacked on the beach during the nourishment process. In some cases, nourishment is accompanied by planting of dense beach grasses, which can directly degrade habitat, as red knots require sparse vegetation to avoid predation. By precluding overwash and Aeolian transport, especially where large artificial dunes are constructed, beach nourishment can also lead to further erosion on the bayside and promote bayside vegetation growth, both of which can degrade the red knot's preferred foraging and roosting habitats (sparsely vegetated flats in or adjacent to intertidal areas). Preclusion of overwash also impedes formation of new red knot habitats. Beach nourishment can also encourage further development, bringing further habitat impacts, reducing future alternative management options such as a retreat from the coast, and perpetuating the developed and stabilized conditions that may ultimately lead to inundation where beaches are prevented from migrating (Bimbi, *pers. comm*., November 1, 2012; Greene 2002).

Following placement of sediments much coarser than those native to the beach, Peterson et al. (2006) found that the area of intertidal-shallow subtidal shorebird foraging habitat was reduced by 14 to 29 percent at a site in North Carolina. Presence of coarse shell material armored the substrate surface against shorebird probing, further reducing foraging habitat by 33 percent, and probably also inhibiting manipulation of prey when encountered by a bird's bill (Peterson et al. 2006). (In addition to this physical change from adding coarse sediment, nourishment that places sediment dissimilar to the native beach also substantially increases impacts to the red knot's invertebrate prey base. Lott (2009) found a strong negative correlation between sand placement projects and the presence of piping plovers (*Charadrius melodus*) (nonbreeding) and snowy plovers (*Charadrius alexandrinus*) (breeding and nonbreeding) in Florida.

Shoreline Stabilization and Coastal Development – Summary

About 40 percent of the U.S. coastline within the range of the red knot is already developed, and much of this developed area is stabilized by a combination of existing hard structures and on-going beach nourishment programs. In those portions of the range for which data are available (New Jersey and North Carolina to Texas), about 40 percent of inlets, a preferred red knot habitat, are hard-stabilized, dredged, or both. Hard stabilization structures and dredging degrade and often eliminate existing red knot habitats, and in many cases prevent the formation of new shorebird habitats. Beach nourishment may temporarily maintain suboptimal shorebird habitats where they would otherwise be lost as a result of hard structures, but beach nourishment also has adverse effects to red knots and their habitats. Demographic and economic pressures remain strong to continue existing programs of shoreline stabilization and to develop additional areas, with an estimated 20 to 33 percent of the coast still available for development. However, we expect existing beach nourishment programs will likely face eventual constraints of budget and sediment availability as sea level rises. In those times and places that artificial beach maintenance is abandoned, the remaining alternatives would likely be limited to either a retreat from the coast or increased use of hard structures to protect development. The quantity of red knot habitat would be markedly decreased by a proliferation of hard structures. Red knot habitat would be significantly increased by retreat, but only where hard stabilization structures do not exist or where they get dismantled. The cumulative loss of habitat across the nonbreeding range could affect the ability of red knots to complete their annual cycles, possibly affecting fitness and survival, and is thereby likely to negatively influence the long-term survival of the rufa red knot.

Invasive Vegetation

Defeo et al. (2009) cited biological invasions of both plants and animals as global threats to sandy beaches, with the potential to alter food webs, nutrient cycling, and invertebrate assemblages. Although the extent of the threat is uncertain, this may be due to poor survey coverage more than an absence of invasions. The propensity of invasive species to spread, and their tenacity once established, make them a persistent problem that is only partially countered by increasing awareness and willingness of beach managers to undertake control efforts (U.S. Fish and Wildlife Service 2012). Like most invasive species, exotic coastal plants tend to reproduce and spread quickly and exhibit dense growth habits, often outcompeting native plants. If left uncontrolled, invasive plants can cause a habitat shift from open or sparsely vegetated sand to dense vegetation, resulting in loss or degradation of red knot roosting habitat that is especially important during high tides and migration periods. Many invasive species are either affecting or have the potential to affect coastal beaches (U.S. Fish and Wildlife Service 2012), and thus red knot habitat.

Japanese (or Asiatic) sand sedge (*Carex kobomugi*) is a 4- to 12-in tall perennial sedge adapted to coastal beaches and dunes (Plant Conservation Alliance 2005; Invasive Plant Atlas of New England undated). The species occurs from Massachusetts to North Carolina (U.S. Department of Agriculture 2013) and spreads primarily by vegetative means through production of underground rhizomes (horizontal stems) (Plant Conservation Alliance 2005). Japanese sand sedge forms dense stands on coastal dunes, outcompeting native vegetation and increasing vulnerability to erosion (Plant Conservation Alliance 2005). In the 2000s, Wootton (2009) documented rapid (exponential) growth in the spread of Japanese sand sedge at two New Jersey sites that are known to support shorebirds.

In summary, red knots require open habitats that allow them to see potential predators and that are away from tall perches used by avian predators. Invasive species, particularly woody species, degrade or eliminate the suitability of red knot roosting and foraging habitats by forming dense stands of vegetation. Although not a primary cause of habitat loss, invasive species can be a regionally important contributor to the overall loss and degradation of the red knot's nonbreeding habitat.

Predation – Nonbreeding Areas

In wintering and migration areas, the most common predators of red knots are peregrine falcons (*Falco peregrinus*), harriers (*Circus* spp.), accipiters (Family Accipitridae), merlins (*F. columbarius*), shorteared owls (*Asio flammeus*), and greater black-backed gulls (*Larus marinus*) (Niles et al. 2008). In addition to greater black-backed gulls, other large gulls (e.g., herring gulls [*Larus argentatus*]) are anecdotally known to prey on shorebirds (Breese 2010). Predation by a great horned owl (*Bubo virginianus*) has been documented in Florida (Schwarzer, *pers. comm*., June 17, 2013). Nearly all documented predation of wintering red knots in Florida has been by avian, not terrestrial, predators (Schwarzer, *pers. comm*., June 17, 2013). However, in migration areas like Delaware Bay, terrestrial predators such as red foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) may be a threat to red knots by causing disturbance, but direct mortality from these predators may be low (Niles et al.et al. 2008).

Peregrine falcons have been seen frequently along beaches in Texas, where dunes would provide good cover for peregrines preying on red knots foraging along the narrow beachfront (Niles et al.et al. 2009). Peregrines are known to hunt shorebirds in the red knot's Virginia and Delaware Bay stopover areas (Niles 2010; Niles et al.et al. 2008), and peregrine predation on red knots has been observed in Florida (Schwarzer, *pers. comm*., June 17, 2013).

Red knots' selection of high-tide roosting areas on the coast appears to be strongly influenced by raptor predation, something well demonstrated in other shorebirds (Niles et al.et al. 2008). Red knots require roosting habitats away from vegetation and structures that could harbor predators (Niles et al. 2008). Red knots' usage of foraging habitat can also be affected by the presence of predators, possibly affecting the birds' ability to prepare for their final flights to the arctic breeding grounds (Watts 2009) (e.g., if the knots are pushed out of those areas with the highest prey density or quality). In 2010, horseshoe crab egg densities were very high in Mispillion Harbor, Delaware, but red knot use was low because peregrine falcons were regularly hunting shorebirds in that area (Niles 2010). Growing numbers of peregrine falcons on the Delaware Bay and New Jersey's Atlantic coasts are decreasing the suitability of a number of important shorebird areas (Niles 2010). Analyzing survey data from the Virginia stopover area, Watts (2009) found the density of red knots far (greater than 3.7 mi.) from peregrine nests was nearly eight times higher than close (0 to 1.9 mi.) to peregrine nests. In addition, red knot density in Virginia was significantly higher close to peregrine nests during those years when peregrine territories were not active compared to years when they were (Watts 2009). Similar results were found for other *Calidris canutus* subspecies in the Dutch Wadden Sea where the spatial distribution of *C. canutus* was best explained by both food availability and avoidance of predators (Piersma et al. 1993).

At key stopover sites, however, localized predation pressures are likely to exacerbate other threats to red knot populations, such as habitat loss, food shortages, and asynchronies between the birds' stopover period and the occurrence of favorable food and weather conditions. Predation pressures worsen these threats by pushing red knots out of otherwise suitable foraging and roosting habitats, causing disturbance, and possibly causing changes to stopover duration or other aspects of the migration strategy.

Reduced Food Availability

Commercial harvest of horseshoe crabs has been implicated as a causal factor in the decline of the rufa red knot by decreasing the availability of horseshoe crab eggs in the Delaware Bay stopover (Niles et al. 2008). Notwithstanding the importance of the horseshoe crab and Delaware Bay, other lines of evidence suggest that the rufa red knot also faces threats to its food resources throughout its range. The following discussion addresses known or likely threats to the abundance or quality of red knot prey. Potential food shortages caused by asynchronies (“mismatches”) in the red knot's annual cycle are discussed in the next section. Although threats to food quality and quantity are widespread, red knots in localized areas have shown some ability to switch prey when the preferred prey species became reduced (Escudero et al. 2012; Musmeci et al. 2011), suggesting some adaptive capacity to cope with this threat.

Food Availability

The quantity and quality of red knot prey may also be affected by the placement of sediment for beach nourishment or disposal of dredged material. Invertebrates may be crushed or buried during project construction. Although some benthic species can burrow through a thin layer of additional sediment, thicker layers (over 35 in.) smother the benthic fauna (Greene 2002). By means of this vertical burrowing, recolonization from adjacent areas, or both, the benthic faunal communities typically recover. Recovery can take from six month to two years (Greene 2002; Peterson and Manning 2001; U.S. Army Corps of Engineers 2014a)). Although many studies have concluded that invertebrate communities recovered following sand placement, study methods have often been insufficient to detect even large changes (e.g., in abundance or species composition), due to high natural variability and small sample sizes (Peterson and Bishop 2005). Therefore, uncertainty remains about the effects of sand placement on invertebrate communities and how these impacts may affect red knots.

The invertebrate community structure and size class distribution following sediment placement may differ considerably from the original community (Zajac and Whitlatch 2003; Peterson and Manning 2001; Hurme and Pullen 1988). Recovery may be slow or incomplete if placed sediments are a poor grain size match to the native beach substrate (Bricker 2012; Peterson et al. 2006; Greene 2002; Peterson et al. 2000; Hurme and Pullen 1988) or if placement occurs during a seasonal low point in invertebrate abundance (Burlas et al. 2001). Recovery is also affected by the beach position and thickness of the deposited material (Schlacher et al. 2012). If the profile of the nourished beach and the imported sediments do not match the original conditions, recovery of the benthos is unlikely (Defeo et al. 2009). Reduced prey quantity and accessibility caused by a poor sediment size match have been shown to affect shorebirds, causing temporary but large (70 to 90 percent) declines in local shorebird abundance (Peterson et al. 2006).

Beach nourishment is a regular practice on the Delaware side of Delaware Bay and can affect spawning habitat for horseshoe crabs. Although beach nourishment generally preserves habitat value better than hard stabilization structures, nourishment can enhance, maintain, or decrease habitat value depending on beach geometry and sediment matrix (Smith et al. 2002). In a field study in 2001 and 2002, Smith et al. (2002) found a stable or increasing amount of spawning activity at beaches that were recently nourished while spawning activity at control beaches declined. These authors also found that beach characteristics affect horseshoe crab egg development and viability. Avissar (2006) modeled nourished versus control beaches and found that nourishment may compromise egg development and viability. Despite possible drawbacks, beach nourishment has been recommended to prevent the loss of spawning habitat for horseshoe crabs (Kalasz 2008; Carter et al. *in* Guilfoyle et al. 2007; Atlantic States Marine Fisheries Commission 1998) and is being pursued as a means of restoring shorebird habitat in Delaware Bay following Hurricane Sandy (Niles et al. 2013; U.S. Army Corps of Engineers 2012). In areas of Delaware Bay with hard stabilization structures or high erosion rates, beach nourishment may be the only option for maintaining habitat.

Food Availability – Recreational Activities

Recreational activities can likewise affect the availability of shorebird food resources by causing direct mortality of prey. Studies from the United States and other parts of the world have documented recreational impacts to beach invertebrates, primarily from the use of off-road vehicles (ORVs), but even heavy pedestrian traffic can have effects. Few studies have examined the potential link between these invertebrate impacts and shorebirds. However, several studies on the effects of recreation on invertebrates are considered the best available information as they involve species and habitats similar to those used by red knots.

In many areas, habitat for the piping plover overlaps considerably with red knot habitats. A preliminary review of ORV use at piping plover wintering locations (from North Carolina to Texas) suggests that ORV impacts may be most widespread in North Carolina and Texas (U.S. Fish and Wildlife Service 2009b). Although red knots normally feed low on the beach, they may also utilize the wrack line. Kluft and Ginsberg (2009) found that ORVs killed and displaced invertebrates and lowered the total amount of wrack, in turn lowering the overall abundance of wrack dwellers. In the intertidal zone, invertebrate abundance is greatest in the top 12 in. of sediment (Carley et al. 2010). Intertidal fauna are burrowing organisms, typically 2 to 4 in. deep; burrowing may ameliorate direct crushing. However, shear stress of ORVs can penetrate up to 12 in. into the sand (Schlacher and Thompson 2007).

Some early studies found minimal impacts to intertidal beach invertebrates from ORV use (Steinback and Ginsberg 2009; van der Merwe and van der Merwe 1991; Wolcott and Wolcott 1984). However, some attempts to determine whether ORVs had an impact on intertidal fauna have been unsuccessful because the naturally high variability of these invertebrate communities masked any effects of vehicle damage (Stephenson 1999). Based on a review of the literature through 1999, Stephenson (1999) concluded that vehicle impacts on the biota of the foreshore (intertidal zone) of sandy beaches have appeared to be minimal, at least when the vehicle use occurred during the day when studies typically take place, but very few elements of the foreshore biota had been examined.

Other studies have found higher impacts to benthic invertebrates from driving (Sheppard et al. 2009; Schlacher et al. 2008a; Schlacher et al. 2008b; Wheeler 1979), although it can be difficult to discern results specific to the wet sand zone where red knots typically forage. Due to the compactness of sediments low on the beach profile, driving in this zone is thought to minimize impacts to the invertebrate community. However, the relative vulnerability of species in this zone is not well known; driving low on the beach may expose a larger proportion of the total intertidal fauna to vehicles (Schlacher and Thompson 2007). The severity of direct impacts (e.g., crushing) depends on the compactness of the sand, the sensitivity of individual species, and the depth at which they are buried in the sand (Schlacher et al. 2008a; Schlacher et al. 2008b). At least one study documented a positive response of shorebird populations following the exclusion of ORVs (Defeo et al. 2009; Williams et al. 2004), although the response could have been due to decreased disturbance (discussed below) as well as (or instead of) increased prey availability following the closure.

Food Availability – Horseshoe Crab Harvest

Reduced food availability at the Delaware Bay stopover site due to commercial harvest and subsequent population decline of the horseshoe crab is considered a primary causal factor in the decline of the rufa subspecies in the 2000s (Escudero et al. 2012; McGowan et al. 2011a; Conservation of Arctic Flora and Fauna [CAFF] 2010; Niles et al. 2008; Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2007; González et al. 2006; Baker et al. 2004; Morrison et al. 2004), although other possible causes or contributing factors have been postulated (Fraser et al. 2013; Schwarzer et al. 2012; Escudero et al. 2012; Espoz et al. 2008; Niles et al. 2008. Due to harvest restrictions and other conservation actions, horseshoe crab populations showed some signs of recovery in the early 2000s, with apparent signs of red knot stabilization (survey counts, rates of weight gain) occurring a few years later (as might be expected due to biological lag times). Since about 2005, however, horseshoe crab population growth has stagnated for unknown reasons.

Under the current management framework (known as Adaptive Resource Management, or ARM), the present horseshoe crab harvest is not considered a threat to the red knot because harvest levels are tied to red knot populations via scientific modeling. Most data suggest that the volume of horseshoe crab eggs is currently sufficient to support the Delaware Bay's stopover population of red knots at its present size. However, because of the uncertain trajectory of horseshoe crab population growth, it is not yet known if the egg resource will continue to adequately support red knot populations over the next 5 to 10 years. In addition, implementation of the ARM could be impeded by insufficient funding for the shorebird and horseshoe crab monitoring programs that are necessary for the functioning of the ARM models.

Many studies have established that red knots stopping over in Delaware Bay during spring migration achieve remarkable and important weight gains to complete their migrations to the breeding grounds by feeding almost exclusively on a superabundance of horseshoe crab eggs. A temporal correlation occurred between increased horseshoe crab harvests in the 1990s and declining red knot counts in both Delaware Bay and Tierra del Fuego by the 2000s. Other shorebird species that rely on Delaware Bay also declined over this period (Mizrahi and Peters *in* Tanacredi et al. 2009), although some shorebird declines began before the peak expansion of the horseshoe crab fishery (Botton et al. *in* Shuster et al. 2003).

The causal chain from horseshoe crab harvest to red knot populations has several links, each with different lines of supporting evidence and various levels of uncertainty: (a) horseshoe crab harvest levels and Delaware Bay horseshoe crab populations (Link A); (b) horseshoe crab populations and red knot weight gain during the spring stopover (Link B); and (c) red knot weight gain and subsequent rates of survival, reproduction, or both (Link C). The weight of evidence supporting each of these linkages is discussed below. Despite the various levels of uncertainty, the weight of evidence supports these linkages, points to past harvest as a key factor in the decline of the red knot, and underscores the importance of continued horseshoe crab management to meet the needs of the red knot.

Human Disturbance

In some wintering and stopover areas, red knots and recreational users (e.g., pedestrians, ORVs, dog walkers, boaters) are concentrated on the same beaches (Niles et al. 2008; Tarr 2008). Recreational activities affect red knots both directly and indirectly. These activities can cause habitat damage (Schlacher and Thompson 2008; Anders and Leatherman 1987), cause shorebirds to abandon otherwise preferred habitats, negatively affect the birds' energy balances, and reduce the amount of available prey. Effects to red knots from vehicle and pedestrian disturbance can also occur during construction of shoreline stabilization projects including beach nourishment.

Red knots can also be disturbed by motorized and non-motorized boats, fishing, kite surfing, aircraft, and research activities (Kalasz, *pers. comm*., November 17, 2011; Niles et al. 2008; Peters and Otis 2007; Harrington 2005; Meyer et al. 1999; Burger 1986) and by beach raking (also called grooming or cleaning). In Delaware Bay, red knots could also potentially be disturbed by hand-harvest of horseshoe crabs during the spring migration stopover period, but, under the current management of this fishery, state waters from New Jersey to coastal Virginia are closed to horseshoe crab harvest and landing from January 1 to June 7 each year (Atlantic States Marine Fisheries Commission 2012); thus, disturbance from horseshoe crab harvest is no longer occurring. Active management can be effective at reducing and minimizing the adverse effects of recreational disturbance (Burger and Niles, *in press*; Forys 2011; Burger et al. 2004), but such management is not occurring throughout the red knot's range.

Although the timing, frequency, and duration of human and dog presence throughout the red knot's U.S. range are not fully known, periods of recreational use tend to coincide with the knot's spring and fall migration periods (Western Hemisphere Shorebird Reserve Network [WHSRN] 2012; Maddock et al. 2009; Mizrahi 2002; Johnson and Baldassarre 1988; Burger 1986). Burger (1986) found that red knots and other shorebirds at two sites in New Jersey reacted more strongly to disturbance (*i.e*., flew away from the beach where they were foraging or roosting) during peak migration periods (May and August) than in other months.

Human disturbance within otherwise suitable red knot migration and winter foraging or roosting areas was reported by biologists as negatively affecting red knots in Massachusetts, Virginia, North Carolina, South Carolina, Georgia, and Florida (U.S. Fish and Wildlife Service 2011b). Some disturbance issues also remain in New Jersey (both Delaware Bay and the Atlantic coast) despite on-going, and largely successful, management efforts since 2003 (New Jersey Department of Environmental Protection 2013; U.S. Fish and Wildlife Service 2011b; Niles et al. 2008). Delaware also has a management program in place to limit disturbance (Kalasz 2008). In Florida, the most immediate and tangible threat to migrating and wintering red knots is apparently chronic disturbance (Niles et al. 2008; Niles et al. 2006) that may be affecting the ability of birds to maintain adequate weights in some areas (Niles 2009).

Disturbance – Precluded Use of Preferred Habitats

Where shorebirds are habitually disturbed, they may be pushed out of otherwise preferred roosting and foraging habitats (Colwell et al. 2003; Lafferty 2001; Luís et al. 2001; Burton et al.

1996; Burger et al. 1995). Roosting knots are particularly vulnerable to disturbance because birds tend to concentrate in a few small areas during high tides; availability of suitable roosting habitats is already constrained by predation pressures and energetic costs such as traveling between roosting and foraging areas (Niles, *pers. comm*., November 19, 2012; Rogers et al. 2006; Colwell et al. 2003; Rogers 2003).

Exclusion of shorebirds from preferred habitats due to disturbance has been noted throughout the red knot's nonbreeding range. For example, Pfister et al. (1992) found sharper declines in red knot abundance at a disturbed site in Massachusetts than at comparable, but less disturbed areas. On the Atlantic coast of New Jersey, findings by Mizrahi (2002) generally suggest a negative relationship between human and shorebird densities; specifically, sites that allowed swimming had the greatest densities of people and the fewest shorebirds. At two sites on the Atlantic coast of New Jersey, Burger and Niles (*in press*) found that disturbed shorebird flocks often did not return to the same place or even general location along the beach once they were disturbed, with return rates at one site of only eight percent for monospecific red knot flocks. In Delaware Bay, Karpanty et al. (2006) found that potential disturbance reduced the probability of finding red knots on a given beach, although the effect of disturbance was secondary to the influence of prey resources. In Florida, sanderlings seemed to concentrate where there were the fewest people (Burger and Gochfeld 1991). From 1979 to 2007, the mean abundance of red knots on Mustang Island, Texas, decreased 54 percent, while the mean number of people on the beach increased fivefold (Foster et al. 2009). In 2008, Escudero et al. (2012) found that human disturbance pushed red knots off prime foraging areas near Río Grande in Argentinean Tierra del Fuego, and that disturbance was the main factor affecting roost site selection.

Although not specific to red knot, Forgues (2010) found the abundance of shorebirds declined with increased ORV frequency, as did the number and size of roosts. Study sites with high ORV activity and relatively high invertebrate abundance suggest that shorebirds may be excluded from prime food sources due to disturbance from ORV activity itself (Forgues 2010). Tarr (2008) found that disturbance from ORVs decreased shorebird abundance and altered shorebird habitat use. In experimental plots, shorebirds decreased their use of the wet sand microhabitat and increased their use of the swash zone in response to vehicle disturbance (Tarr 2008).

Oil Spills and Leaks

The red knot has the potential to be exposed to oil spills and leaks throughout its migration and wintering range. Oil, as well as spill response activities, can directly and indirectly affect both the bird and its habitat through several pathways. Red knots can be exposed to petroleum products via spills from shipping vessels, leaks or spills from offshore oil rigs or undersea pipelines, leaks or spills from onshore facilities such as petroleum refineries and petrochemical plants, and beach-stranded barrels and containers that can fall from moving cargo ships or offshore rigs. Several key red knot wintering or stopover areas also contain large-scale petroleum extraction, transportation, or both activities. With regard to potential effects on red knot habitats, the geographic location of a spill, weather conditions (e.g., prevailing winds), and type of oil spilled are as important, if not more so, than the volume of the discharge.

Contaminants

Red knots are exposed to a variety of contaminants across their nonbreeding range. Exposure risks exist in localized red knot habitats in Canada, but best available data suggest shorebirds in Canada are not impacted by background levels of contamination. Levels of trace heavy metals in red knot feathers from the Delaware Bay have been somewhat high, but generally similar to levels reported from other studies of shorebirds. One preliminary study suggests organochlorines and trace metals are not elevated in Delaware Bay shorebirds, although this finding cannot be confirmed without updated testing. Levels of metals in horseshoe crabs are generally low in the Delaware Bay region and not likely impacting red knots or recovery of the crab population.

Horseshoe crab reproduction does not appear impacted by the mosquito control chemical methoprene (at least through the first juvenile molt) or by ambient water quality in mid-Atlantic estuaries. Shorebirds have been impacted by pesticide exposure, but use of the specific chemical that caused a piping plover death in Florida has subsequently been banned in the United States. Exposure of shorebirds to agricultural pollutants in rice fields may occur regionally in parts of South America, but red knot usage of rice field habitats was low in the several countries surveyed. Finally, localized urban pollution has been shown to impact South American red knot habitats, but we are unaware of any documented health effects or population-level impacts. Thus, we conclude that environmental contaminants are not a threat to the red knot.

Conservation Efforts

Many components are being partially managed through conservation efforts. For example, the reduced availability of horseshoe crab eggs from the past overharvest of crabs in Delaware Bay is currently being managed through the ASMFC's ARM framework. This conservation effort more than others is likely having the greatest effect on the red knot subspecies as a whole because a large majority of the birds move through Delaware Bay during spring migration and depend on a superabundant supply of horseshoe crab eggs for refueling. Other factors potentially influencing horseshoe crab egg availability are outside the scope of the ARM, but some are being managed. For example, enforcement is on-going to minimize poaching, and steps are being implemented to prevent the importation of nonnative horseshoe crab species that could impact native populations. Despite the ARM and other conservation efforts, horseshoe crab population growth has stagnated for unknown reasons, some of which (e.g., possible ecological shifts) may not be manageable. See regarding threats to, and conservation efforts to maintain, horseshoe crab spawning habitat.

Some threats to the red knot's other prey species (mainly mollusks) are being partially addressed. For example, the Service is working with partners to minimize the effects of shoreline stabilization projects on the invertebrate prey base for shorebirds (e.g., Rice 2009, entire), and management of ORVs is protecting the invertebrate prey resource in some areas. Other likely threats to the red knot's mollusk prey base (e.g., ocean acidification; warming coastal waters; marine diseases, parasites, and invasive species) cannot be managed at this time, although efforts to minimize ballast water discharges in coastal areas likely reduce the potential for introduction of new invasive species.

Other smaller-scale conservation efforts implemented to reduce Factor E threats include beach recreation management to reduce human disturbance, gull species population monitoring and management in Delaware Bay, research into HAB control, oil spill response plan development and implementation, sewage treatment in Río Gallegos (Argentina), and national and state wind turbine siting and operation guidelines. In contrast, no known conservation actions are available to address asynchronies during the annual cycle.

ENVIRONMENTAL BASELINE

The Piping Plover Biological Opinion describing the beach stabilization activities and dredging activities that have impacted intertidal foraging habitats on Long Island is incorporated by reference.

Description of the Action Area

The environmental baseline includes the past and present impacts of all federal, State, or private activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early consultation, and the impact of State or private actions that are occurring in the action area. As defined in 50 CFR §402.02, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole, or in part, by federal agencies in the United States or upon the high seas. The "action area" is defined as all areas to be affected directly, or indirectly, by the federal action, and not merely the immediate areas involved in the action, which have resulted in habitat fragmentation, loss, and functional homogenization, and impacts to the species and population as a whole. The current piping plover reproduction, numbers, and distribution on Long Beach Island is reflective of all of these impacts that are described below.

The Action Area corresponds to the Corps' plan sheets numbered 8-14 (U.S. Army Corps of Engineers 2014b). It extends from the terminal groin in Point Lookout to the western end of the Lido Beach West Town Park for a distance of 3 mi., and includes the beach area between mean high water and the existing dunes.

Status of the Species Within the Action Area

As stated above, the Service is not aware of comprehensive monitoring of red knots on Long Island, New York, or within the Action Area. Some data are available from individual birders or associated with horseshoe crab monitoring. Individual birders have documented red knot presence on Long Beach Island particularly in the Action Area: eBird website - http://ebird.org/ebird/subnational2/US-NY-103/hotspots.

Red knot presence is expected to be present within the Action Area during spring and fall migrations (April-June and August-October).

EFFECTS OF THE ACTION

Human Disturbance

Recreational activities within the action area include, but are not limited to, beach bathing, kite flying, surfing, fishing, walking, etc. Administrative use of ORVs is undertaken for public safety and beach maintenance purposes. The proposed action will initially create wider ocean beaches from Jones Inlet to groin D, and then from the Sands at Lido Beach to the western end of Lido Beach West Town Park, which will likely increase the amount of recreational activities within suitable foraging and roosting areas where red knots are likely to occur. This increase in recreational activities could increase the amount of disturbance to foraging and roosting red knots as well as alter the wrack line foraging habitat along the ocean shoreline.

Further information on the effects of the potential increase in recreation are excerpted from Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for the Rufa Redknot (*Calidris canutus rufa*); Proposed Rule (U.S. Fish and Wildlife Service 2013):

Recreational activities affect red knots both directly and indirectly. These activities can cause habitat damage (Schlacher and Thompson 2008; Anders and Leatherman 1987), cause shorebirds to abandon otherwise preferred habitats, negatively affect the birds' energy balances, and reduce the amount of available prey. Effects to red knots from vehicle and pedestrian disturbance can also occur during construction of shoreline stabilization projects including beach nourishment. Red knots can also be disturbed by motorized and non-motorized boats, fishing, kite surfing, aircraft, and research activities (Kalasz, pers. comm., November 17, 2011; Niles et al. 2008; Peters and Otis 2007; Harrington 2005; Meyer et al. 1999; Burger 1986) and by beach raking (also called grooming or cleaning).

Recreational activities can likewise affect the availability of shorebird food resources by causing direct mortality of prey. Studies from the United States and other parts of the world have documented recreational impacts to beach invertebrates, primarily from the use of ORVs, but even heavy pedestrian traffic can have effects. Few studies have examined the potential link between these invertebrate impacts and shorebirds. However, several studies on the effects of recreation on invertebrates are considered the best available information, as they involve species and habitats similar to those used by red knots.

Although pedestrians exert relatively low ground pressures, extremely heavy foot traffic can cause direct crushing of intertidal invertebrates. In many areas, habitat for the piping plover overlaps considerably with red knot habitats. A preliminary review of ORV use at piping plover wintering locations (from North Carolina to Texas) suggests that ORV impacts may be most widespread in North Carolina and Texas (U.S. Fish and Wildlife Service 2009b). Although red knots normally feed low on the beach, they may also utilize the wrack line. Kluft and Ginsberg (2009) found that ORVs killed and displaced invertebrates and lowered the total amount of wrack, in turn lowering the overall abundance of wrack dwellers. In the intertidal zone, invertebrate abundance is greatest in the top 12 in of sediment (Carley et al. 2010). Intertidal fauna are burrowing organisms, typically 2 to 4 in deep; burrowing may ameliorate direct crushing. However, shear stress of ORVs can penetrate up to 12 in into the sand (Schlacher and Thompson 2007). Some early studies found minimal impacts to intertidal beach invertebrates from ORV use (Steinback and Ginsberg 2009; van der Merwe and van der Merwe 1991; Wolcott and Wolcott 1984). However, some attempts to determine whether ORVs had an impact on intertidal fauna have been unsuccessful because the naturally high variability of these invertebrate communities masked any effects of vehicle damage (Stephenson 1999).

Other studies have found higher impacts to benthic invertebrates from driving (Sheppard et al. 2009; Schlacher et al. 2008a; Schlacher et al. 2008b; Wheeler 1979), although it can be difficult to discern results specific to the wet sand zone where red knots typically forage. The severity of direct impacts (e.g., crushing) depends on the compactness of the sand, the sensitivity of individual species, and the depth at which they are buried in the sand (Schlacher et al. 2008a; Schlacher et al. 2008b).

The extent to which mortality of beach invertebrates from recreational activities propagates through food webs is unresolved (Defeo et al. 2009). However, we conclude that these activities likely cause at least localized reductions in red knot prey availability.

Predation

Localized predation can exacerbate other threats to red knot populations. Hunting efficiency of predators may be increased by confining red knot forage areas to narrow, predictable bands of linear ocean habitats. Past and on-going stabilization projects in the Action Area have fundamentally altered the naturally dynamic coastal processes that create and maintain beach strand and habitats, including those habitat components on which knots rely. Past loss of stopover habitat likely reduces the resilience of the red knot by making it more dependent on those habitats that remain and more vulnerable to threats, including predation, within those restricted habitats (U.S. Fish and Wildlife Service 2013b).

Prey Resource Burial

The proposed project would bury ocean beach invertebrate prey species and wrack line foraging habitat of the red knot. Although this impact would be temporary as the benthic community will recover, this recovery could take up to two years (Greene 2002; Peterson and Manning 2001). Further information on the effects of prey resource burial is excerpted from Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for the Rufa Redknot (*Calidris canutus rufa*); Proposed Rule (U.S. Fish and Wildlife Service 2013b).

The quantity and quality of red knot prey may also be affected by the placement of sediment for beach nourishment or disposal of dredged material. Invertebrates may be crushed or buried during project construction. Although some benthic species can burrow through a thin layer of additional sediment, thicker layers (over 35 in) smother the benthic fauna (Greene 2002). By means of this vertical burrowing, recolonization from adjacent areas, or both, the benthic faunal communities typically recover. Recovery may be slow or incomplete if placed sediments are a poor grain size match to the native beach substrate (Bricker 2012; Peterson et al. 2006; Greene 2002; Peterson et al. 2000; Hurme and Pullen 1988), or if placement occurs during a seasonal low point in invertebrate abundance (Burlas et al. 2001). If the profile of the nourished beach and the imported sediments do not match the original conditions, recovery of the benthos is unlikely (Defeo et al. 2009). Reduced prey quantity and accessibility caused by a poor sediment size match have been shown to affect shorebirds, causing temporary, but large (70 to 90 percent), declines in local shorebird abundance (Peterson et al. 2006).

Direct Effects of Construction Activities

Red knots are expected to occur in the Action Area during the spring (April-June) and fall (August-October) months. Construction activities are likely to disturb foraging and roosting red knots along the ocean shoreline where they may occur. Further information on the effects of working when red knots may be present is excerpted from Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for the Rufa Redknot (*Calidris canutus rufa*); Proposed Rule (U.S. Fish and Wildlife Service 2013b):

Red knots may be directly disturbed if beach nourishment takes place while the birds are present. Beach nourishment has typically been scheduled for the fall when red knots are present because of various constraints at other times of year. In addition to causing disturbance during construction, beach nourishment often increases recreational use of the widened beaches that, without careful management, can increase disturbance of red knots. Beach nourishment can also temporarily depress, and sometimes permanently alter, the invertebrate prey base on which shorebirds depend.

In addition to disturbing the birds and impacting the prey base, beach nourishment can affect the quality and quantity of red knot habitat (Bimbi, pers. comm., November 1, 2012; Greene 2002). The artificial beach created by nourishment may provide only suboptimal habitat for red knots, as a steeper beach profile is created when sand is stacked on the beach during the nourishment process. In some cases, nourishment is accompanied by planting of dense beach grasses, which can directly degrade habitat, as red knots require sparse vegetation to avoid predation.

Preclusion of Habitat Formation

The construction of berms and dunes along the ocean shoreline are designed to limit or prevent overwash, a natural process that create and or maintain suitable red knot foraging and roosting habitat. Further information on the effects of preclusion of habitat formation is excerpted from Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for the Rufa Redknot (*Calidris canutus rufa*); Proposed Rule (U.S. Fish and Wildlife Service 2013b):

By interrupting natural processes, especially when large artificial dunes are constructed, beach nourishment can promote oceanside vegetation growth and degrade the red knot’s preferred foraging and roosting habitats (sparsely vegetated flats in or adjacent to intertidal areas. Beach nourishment can also encourage further development, bringing further habitat impacts, reducing future alternative management options such as a retreat from the coast, and perpetuating the developed and stabilized conditions that may ultimately lead to inundation where beaches are prevented from migrating (Bimbi, pers. comm., November 1, 2012; Greene 2002).

CUMULATIVE EFFECTS

Other than beach nourishment projects that would require Corps authorization, local/State actions that are reasonably certain to occur in the project area that could potentially affect the red knot include beach cleaning, installation of sand fencing, and recreational use of migratory stopover areas.

Beach Cleaning

Mechanized beach raking/cleaning is a beach management practice that does occur within the action area. Although red knots normally feed low on the beach, they may also utilize the wrack line. The beach cleaning/raking displaces/removes invertebrates and the total amount of wrack, in turn lowering the overall abundance of wrack-dwelling species on which the red knot feeds.

Sand Fencing

Installation of sand fencing or the planting of beach grass are common practices in attempting to stabilize nourished beaches and have occurred on other sites on Long Island without federal (Service, Corps) or state (NYSDEC) coordination/authorization.

Vegetation planting and sand fence placement will artificially accelerate growth of dense vegetation that precludes use of habitat by red knot and degrades the habitat for this species as red knots require sparse vegetation to avoid predation (U.S. Fish and Wildlife Service 2013b).

This effect will limit the amount of available suitable habitat for these species and will create suboptimal habitat conditions.

Recreation and ORV Use of Migratory Stopover Areas

ORVs are used for administrative purposes in the Action Area and may be expected to disturb red knot from foraging areas. Increased recreation as a result of this project will result in the need for increased administrative use of ORVs, which can significantly degrade shorebird habitat (Wheeler 1979) or disrupt the birds' normal behavior patterns (Zonick 2000). Godfrey et al. (1980 as cited in Lamont et al. 1997) postulated that vehicular traffic along the beach may compact the substrate and kill marine invertebrates. Zonick (2000) found that the density of ORVs negatively correlated with abundance of roosting piping plovers on the ocean beach. In many areas, such as in this Action Area, habitat for the piping plover overlaps considerably with red knot habitats. A preliminary review of ORV use at piping plover wintering locations (from North Carolina to Texas) suggests that ORV impacts may be most widespread in North Carolina and Texas (U.S. Fish and Wildlife Service 2009b). Although red knots normally feed low on the beach, they may also utilize the wrack line. Kluft and Ginsberg (2009) found that ORVs killed and displaced invertebrates and lowered the total amount of wrack, in turn lowering the overall abundance of wrack dwellers. In the intertidal zone, invertebrate abundance is greatest in the top 12 in of sediment (Carley et al. 2010). Intertidal fauna are burrowing organisms, typically 2 to 4 in deep; burrowing may ameliorate direct crushing. However, shear stress of ORVs can penetrate up to 12 in. into the sand (Schlacher and Thompson 2007).

CONCLUSION

After reviewing the current status of the red knot, the environmental baseline for the Action Area, the direct, indirect, and cumulative effects of the proposed project, and the proposed project conservation measures, it is the Service's conference opinion that the action, as proposed, is not likely to jeopardize the continued existence of the red knot.

There is no proposed critical habitat in the project area, therefore, none will be adversely modified by the proposed action.

The Service has based this conclusion on the following:

- The proposed site does not represent a major concentration area for red knots, based on our current understanding of the species use of the Action Area.

- The proposed time-of-year restrictions that prohibit construction during the piping plover and seabeach amaranth (April to November, inclusive), along with the 1,000-m buffer zone would minimize direct impacts to the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided such taking is in compliance with the terms and conditions of this Incidental Take Statement.

As a proposed species, the prohibitions against taking the red knot found in section 9 of the ESA (as stated above) do not apply until the species is listed. However, the Service advises the Corps to consider implementing the reasonable and prudent measures defined in this conference opinion to conserve the species and preclude listing. If this conference opinion is adopted as a biological opinion following federal listing and/or critical habitat designation, the measures described below, with their implementing terms and conditions, will be non-discretionary. These measures must be undertaken by the Corps so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require adherence to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grand document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement (50 CFR §402.14(i)(3)).

Incidental take of red knot will be in the form of harassment and harm. Harassment will result in the disruption of feeding and sheltering behaviors due to terminal groin construction which will take place during the red knot migration period. This will result in red knot abandoning the immediate area where this construction is planned. The Service anticipates that take due to harassment of red knot will be difficult to quantify for the following reasons:

> Red knots use of the Action Area is likely transient in nature as they move around the inlet complex to avail themselves of exposed intertidal areas. Red knots would be expected to use available and suitable bay and ocean shorelines in the vicinity of the project area. Red knots, like other shorebirds, are extremely sensitive to disturbance and, therefore, it may be difficult to identify harassment considering the many recreational and administrative activities that already take place in the Action Area.
>
> The Service also anticipates incidental take due to indirect effect will occur in the form of harm to the species habitat if initial berm construction and renourishment cycles occur in late spring and suppresses prey resources of the species and the ability of the species to obtain necessary food to complete its northward or southward migration. This source of take will also be difficult to quantify considering the many factors that may influence the species' use of the site for foraging.

REASONABLE AND PRUDENT MEASURES

1) Reduce project impacts to red knots and their foraging habitats;
2) Monitor habitat conditions in the Action Area; and
3) Report to the Service the implementation of the reasonable and prudent measures and their terms and conditions.

TERMS AND CONDITIONS

The following habitat-related conservation measures are recommended to address direct, indirect, and cumulative effects of the proposed action and to further the recovery of the red knot:

<u>Terms and Conditions for Reasonable and Prudent Measure 1</u>

1) The Corps shall develop and implement a pre-, concurrent, and post-construction monitoring plan for red knot with guidance and approval from the Service.

2) Dredging submerged and emergent shoals shall be avoided to preserve beach dynamics and shorebird habitat.

3) The footprint of the artificial dune west of groin D shall not overlap ephemeral ponding areas, leading to loss of this habitat type.

4) To ensure that the ephemeral pool habitat continues to be a productive area for plovers, and not adversely affected by impacts other than erosion, the Corps shall survey beach elevations prior to construction to establish baseline conditions and then annually over the life of the project using Light Detection and Ranging (LIDAR) as described below. Survey results shall be submitted each year to the Service in digital form and be able to be utilized in GIS software applications.

5) The Corps shall ensure coordination with the Service to establish elevational targets for the maintenance of ephemeral pool habitats in the Action Area before April 1 of each year over the project life.

6) Construction of the artificial dune west of groin D shall not use any sediment from the beach or ponding areas such as by beach scraping. Heavy equipment shall avoid the ephemeral pool areas to prevent any compaction of the sediment and crushing of the invertebrate fauna that are the prey base for birds.

7) Vegetation planting of the artificial dune shall be limited to the following areas: from Jones Inlet to proposed groin D, and then in front of Lido Beach Towne House Condominiums, and from Prescott to Allevard Avenues in Lido Beach. The Corps shall incorporate a mix of native dune plant species and not be limited to a single grass species.

Plantings should be made in a random manner and not rows with uniform spacing. The plantings should mimic natural dune vegetation in the region in species diversity, density, and spacing.

8) The Corps shall not erect sand fences on, or adjacent to, the artificial dune west of groin D through Lido Beach East Town Park West. Sand fencing is permitted in front of the Lido Beach Towne House Condominiums and from Prescott Street to Allevard Street in Lido Beach. Elimination of federal participation in sand fencing would minimize impacts to the highly dynamic and ephemeral mosaic of habitat features in those areas. The creation of additional dunes through sand fencing seaward of the artificial dune could lead to future conflicts over which dune toe is utilized to measure the berm width, thereby triggering construction of the two deferred groins and/or beach fill in the bird nesting and foraging areas.

9) The Corps shall not plant beach grass west of groin D, except in the front of the residential areas noted above. Beach grass planting may lead to increases in the berm elevation and reduce the potential for ephemeral ponding and the frequency at which it occurs.

10) In order to address habitat loss, degradation, and fragmentation in the Action Area, the Corps shall undertake habitat restoration (vegetation removal and topographical management), west of proposed groin D. The Corps shall devise a restoration plan in coordination with the Town, Nassau County, and the Service. The plan shall be finalized prior to initial construction of the project.

11) In order to address take associated with decreases in prey resources on the oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm, and backshore is conducted based on a sampling program that has been devised in consultation with, and agreed to by, the Service prior to its implementation. The information collected during this monitoring program shall be used to adaptively manage the operation and maintenance phases of the project to further avoid and minimize take. The prey monitoring plan shall be finalized prior to initial construction of the project.

12) To reduce the anticipated level of take due to increases in disturbances from recreational activities, the Corps shall, over the life of the project, utilize their project authorities and authorities under Section 7(a)(1) of the ESA to work with local landowners to establish protection for foraging and loafing red knots.

13) The Corps shall place only clean sand that is a close grain size match to the native beach material.

Terms and Conditions for Reasonable and Prudent Measure 2

1) Seasonal surveys of the area west of proposed groin D shall be undertaken using LIDAR to monitor the microtopography of the area in order to best capture habitat features including ephemeral ponding areas. LIDAR is non-intrusive, does not disturb the habitat or its wildlife, and allows for complete coverage of the area to be monitored. If these areas are documented to be filling in with an increase in sediment supply to the area (via aeolian sediment transport) from the beach fill both to the east and west, habitat features shall be restored.

Terms and Conditions for Reasonable and Prudent Measure 3

1) In order to determine if the amount of take due to harm from indirect impacts on habitat is approached or exceeded, the Corps shall ensure the implementation of the monitoring programs outlined above.

2) In the event of take, a system of notification shall be implemented following the guidelines:

   Exercise care in handling any specimens of dead red knots to preserve biological material in the best possible state. In conjunction with the preservation of any specimens, the finder is responsible for ensuring that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. Finding dead or non-viable specimens does not imply enforcement proceedings pursuant to the ESA. Reporting dead specimens is required for the Service to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective.

   Upon locating a dead piping plover, initial notification must be made to the following Service Law Enforcement office:

Resident Agent in Charge
U.S. Fish and Wildlife Service
Office of Law Enforcement
70 East Sunrise Highway, Ste. 419

Valley Stream, NY 11581
516-825-3950

and

U.S. Fish and Wildlife Service
Long Island Field Office
340 Smith Road
Shirley, NY 11967

3) Construction of the artificial dune west of groin D shall not use any sediment from the beach or ponding areas such as by beach scraping. Heavy equipment shall avoid the ephemeral pool areas to prevent any compaction of the sediment and crushing of the invertebrate fauna that are the prey base for birds.

Term and Condition 1 for Reasonable and Prudent Measure 3

1) The Corps shall provide an annual report due to the Service on December 1 of each year that documents the implementation of the reasonable and prudent measures and their terms and conditions.

2) The Corps shall conduct pre- and post-project surveys of the prey base in important habitats to document the extent of harm to habitat, as well as to inform evaluation and improved design of future projects.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1) Evaluate and recommend areas on Long Island where natural processes, including natural inlet formation, and overwashing can act unimpeded;

2) Work in coordination with the Town of Hempstead and Nassau County to place symbolic fencing around roosting areas during the time of year when red knots are present;

3) Work in conjunction with the Town and County to reduce disturbance by prohibiting dogs on the beach during the time of year when red knots are present;

4) Work in conjunction with the Town and County during periods when high use by birds and humans coincide to provide stewards to educate beach users about measures to reduce disturbance to rufa red knots and other shorebirds;

5) Develop and incorporate measures for the Corps' Civil Works and Regulatory Programs to minimize disturbance from shoreline stabilization, dredging, and other activities involving heavy equipment at those times of year when red knots are present, especially at stopover locations that the knots use for relatively short periods when maximizing rapid weight gain may be most important for the birds;

6) Maintain the beach berm in a wide, open, sparsely vegetated condition, especially in areas with a history of use for roosting;

7) Incorporate provisions prohibiting introduction of, and requiring removal of, existing invasive plant species that degrade beach and dune habitats; and

8) Minimize beach nourishment activities that may bury prey at those times of year when red knots are present, especially at stopover locations used for relatively short periods when maximizing rapid weight gain may be most important for the birds. Where possible, schedule beach nourishment to allow sufficient time for habitat and benthic prey recovery/adjustment before birds return.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

CLOSING STATEMENT

This concludes the conference for the Corps' Long Beach Island Project. You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the species is listed or critical habitat is designated. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

After listing of red knot as a threatened species and/or designation of critical habitat for red knot and any subsequent adoption of this conference opinion, the federal agency shall request initiation of consultation if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action.

The Incidental Take Statement provided in this conference opinion is adopted as the biological opinion issued through formal consultation. At the time, the project will be reviewed to determine whether any take of the species or critical habitat has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of red knot or its critical habitat may occur between the listing of the species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

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Emailed 07/23/2014

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

July 23, 2014

Colonel Paul E. Owen, P.E.
U.S. Army Corps of Engineers
Commander, New York District
26 Federal Plaza
New York, NY 10278

Attention: Mr. Peter Weppler

Dear Colonel Owen:

Re: Response to request for initiation of formal consultation for the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Damage Risk Management Project

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) receipt of your July 10, 2014, request for formal consultation pursuant to section 7 of the federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.; Act). The U.S. Army Corps of Engineers (Corps) has requested consultation for project impacts resulting from the above-referenced project that may affect the piping plover (*Charadrius melodus*; threatened).

In electronic correspondence dated May 6, 2014, the Corps submitted a biological assessment (BA) to the Service in which it made a determination of "Not Likely to Adversely Affect" (NLAA) for both the seabeach amaranth (*Amaranthus pumilis*; threatened) and the piping plover. The Service responded with a letter dated, July 1, 2014, stating that we did not concur with the NLAA determination for piping plover for reasons stated in that document and recommending initiation of formal consultation pursuant to section 7 of the Act.

In this same letter, we concurred with the NLAA determination regarding seabeach amaranth due to the understanding that this species was not found within the project area and the Corps' stated intention to request reinitiation if the species was subsequently found. However, it is necessary for us to revise our concurrence, based on the documented presence of seabeach amaranth in the project area (U.S. Fish and Wildlife Service 2010 and 2011) of which we have subsequently become aware; therefore, we will include this species in the consultation.

The consultation will also include a conference on the red knot (*Calidris canutus rufa*; proposed), which has been documented in the project area and may be adversely impacted by the project.

All information required to initiate formal consultation was included with the BA and associated project documents found at http://www.nan.usace.army.mil/Missions/CivilWorks/ProjectsinNewYork/JonesInlettoEastRockawayInlet(LongBeach).aspx. Consequently, formal consultation is considered to be initiated effective the date of your July 10, 2014, request for initiation, as stipulated by the Endangered Species Consultation Handbook, §4.4 (U.S. Fish and Wildlife Service and National Marine Fisheries Service, March 1998).

Both the Act and its supporting regulations mandate that formal consultation is to be concluded within 90 days of initiation, with the Service's final biological opinion delivered to the Corps within 45 days after conclusion of the consultation period (50 CFR 402.14[e]). We acknowledge the Corps' request to expedite this consultation; however, we note that we have already committed to expedited consultations, as well as the expedited provision of reports pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*), for several other major projects at the Corps' request. While we will make every attempt to complete this consultation in as timely a manner as possible, the Service is unable to commit to a particular expedited timeframe. Therefore, the Service expects to deliver the final biological opinion to the Corps no later than November 24, 2014.

Please note that although we have received adequate information to initiate consultation, it may be necessary to further clarify any issues that may arise during this process. We expect to remain in close coordination with the Corps throughout the consultation period.

As a reminder, section 7(d) of the Act requires that after initiation of formal consultation, the federal action agency may not make any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying their critical habitats until formal consultation has been concluded.

If you have any questions, please contact Steve Papa of the Long Island Field Office at (631) 286-0485.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Branch

April 29, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Long Beach Hurricane and Storm Damage Reduction Project

Dear Mr. Stilwell,

This is a follow-up to August 12, 2013 letter and subsequent email correspondence regarding informal Section 7 consultation for the project referenced above. The U.S. Army Corps of Engineers, New York District has determined that the proposed actions that may occur in the project area may affect, but are not likely adversely affect, listed species under the Endangered Species Act. Please see the attached Biological Assessment for our justification for our Determination of Effect statement for the project.

It is requested that your office concur with the determination. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Attachments
cc. USFWS-LIFO

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES OF THE BIOLOGICAL ASSESSMENT

This BA has been prepared in accordance with requirements identified in the Endangered Species Act (ESA) of 1973, to identify and discuss potential impacts to Federally-listed threatened and endangered (T&E) species caused by the U.S. Army Corps of Engineers (USACE), New York District (District) activities associated with implementation of the Atlantic Coast of New York, East Rockaway inlet to Jones Inlet, Long Beach Island, New York Storm Damage Reduction Project (Project), Nassau County, New York (Figure 1.1). T&E species include those species Federally-listed and protected by the U.S. Department of the Interior, Fish and Wildlife Service (USFWS) under the ESA.

In accordance with Section 7(a)(2) of the ESA, as amended, Federal agencies are required to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of any habitat of such species determined to be critical unless an exemption has been granted. Additionally, a Biological Assessment (BA) must be prepared if listed species or critical habitat may be present in an area to be impacted by a "major construction activity." A major construction activity is defined at 50 CFR §402.02 as a construction project (or an undertaking having similar effects) which is a major Federal action significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332(2)(C)).

1.1.1 List of Species

The USFWS, through its formal consultation with the District regarding implementation of the Project, identified two T&E species as being present on or near the Project area (USFWS 1995a). Based on habitat and life history assessments, recommendations from the USFWS in the Fish and Wildlife Coordination Act 2B Report and follow-up consultation for this Project (USFWS 1995a), and a site assessment conducted by the USACE in 2003, the District has determined that the following Federally-listed species are likely to occur in the Long Beach Island Project area and warrant a Biological Assessment:

- Piping plover (*Charadrius melodus*), Federally threatened; and,
- Seabeach amaranth (*Amaranthus pumilus*), Federally threatened

The state-listed threatened common tern (*Sterna hirundo*) and least tern (*Sterna antillarum*) and the Federally and state-listed Endangered roseate tern (*Sterna dougallii*), utilize beach habitat similar to that of the piping plover and sea beach amaranth, and have been identified as species that may occur in the Project area (USACE 1998, USFWS 1995a). Additionally, the state species of special concern, black skimmer (*Rynchops niger*), also is known to nest on coastal beaches and frequently nests in or near tern nesting areas (NatureServe 2002). None of these species have been identified by the USFWS as species requiring further ESA consultation or Biological Assessment (USFWS 1995a). However, measures taken to avoid and protect plover and seabeach amaranth habitats would benefit and protect these species as well.

Figure 1.1 Site Location.

1.1.2 Objectives for this BA

This BA will facilitate the preparation of the Environmental Assessment (EA) that will identify and evaluate potential environmental impacts associated with the proposed Project and will maintain compliance with Section 7(a)(2) of the ESA. The BA is designed to provide the USFWS with the required information for their assessment of the effects of the proposed Project on Federally-listed endangered and threatened species. This BA does not address environmental issues or species relating to the borrow area portion (located approximately 1.5 miles south of Long Beach Island) of the proposed Project.

Specific objectives of this BA are to:

1. Ensure Project actions do not contribute to the loss of viability of T&E species;

2. Comply with the requirements of the ESA, as amended, that Project actions not jeopardize or adversely modify critical habitat for Federally-listed T&E species;

3. Analyze the effects of implementation of Project actions on Federally-listed T&E species;

4. Recommend impact avoidance, minimization, and measures to offset impacts to Federally-listed T&E species; and,

5. Provide biological input to ensure District compliance with the NEPA and the ESA.

1.2 PROJECT BACKGROUND

Long Beach Island, New York, has an extensive history of property damage and economic loss as a result of coastal flooding and erosion associated with frequent storms. Significant beach erosion and sand loss has reduced the width of the protective beach front and has exposed properties to a high risk of damage from ocean flooding and wave attack, and existing groins and jetties along the island have deteriorated and are becoming less effective at reducing sand loss along the shoreline and providing wave protection.

In October 1986, the Committee on Public Works and Transportation of the United States House of Representatives authorized the USACE to review the previous report on the Atlantic Coast of Long Island, New York, Jones Inlet to East Rockaway Inlet, to determine the feasibility of providing storm damage protection works for Long Beach Island. Subsequently, a reconnaissance study and report were completed in 1989, a Draft Feasibility Report and Draft Environmental Impact Statement (DEIS) report were circulated in 1994, and a Final Feasibility Report and Final Environmental Impact Statement (FEIS) report, and circulated in 1998 (USACE 1998). A Record of Decision (ROD) was signed on December 23, 1998 and filed in the Federal Register in January 1999. The 1995 Feasibility Report Recommended Plan was authorized for construction by the 1996 Water Resources Development Act (WRDA).

As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and sand removal from an offshore borrow area. However, since the 1998 release of the FEIS for the Project, the proposed alternative was re-evaluated. The re-evaluation was conducted to incorporate advancements in engineering evaluation methods, to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups. As a result of Project re-evaluation, several modifications were made to the plan that was selected in 1998 for this Project.

In 2002, the District initiated a limited re-evaluation study to explore options to refine the proposed Project modification. The intent of the limited re-evaluation study was to identify and evaluate various means of maintaining the beach that are longer-term and less expensive than the current plan and that incorporate concerns addressed by agencies and/or interest groups. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the 2005 LRR for this Project and subsequent plan modifications (USACE 2005).

1.3 PROJECT AREA DESCRIPTION

The Long Beach barrier island is approximately 9 miles long and varies in width from 1,500 to 4,000 ft. The island is located along the Atlantic (south) coast of Long Island, New York from Jones Inlet westerly to East Rockaway Inlet and parallels the south coast of Long Island (Figure 1). The island is separated from the mainland by an extensive bay system. The Project area covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan), 35,500 linear feet (lf) of the Long Beach barrier island. The Project area is situated within Nassau County, New York, and from east to west includes the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach) and the City of Long Beach (USACE 2005).

The Project area consists of beaches, sand dunes, herbs, low-growing shrubs, and tidal flats, and has been highly modified as a result of human development. Upland areas in the vicinity of the Project have been committed to residential, commercial and recreational development. Near shore and upper beach areas in the Project area are heavily utilized for beach recreation. Numerous stone groins currently exist in the Project area, including 23 at Long Beach, three at Point Lookout (including the terminal groin) and four at Lido Beach. Based on a 2003 assessment, over 50% of these are deteriorated (USACE 2005). The offshore portion of the proposed Project, which is not addressed in this BA, includes a 550-acre borrow area located approximately 1.5 miles south of Long Beach Island between 25 ft mean low water to about 60 ft mean low water.

1.4 Description of Habitats and Species

Oceanfront beach and deepwater ocean habitats constitute the majority of the Project area. The beach community includes upper, intertidal, and nearshore subtidal areas. Except for the sparsely vegetated herb and herb/shrub community associated with the upper beach/dune area, most of the Project area is devoid of vegetation and is significantly impacted from human use of the area for recreational activities. In addition, significant development abuts the upper beach zone in most of the Project area. Dunes are present in less than half of the beach profiles in the Project area. Dunes range in height from +13.5 to +20 ft NGVD and have an average height of +17.75 NGVD (USACE 2005). The only undeveloped sites in the Project area, besides the beach itself, are dune areas that occur at Silver Point on the western end of the island and Lido Beach/Point Lookout on the eastern end.

Habitat Types

The upper beach zone extends from dune areas to just above the high water line and includes dunes and supratidal areas of the beach. The upper beach area is dominated by a sandy substrate and is generally sparsely vegetated (< 25% cover). Vegetation is dominated by beach grass (*Ammophila breviligulata*), but may also include < 5% cover of spurge (*Euphorbia polygonifolia*), beach plum (*Prunus maritima*), seaside goldenrod (*Solidago sempervirens*), beach heather (*Hudsonia tomentosa*), and sea rocket (*Cakile edentula*). Vegetation on stable foredunes is denser than that of the upper beach area (up to 50% vegetated cover), and includes similar species. Mixed herb/shrub communities dominate dune crests and protected areas behind dunes. Common species include the herbs found in fordune areas and shrubs such as bayberry *(Myrica pensylvanica),* shadbush (*Amelanchier Canadensis)* and multiflora rose (*Rosa multiflora*). Only one area of saltmarsh habitat remains on the north shore of the island and is located in the vicinity of Lido Beach. In areas of low human disturbance, these areas can provide nesting and foraging areas for birds.

The intertidal zone extends from the low tide line to the high tide line and is submerged and exposed according to daily tidal cycles. The zone is unvegetated and consists of fine-grained sand substrate. Wrack and ocean debris are common within this zone. Species diversity is relatively low due to limited ability of species to withstand the daily submersion and exposure. Micro and macro-invertebrates known to inhabit this zone include crabs, shrimp, bivalves, and worms. The intertidal zone provides key foraging habitat for shorebirds/seabirds, which feed on these organisms.

The affected near shore subtidal zone extends from the low water line down to 25 ft below mean low water (MLW) and is nearly continuously submerged. The zone is unvegetated and consists of fine-grained sand substrate. The area contains a rich diversity of species including crabs, shrimp, bivalves, worms, and finfish. In addition, numerous man-made groins extend from the intertidal zone into the subtidal zone from 200 to 600 ft (USACE 1998). These structures provide habitat for numerous fish, macro-invertebrates, and birds.

Human use of unrestricted areas of these zones is high and the upper beach area is subjected to periodic beach raking during the summer months.

Finfish and Shellfish

The nearshore waters of the Project area support seasonally abundant populations of many recreational and commercial finfish (USACE 1998, USFWS 1982, 1995a). Primary recreational fish species include black sea bass (*Centropristis striata*), summer flounder (*Paralichthys dentatus*), winter flounder (*Pseudopleuronectes americanus*), weakfish (*Cynosion regalis*), bluefish (*Pomatomus saltatrix*), scup (*Stenotomus chrysops*), striped bass (*Morone saxatillis*), and Atlantic mackerel (*Scomber scombrus*) (USFWS 1989). Nearshore waters also contain a number of migrant anadromous and catadromous species such as the Atlantic sturgeon (*Acipenser oxyhinchus*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), striped bass, and American eel (*Anguilla rostrata*) (Woodhead 1992).

Invertebrate Communities

The benthic community of the greater Project area is dominated by polychaetous annelids, followed by malacostracans, bivalves, and gastropods (Reid et al. 1991, Ray and Clarke 1995, Ray 1996, USACE 2005). Common shellfish species in the Project area are the hardshell clam (*Mercenaria mercenaria*), softshell clam (*Mya arenaria*), telling (*Tellina agilis*), razor clam (*Ensis directus*), rock crab (*Cancer irroratus*), lady crab (*Ovalipes ocellatus*), American lobster (*Homarus americanus*), hermit crab (*Homarus americanus*) and blue crab (*Callinectes sapidus*) (USACE 1998, 2005). Mussels (*Mytilus* spp) dominate man-made structures such as groins and jetties in the Project area (USACE 1998). Ghost crabs (*Ocypode* spp) and sand fleas (*Talorhestia* spp.) dominate the beach community (USACE 1998). Surveys conducted by the USACE in 2003 indicate that the borrow area itself contains very small, to no, localized populations of surf clam (USACE 2005).

Reptiles and Amphibians

Adjacent development, lack of habitat, and high recreational use, limit the value of the Project area for many wildlife species. Based on an evaluation of the habitats available in the Project area and results of studies conducted within similar habitats on Fire Island, New York, no amphibians or reptiles are expected to inhabit the Project area (Brotherton et al. 2003, Connor 1971, NYDEC 2001, USACE 1998, 2004, USFWS 1982).

Several Federally-listed species of marine turtles may be present in offshore, and possibly nearshore waters near the Project area during various times of the year (NMFS 1993, USACE 1998).

Mammals

Based on an evaluation of the habitats available in the Project area and results of studies conducted within similar habitats on Fire Island, New York, the most common mammalian species likely to inhabit the general Project area include habitat generalists that are able to tolerate development and active human use of the area (Brotherton et al. 2003, USACE 1998, 2004, USFWS 1982). Species include the white-footed mouse (*Peromyscus leucopus),* eastern cottontail (*Sylvilagus floridanus*), house mouse (*Mus musculus),* Norway rat *(Rattus norvegicus),* red fox (*Vulpes vulpes),* gray squirrel (*Sciurus carolinensis*) and feral cat (*Felis catus*). Extensive use of the beach and dune areas for public recreation limits use of much of the Project area by mammals to feeding.

Based on studies conducted in similar habitats near the Project area, a wide diversity of bird species are likely to occur in the vicinity of the Project area (USACE 1993, 1998, 2003, USFWS 1982). However, as with mammalian species, the most abundant bird species are common habitat generalists that are tolerant of development and that can utilize the shoreline and deepwater habitats. Common avian species of the Project area and surrounding areas (ocean and residential/commercial areas) include herring gull (*Larus argentatus*), greater black-backed gull (*Larus marinus*), yellow-rumped warbler (*Dendroica coronata*), American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), barn swallow (*Hirundo rustica*), black-bellied plover (*Pluvialis squatarola*), black scoter (*Melanitta nigra*), bufflehead (*Bucephala albeola*), common grackle (*Quiscalus quiscula*), common yellowthroat (*Geothlypis trichas*), dark-eyed junco (*Junco hyemalis*), double-crested cormorant (*Phalacrocorax auritus*), European starling (*Sturnus vulgaris*), gray catbird (*Dumetella carolinensis*), mourning dove (*Zenaida macroura*), eastern towhee (*Pipilo erythrophthalmus*), song sparrow (*Milospiza melodia*), and tree swallow (*Iridoprocne bicolor*). Listed or special concern bird species observed during surveys conducted on Fire Island (from Robert Moses State Park to Southhampton Beach, NY) included piping plover, common tern, least tern, and black skimmer (USACE 2003). Extensive use of the beach and dune areas for public recreation limits the potential for nesting and limits use of much of the Project area by birds to resting and feeding.

Significant Habitats

New York State Department of State (NYSDOS) lists Nickerson Beach (formerly called Nassau Beach), located approximately 1 mile west of Point Lookout, as a significant coastal fish and wildlife habitat (NYSDOS 1987). Nickerson Beach consists of approximately 15 acres of sparsely vegetated dunes and adjacent pebble and shell areas. Despite heavy recreational use nearby, the area remains as an undeveloped barrier beach ecosystem (a rare occurrence in Nassau County). This area serves as key nesting habitat for the Federally and state-listed piping plover and has previously provided habitat for the state-listed least tern and common tern (USFWS 1994A).

Although use of this area by listed species had been documented (eight piping plover, 148 least tern), in 1993 NYSDEC documented a reduction in habitat use (six piping plover and zero least terns) in this area (USFWS 1994A, USACE 1998, USACE 2005). The drop appears to be correlated to severe erosion and loss of suitable nesting habitat in the area (USACE 2005).

Based on a review of the National Oceanic and Atmospheric Administration (NOAA) guide to Essential Fish Habitat (EFH) designations in the Northeastern United States, designated EFH habitat does occur in the greater Project area (NMFS 2004). EFH is defined by congress as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10). Specifically, the 10-minute by 10-minute square that is bounded by North 40º 40.0’ N, East 73º 50.0’ W, South 40º 30.0’ N, and West 74º 00.0’, is reported to include habitat that is essential to support a sustainable fishery and managed fish species contribution to a healthy ecosystem.

Listed Species

The Federally and state-listed piping plover, sea beach amaranth, and roseate tern, as well as the state-listed common tern and least tern, and the state species of special concern black skimmer, all nest or carry out a major portion of their life cycle activities (i.e., breeding, resting, foraging) within essentially the same habitat (Table 1.1). This habitat encompasses areas located between the high tide line and the area of dune formation and consists of sand or sand/cobble beaches along ocean shores, bays and inlets and occasionally in blowout areas located behind dunes (Bent 1929, NatureServe 2002, NJDEP 1997, USACE 2005, USFWS 2004a).

Table 1.1. Protection Status of Species that Utilize Habitats Similar to those in the Project Area.

Common Name	Federal Status	State Status
Common Tern	Not Listed	Threatened
Least Tern	Not Listed	Threatened
Piping Plover	Threatened	Endangered
Roseate Tern	Endangered	Endangered
Seabeach Amaranth	Threatened	Imperiled

Piping plover have been identified and are known to nest within upper beach areas located within the Project area (USACE 1998, USFWS 1995a, b, 2002). In addition, seabeach amaranth and least tern are known to occur on barrier islands of Long Island (USFWS 1982, 2004b). These species were not documented in the Project area during field surveys conducted by the USFWS in the early 1990's. However, seabeach amaranth was found nearby on Jones Beach Island and Rockaway Peninsula and nesting least and common tern have been documented at Nickerson Beach (USFWS 1994a, USACE 1998, 2005). The USFWS has determined that habitats that occur in the Project area are suitable for piping plover and seabeach amaranth (USFWS 1995a). Therefore, the life histories of piping plover and seabeach amaranth and potential impacts to these species and their associated habitats are discussed in detail in this Biological Assessment. The black skimmer and least, roseate, and common terns, could potentially utilize habitats within the Project area. Measures taken to avoid and protect plover and seabeach amaranth habitats would benefit and protect these species, as well as numerous other shorebird/seabird species that depend on coastal habitats.

Based on consultation conducted for the FEIS for the original project, no Federal or state-listed marine mammals are known to breed in the Project area (USACE 1998, 2005). However, the threatened loggerhead (*Caretta caretta*) and the endangered Kemp's ridley (*Lepiduchelvs kempi*), leatherback (*Dermochelys coriacea*), and green (*Chelonia mydas)* turtles have been known to utilize coastal waters of New York during the summer months and early fall (NMFS

1993). Additional consultation may be necessary for these species for the borrow area component of the Project; a component not addressed in this BA.

2.0 PROPOSED FEDERAL ACTION

The recommended plan for this Project includes the preferred plan (identified in the 1995 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the LRR (USACE 2005). The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project area.

The proposed action is a modification to the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York, Storm Damage Reduction Project that received a favorable Record of Decision (ROD) in 1999. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 7,000 lf of the project area length (i.e., 12,000 lf of project area including areas with and without beach fill), a reduction of 2,042,000 cy of beach fill material that would be needed for initial beach fill and 385,000 cy per yr for 5-year renourishment activities, a reduction of 17 (ac) of dune plantings and a reduction of 43,000 lf of sand fence. Specifically, there will be a reduction of 104 ac of filling in the upper beach zone, 35 fewer acres of filling in the intertidal zone, and 31 fewer acres of filling in the sub-tidal zone.

Structural components of the Project modification include the construction of 12 timber dune walkovers, 12 gravel surface dune walkovers, eight extensions of existing dune walkovers, eight gravel surface vehicle access ways, two swing gate vehicle access structures, one timber raised vehicle access way, construction of one lifeguard headquarters, construction of retaining walls (around four existing comfort stations, two existing comfort/lifeguard stations with concession stands, and one existing lifeguard headquarters), construction of four new groins (three of the seven groins originally proposed for the Project modification have been deferred indefinitely, and are not part of the current proposed Project), the rehabilitation of 17 groins, the rehabilitation and extension of the eastern terminal groin, and a modification to the sand placement location in the City of Long Beach such that a sand barrier (instead of a dune) is placed beneath the existing boardwalk instead of in front of the boardwalk. Supplemental NEPA documentation would be prepared to address construction of the three deferred groins as appropriate.

In addition to the decrease in the size of the Project Area and the amount of sand material required for the Project, when compared to the original Project, the Project modification would result in five fewer dune walkovers, one fewer vehicle access ramp, and two fewer new groins than were originally proposed for the Project. Originally, six new groins were proposed. Now four new groins are proposed and three have been deferred subject to changes in the local shore conditions. In addition, the construction activities originally proposed within a 136-acre shorebird nesting/foraging area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (Figure 1) would be excluded from the Project (Table 2.1). The proposed Project modification would, however, result in an increase in eight walkover extensions, an additional 11,000 lf of boardwalk repair, construction of one lifeguard headquarters, and the construction of an additional 2,204 lf of timber retaining walls (around four existing comfort stations, two existing comfort/lifeguard stations with concession stands, and one existing lifeguard headquarters), the rehabilitation of two groins, and the extension of the terminal groin. A comparison of components of the original selected plan and the proposed Project modification are shown in Table 2.1.

Table 2.1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 linear feet (lf), some within shorebird nesting area	35,000 lf, none within shorebird nesting area	- 6,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cubic yards (cy)	4,720,000 cy	- 3,922,000 cy
Dune plantings	29 acres (ac)	34.0 ac	+5.0 ac
Sand fence	90,000 lf	75,000 lf	- 15,000 lf
Timber dune walkover ADA	13	12	-1
Timber Dune walkovers (from boardwalk) ADA	5	5	0
Timber Dune walkovers (from boardwalk) None ADA	0	6	+6
Timber non-ADA walkovers	6	23	+17
Timber Vehicle and pedestrian access from boardwalk	2	2	0
Gravel surface vehicle and pedestrian access way	2	9	+7
Extension of existing walkovers	12	8	-4
Raised timber vehicular access	1	0	-1
5-yr renourishment	2,111,000 cy/year (yr)	1,770,000 cy/yr	- 341,000 cy/yr
Rehab and 100 ft Extension of terminal groin	0	1	+ 1
New groins	6	4 (6 proposed, but 2 have been deferred)	0
Rehabilitation of existing groins	15	17	+ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

2.1 PROJECT ELEMENTS

2.1.1 Beach Fill

The selected storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 lf of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H that will extend along the entire project area (1V:3H on landward slope fronting the boardwalk; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 lf of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Total sandfill quantity of 4,720,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); 5)planting of 34 acres of dune grass and installation of 75,000 lf of sand fence

2.1.2 Rehabilitation of Existing Groins

Sixteen groins were proposed for rehabilitation in the plan selected in 1998. However, the existing groins within the Project were re-evaluated in March 2002 (USACE 2004b). The groins were evaluated for structural condition, sand trapping effectiveness, and planform holding effectiveness. As a result of this survey, a total of 17 groins were recommended for rehabilitation, including 15 groins in Long Beach and two groins in Point Lookout.

Rehabilitation was based on a condition survey of the existing groins conducted in September 2003, the plans for rehabilitation of existing groins in the Recommended Plan has been modified to include rehabilitation of those groins that were found in poor or fair condition that would be beneficial to the beach stability. Based on this evaluation, 15 of the 23 groins in the City of Long Beach and two groins in Point Lookout should be rehabilitated. The proposed rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward 200-330 feet of each of the groins. A minimum constructible crest width of approximately 13 ft was selected with side slopes of 1V on 2H. A primary armor weight of approximately five tons was selected in order to approximately match the existing armor stone order to match the existing armor.2005).

2.1.3 Construction of New Groins

The selected 1995 plan proposed eventual construction of six new groins (all 765 ft long and 70 ft wide) at Point Lookout (USACE 1995). Currently only the first four groins are targeted for immediate construction, whereas the remaining two groins are proposed for deferred construction as needed based on the stability of the existing weldment area. However, based on subsequent re-evaluation of the area, some modifications to the original design of the four new groins have been proposed. The Project requires the immediate construction of a new groin field at Point Lookout that will contain six groins that begin 800 feet west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 feet. Groin lengths vary and range from 380 ft to 800 ft. Groin widths will be 13 ft.

A determination to construct the two westernmost groins will be triggered at a later date within the 50-year Project life and be based on monitoring data. The criterion for construction includes a change from an accreting beach to an eroding beach in the area where the structures are to be located. The criteria will be evaluated based upon field measurements and analysis.

2.1.4 Point Lookout Terminal Groin Rehabilitation and Extension

During re-evaluation of the proposed Project, the USACE determined that Groin #58 (i.e., West Groin), the terminal groin in Point Lookout, required rehabilitation and extension. Accordingly, the District plans to rehabilitate the existing portion of the groin, extend the length an additional 100 feet (currently 200 ft), and extend the width to between 107 and 170 ft (currently widths range from 50 to 107 ft), in accordance with design specifications presented in the USACE Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, New York Report. Extending the terminal groin may decrease the amount of sediment lost toward the inlet after the beach fill component of the project is carried out. It will also possibly retain additional longshore sediment transport without causing large changes in inlet dynamics. The median armor weight for the rehabilitated and new portions of Groin #58 is approximately 10 to 10.75 tons (USACE 1999)

2.1.5 Dune Walkovers, Vehicle Access Structures, and Boardwalk Surface Replacement

Several dune walkovers, vehicle access points and boardwalk extensions are proposed for the City of Long Beach and the Town of Hempstead. Construction of these structures will allow the public to gain safe access to the beach without harming the existing and enhanced dune system.

A total of 57 timber dune walkovers (including 17 timber wheelchair accessible), 9 gravel surface vehicle and pedestrian walkovers, 29 timber non ADA compliant, two timber vehicular access ways from the boardwalk, eight extensions to existing walkovers, are currently proposed. Originally, 29 dune walkovers (both timber and gravel) and 12 vehicle access ramps were included in the selected plan (USACE 1995).

2.1.6 Comfort Stations and Lifeguard Headquarters

The currently proposed plan does not include the construction of combined comfort/lifeguard stations or the construction of timber retaining walls around four existing comfort stations. The relocation and rebuilding of comfort stations and/or lifeguard stations and headquarters was not proposed in the original Project (USACE 1995). However, these structures were destroyed by Hurricane Sandy and the Town of Long Beach has currently relocated them.

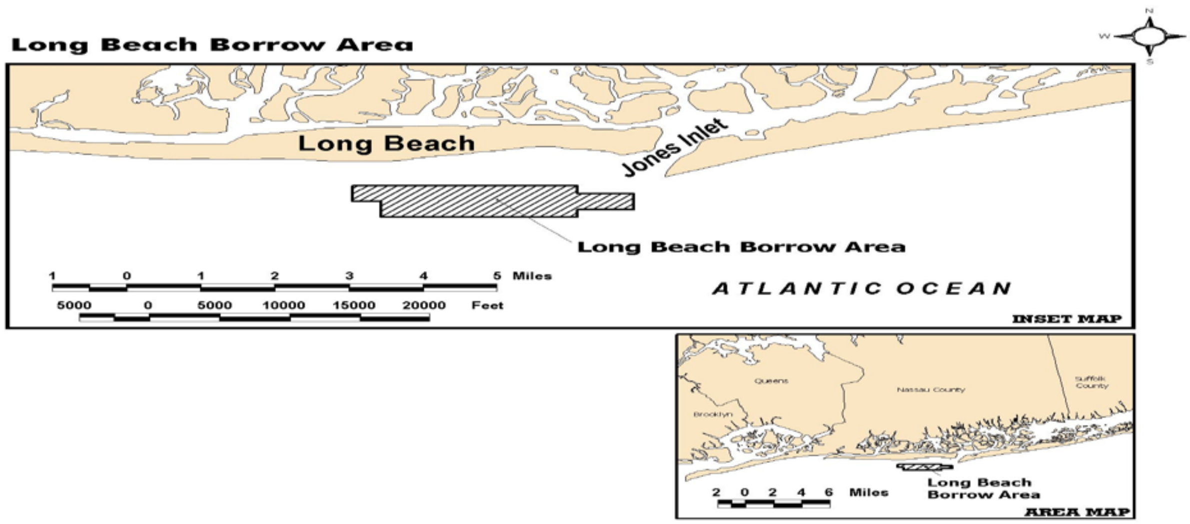
2.1.7 Bird Nesting and Foraging Area

The proposed Project modification has excluded Project activities from within a 93.4-acre ephemeral pool and a 42.3-acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (Appendix J). Project activities were proposed within this area as part of the original plan that was selected in 1995. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties (USACE 1995). As a result, construction of a beach berm within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Two new groins were originally proposed within the tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred. No beach fill activities will take place within the bird foraging and nesting area.

2.1.8 Sand Removal from Offshore Borrow Area

An offshore borrow area, located approximately 1.5 miles south of Long Beach Island (Figure 3) between 25 feet mean low water and about 60 feet mean low water, has been identified as a potential source of sand material for beach fill and dune construction activities. Approximately 4,720,000 cy of material will be removed from this area. The original plan selected in 1995 proposed 8,642,000 cy of sand removal (USACE 1995).

Figure 2. Location of the Long Beach Borrow Area.



2.2 REASONABLY FORESEEABLE FUTURE ACTIONS

Reasonably foreseeable future actions of the Project include beach renourishment and maintenance of beach access locations. Renourishment will be conducted every 5-years over the 50-year life of the Project. During each renourishment, approximately 1, 770,000 cy of sand will be added to the beach from the borrow area located approximately 1.5 miles offshore to the south of Long Beach Island. This borrow area contains approximately 36 million cy of suitable beach fill material. Approximately 2,111,000 cy per 5 years of sand removal were proposed in the 1995 selected plan (USACE 1995). Maintenance of beach access locations includes replacing deteriorated or damaged ramps, railings, and stairs associated with dune walkover and boardwalk extensions. Additionally, vehicle access locations will be monitored for excessive wear and maintained on an as-needed basis. Facilities such as lifeguard stations, comfort stations, and associated buildings will likely require periodic maintenance by the local sponsor.

3.0 SPECIES OCCURENCE

Previous surveys conducted by NYSDEC and USFWS confirmed presence of piping plover and suitable habitat for seabeach amaranth in the Project area (USFWS 1982, 1994a, 1995a, 1995b, 1996). Therefore, in accordance with the ESA recommendations, the following section provides species profiles for each of these Federally-listed T&E species, including a discussion of each species' current status, range, life history, historic occurrences, habitat requirements, and important life history dates. This information, along with the knowledge of local experts, wildlife biologists, botanists, and District and USFWS personnel, was utilized to identify potential impacts to these species as a result of implementation of the proposed action.

The following provides a discussion of the life history and Project-specific effect determinations for the piping plover and seabeach amaranth.

3.1 PIPING PLOVER

The piping plover was listed as a threatened/endangered species on January 10, 1986, under provisions of the ESA, as amended (USFWS 1984, 1985). This species breeds only in North America in three geographic regions. The Atlantic Coast population breeds on sandy beaches along the east coast of North America, from Newfoundland to South Carolina. The Atlantic Coast population of piping plover was 1,150 pairs in 1994 (USFWS 1995b). However, although New York populations appear to have increased overall during the past 18 years, there has been a 50–80 percent decline over the past 50 years in the Atlantic Coast population (USFWS 1992, 2003, NatureServe 2002).

Available data suggest that the most recent Atlantic Coast-wide population decline began in the late 1940's or early 1950's (Haig and Oring 1988). Reports of local or statewide declines between 1950 and 1985 are numerous and are summarized by Cairns and McLaren (1980) and by Haig and Oring (1988). Wilcox (1939) estimated more than 500 pairs of piping plovers on Long Island. A 1990 survey of long Island recorded 197 pairs (Litwin et al. 1993). Similarly, numbers of pairs of breeding piping plovers declined 50–100% at seven Massachusetts sites between the early 1970's and 1984 (Griffin and Melvin 1984). Significant habitat loss and lack of plover management are key factors in this decline (USFWS 1985, 1992, 2003).

However, there are approximately 65 sites that have been surveyed annually since 1986 as part of the NYSDEC's Long Island Colonial Waterbird and Piping Plover Census Survey Program (USFWS 2004). These active breeding areas are located across the north and south shore of Long Island from Queens County in the west to Suffolk County in the east. Based on an evaluation of recent trends (i.e., within the past 10 years) after a 3% decline between 1997 and 1999, the estimate of breeding pairs on the U.S. Atlantic coast has steadily increased; posting a 4% increase between 1999 and 2000, followed by a 6% gain in 2001, and a 10% gain in 2002 (USFWS 2003). Preliminary survey results indicate that the total 2003 U.S. Atlantic breeding pair count of 1,419 pairs, is the highest since the species' 1986 listing under the U.S. Endangered Species Act (USFWS 2003). Increases occurred in all three U.S. Atlantic recovery units, with the largest percentage gains occurring in New York-New Jersey. Population estimates in the New York – New Jersey recovery unit grew by 15% in 2000, 7% in 2001, 15% in 2002, and based on preliminary results, a 4% increase in 2003 (USFWS 2003). Increases have occurred in both states, but 2003 results indicate that New York has again exceeded the previous years record number of nesting pairs (369) by 4% (USFWS 2003).

Researchers note, however, that the trends in piping plover populations over the past 20 years for the Atlantic coast of New York are questionable. Although protection of beach nesting birds in New York increased after 1983, survey effort has also intensified and may be a factor in the positive trends (Ducey-Ortiz et al. 1989, Downer and Leibelt 1990).

3.1.1 Life History

The piping plover is a small robin-sized shorebird 17–18 cm (7.25 in) in length, a wingspan of 47 cm (19 in), and an average weight of 55 g (1.9 oz) (Sibley 2000). Piping plover breed and nest on coastal beaches from Newfoundland and southeastern Quebec to North Carolina and winter primarily on the Atlantic coast from North Carolina to Florida. Along the Atlantic coast, plover nest mainly on gently sloping foredunes above the high tide line, in blow-out areas behind primary dunes of sandy coastal beaches, and on suitable dredge spoil deposits (USFWS 1988, Cashin Associates 1993, NPS 1994). Nests are usually found in sandy areas with little or no vegetation. Vegetation, when present, consists of beach grass, sea rocket, and/or seaside goldenrod.

Plover begin northward migration to breeding grounds from southern U.S. wintering areas in March, and arrive on nesting grounds from March – May; males arrive prior to females. Fall migration to southern wintering grounds begins in mid- to late summer. Juvenile plover may remain on breeding grounds later but are generally gone by mid- to late August (Cuthbert and Wiens 1982). Atlantic coast breeders migrate primarily to Atlantic coast sites located farther south of breeding areas (i.e., Virginia to Florida, Bahamas) (Haig and Oring 1988, Haig and Plissner 1993).

The adult males arrive earliest, select beach habitats, and defend established territories against other males (Hull 1981). When adult females arrive at the breeding grounds several weeks later, the males conduct elaborate courtship rituals including aerial displays of circles and figure eights, whistling song, posturing with spread tail and wings, and rapid drumming of feet. The breeding season begins when adult female plovers reach the breeding grounds in mid- to late-April or in mid-May in northern parts of the range. (Bent 1929, Hull 1981).

Plover typically return to the same general nesting area in consecutive years (but few return to natal sites). Plover are known to shift breeding location by up to several hundred kilometers between consecutive years (NatureServe 2002). However, Wilcox (1959) found that plover a relatively site faithful and only 20 percent settled at a nest site farther than 1,000 ft from the previous year's locality. Previous reproductive success does not appear to increase the probability of returning to specific breeding sites (NatureServe 2002).

Nest sites are simple depressions or scrapes in the sand (Bent 1929, Wilcox 1959). The average nest is about 6 to 8 cm in diameter, and is often lined with pebbles, shells, or driftwood to enhance the camouflage effect. Males make the scrapes and may construct additional (unused) nests in their territories, which may be used to deceive predators or may simply reflect over-zealousness (Wilcox 1959, Hull 1981). Occupied nests are generally 50 to 100 meters apart (Wilcox 1959, Cairns 1977, Cuthbert and Wiens 1982).

Egg-laying commences soon after mating (Hull 1981, Cuthbert and Wiens 1982). Eggs are laid every second day. The average clutch size is four eggs (Wilcox 1959) and three-egg clutches occur most commonly in replacement clutches. The average number of young fledged per nesting pair usually is two or fewer. The young hatch about 27 to 31 days after egg laying. Incubation is shared by both adults (Wilcox 1959, Hull 1981).

Young plover leave the nest about two hours after hatching and immediately are capable of running and swimming. The young usually remain within about 200 meters of the nest, although they do not return after hatching (Wilcox 1959, Johnsgard 1979, Hull 1981). When disturbed or threatened, the young either freeze or combine short runs with freezing and blend very effectively into their surroundings (Wilcox 1959, Hull 1981). Adults will feign injury to draw intruders away from the nest or young (Bent 1929, Wilcox 1959). Adults also defend the nest territory against other adult piping plovers, gulls, and songbirds (Wilcox 1959, Matteson 1980). First (unsustained) flight has been observed at around 18 days, with chicks molting into first juvenile plumage by day 22 (NatureServe 2002).

Nest success depends heavily upon camouflage (Hull 1981). Hatching success ranges widely as follows: 91 percent for undisturbed beaches on Long Island (Wilcox 1959), 76 percent for undisturbed beaches in Nova Scotia (Cairns 1977), 44 percent on relatively undisturbed beaches at Lake of the Woods (Cuthbert and Wiens 1982), and 30 percent maximum at disturbed Michigan beaches (Lambert and Ratcliff 1979).

Plover diet consists of worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates (Bent 1929). In New Jersey, intertidal polychaetes were the main prey of plovers (Staine and Burger 1994). Plover forage along ocean beaches, on intertidal flats and tidal pool edges. Studies by Cuthbert and Weins (1982) indicate that open shoreline areas are preferred and vegetated beaches are avoided. Plover obtain their food from the surface of the substrate, or occasionally will probe into the sand or mud.

In Massachusetts, plover preferred mudflat, intertidal and wrack habitats for foraging (Hoopes et al. 1992a). On Assateague Island, bay beaches and island interiors were much more favorable as brood-rearing habitats than were ocean beaches (Patterson et al. 1992).

3.1.2 Threats to Species

The wide, flat, sparsely vegetated barrier beaches preferred by the piping plover are an unstable habitat, dependent on natural forces for renewal and susceptible to degradation by development and shoreline stabilization efforts. In high use recreational areas such as Long Beach, the primary threat to piping plover is disturbance by recreational beach users during the breeding season. Other significant threats include destruction and degradation of habitat and predation (USFWS 1988, 1995b, Burger 1993, NJDEP 1997).

Human Disturbance

Sandy beaches that provide nesting habitat for piping plovers are also attractive recreational habitats for people and their pets. The increasing intensity of human recreation dating from the end of World War II on Atlantic coast piping plover breeding sites was a major threat cited in the 1986 listing of the piping plover (USFWS 2004b). Disturbance during nesting is the major factor in the decline of piping plover populations in many areas, and is the most serious threat in Canada (Flemming et al. 1988). Elias-Gerken (1994) found that piping plovers on Jones Beach Island, New York, selected beachfront that had less pedestrian disturbance than beachfront where plovers did not nest. Sections of beach at Trustom Pond National Wildlife Refuge in Rhode

Island were colonized by piping plovers within two seasons of their closure to heavy pedestrian recreation (USFWS 1988). Burger (1991, 1994) found that presence of people at several New Jersey sites caused plovers to shift their habitat use away from the ocean front to interior and bayside habitats; the time plovers devoted to foraging decreased and the time spent alert increased when more people were present. Burger (1991) also found that when plover chicks and adults were exposed to the same number of people, the chicks spent less time foraging and more time crouching, running away from people, and being alert than did the adults. Free-running dogs also pose a major threat to plover (Cairns and McLaren 1980, Quinn and Walden 1966, Lambert and Ratcliff 1979, USFWS 1988.). Halbeisen (1977) found that dogs frighten snowy plovers from nests an average of twice as long (5.8 versus 2.8 minutes) compared to people.

Pedestrians and free-running dogs may flush incubating plovers from nests, exposing eggs to avian predators or excessive temperatures. 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. 1992b, Loegering 1992, Goldin 1993), forcing them out of preferred habitats, decreasing available foraging time, and causing expenditure of energy. Recreational activities of humans can be a source of both direct mortality and harassment of piping plovers. Pedestrians on beaches may crush 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). Fireworks and kites have also been found to be highly disturbing to piping plovers (Hoopes et al. 1992, Howard et al. 1993). In addition, beach use by humans can increase food refuse that may attract predators such as gulls, crows, fox, raccoons, and other predators to nesting areas (as discussed in detail below).

Use of motorized vehicles on beaches also poses a serious threat to piping plovers and their habitats. Particularly on northern beaches, such as those found in New York where beaches are relatively narrow and vehicular traffic is often concentrated in the elevation zone required by piping plover (USFWS 1996). Vehicles can crush eggs (Wilcox 1959; Tull 1984, Burger 1987b, Patterson et al. 1991) as well as adults and chicks. In Massachusetts and New York, biologists documented 14 incidents in which 18 chicks, and two 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 four on the Northern Great Plains) due to vehicles. Biologists that monitor and manage piping plovers believe that vehicles kill many more chicks than are found and reported (Melvin et al. 1994). 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.M. Melvin pers. obs.).

Vehicles 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 (Hoopes et al. 1992, Goldin 1993), by creating ruts that can trap or impede movements of chicks (USFWS 1988), and by preventing plovers from using habitat that is otherwise suitable (MacIvor 1990, Strauss 1990, Hoopes et al. 1992, Goldin 1993, Hoopes 1994). Vehicles that drive too close to the toe of the dune may destroy "open vegetation" that may also furnish important piping plover habitat (Elias-Gerken 1994). However, during the dormant season, limited ORV use in heavily vegetated areas of the upper beach may be beneficial to piping plover because physical disturbance may reduce the coverage of vegetation to levels more suitable for piping plover. In addition, compression of beaches by vehicular traffic may also reduce invertebrate prey populations (Ryan 1996).

Mechanized beach-cleaning activities can also adversely affect piping plover by indiscriminately altering beach habitat, direct crushing of piping plover nests and chicks, prolonged disturbance from the machine's noise, and removal of the birds' natural wrackline feeding habitat (Eddings and Melvin 1991, Howard et al. 1993, USFWS 1996).

Habitat Loss/Alteration

Along the Atlantic coast, development, encroachment of beach vegetation, flooding and erosion are primary factors in the loss of suitable breeding and nesting habitat for piping plover (Haig 1992). In Maine, construction of seawalls, jetties, piers, homes, parking lots, and other structures has reduced historic nesting habitat by more than 70%; where more than 20 miles of historic habitat may have supported more than 200 pairs of piping plovers, 32 pairs nested in 1993 on habitat with an estimated capacity of 52 pairs (Maine Department of Inland Fisheries and Wildlife 1995). Wilcox (1959) pointed to summer home and road construction as causes of declining plover nesting along Moriches Bay on Long Island, New York, between 1939 and 1951. Raithel (1984) cited coastal development and shoreline stabilization, including construction and dredging of permanent breachways, building of breakwaters, and planting of dune areas, as major contributors to the decline of the piping plover in Rhode Island. Analysis of 4 years of piping plover nest location data on a New York site revealed that the nests were significantly farther from concrete walkways leading from the dunes to the berm than were random points, suggesting that the walkways decrease the carrying capacity of the beach (Hoopes 1995). In 1993 NYSDEC documented a reduction in nest sites and habitat use by piping plover and least terns at a colony on Long Island and attributed the reduction to severe erosion and loss of suitable habitat in the area (USACE 1998, USACE 2005).

The location of developments on beaches where they are vulnerable to erosion often leads to impacts that go far beyond the footprint of the facilities themselves. Requests from private communities within the Fire Island National Seashore, New York, to construct artificial dunes on adjacent undeveloped National Park Service lands in 1993 (NPS 1992, 1993) exemplify situations where shoreline development has created demand to modify and stabilize habitat suitable for plover nesting.

Plover are also likely experiencing loss of habitat in areas where the vegetation in the upper beach zone exceeds levels desired by piping plover. In general, plover prefer to nest in sparsely vegetated areas (Cohen et al. 2002, 2003a, 2003b). However, dense vegetation located near the breeding area is also desirable for plover foraging and cover.

Predation

Predation has been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites (Burger 1987a, MacIvor 1990, Patterson et al. 1991, Cross 1992, Elias-Gerken 1994). As with other limiting factors, the nature and severity of predation is highly site-specific. Predators of piping plover eggs and chicks include red fox, striped skunk, raccoon, Norway rat, opossum, crows, ravens, gulls, common grackles, American kestrel, domestic and feral dogs and cats, and ghost crabs.

Human activities affect the types, numbers, and activity patterns of predators, thereby exacerbating natural predation. Human activities have abetted the expansions in the populations and/or range of other species such as gulls (Drury 1973, Erwin 1979) and opossum (Gardner 1982). The availability of trash at summer beach homes increases local populations of skunks, raccoons and fox (Raithel 1984, Strauss 1990). In Massachusetts, predators, primarily red fox (*Vulpes vulpes*), destroyed 52 – 81 percent of nests in one study area (MacIvor et al. 1990). Similalry, on Assateague Island, Maryland and Virginia, predators, mainly red fox and raccoon (*Procyon lotor*), accounted for about 90 percent of the known causes of nest loss (Patterson et al. 1992). In addition, gulls, grackles (*Quiscalus quiscula*), crows (*Corvus* spp.), and in developed, high recreational use areas such as Long Beach, domestic and free-roaming cats and dogs are equally as detrimental to plover populations by direct predation or disturbance of nest sites (Cartar 1976, Lambert and Ratcliff 1979, Cairns and McLaren 1980, Nol 1980, USFWS 1988, Patterson et al. 1990, NJDEP 1997).

3.2 SEABEACH AMARANTH

Seabeach amaranth is a native annual plant that inhabits barrier island beaches along the Atlantic Coast. This plant historically occurred in 31 counties in nine states from Cape Cod in Massachusetts to South Carolina. However, by 1990, only 55 populations remained, which were located in South Carolina, North Carolina, and New York (USFWS 1996). In 1993, the USFWS listed the plant as a Federally-threatened species because of the declining population and its overall vulnerability to habitat destruction (USFWS 1993). Seabeach amaranth is also listed as threatened or endangered throughout its current and historical range, including New York where it is imperiled (i.e., endangered). Accordingly, the ESA, as well as several state-level endangered species laws and regulations, protect this species.

Due to the protection afforded to it by the ESA and state laws, seabeach amaranth has returned to several states after years of extirpation. Known populations of this species occur in New York, Delaware, Maryland, Virginia, North Carolina, and South Carolina (USFWS 2004b). Many of these new occurrences are the result of reintroduction and restoration programs conducted by Federal, state, and local governments and non-profit organizations. Long Island supports the largest population of seabeach amaranth within its historical range, which extends from South Carolina to Massachusetts. Each year Endangered Species Biologists from the Long Island Field Office of the USFWS assist the New York Natural Heritage Program in conducting annual surveys for this threatened species. In 2001, a total of 179,300 plants were surveyed at 23 sites stretching from Breezy Point, Queens County to Hampton Beach in Suffolk County along the south shore of Long Island (USFWS 2004b).

3.2.1 Life History

Seabeach amaranth germinates as small, unbranched, fleshy red colored sprigs between June and July in New York State (USFWS 2004b). These sprigs develop into a rosette of small, wrinkled leaves that branch out from the low-lying reddish stems. As the plant matures, it develops into a clump with numerous stems, which can reach a diameter of 3 ft. The small (1.3 to 2.5 centimeters in diameter) rounded leaves are clustered around the tip of the stems, exhibit a spinach-green color, and have a small notch at the rounded tip of the leaf (USFWS 1996). Inconspicuous flowers develop in clusters around the stem in mid-summer and can produce seed by July. Seed production continues until the plant dies, usually in mid to late fall, but can continue into January (USFWS 1996).

Seabeach amaranth is most likely wind-pollinated, based on the morphology of the flower and inflorescence and lack of visual, chemical, or nectar attractants. Additionally, this species is capable of self-pollination, as are other species of *Amaranthus* (USFWS 1996). Seed dispersal is carried out by water (hydrochory) and wind (anemochory) (USFWS 1996).

The primary habitat for seabeach amaranth consists of the dynamic and ever changing seaward facing areas of barrier islands, including overwash flats at accreting ends of islands, lower foredunes, and upper strands of non-eroding beaches located landward of the wrack line (USFWS 1996). Seabeach amaranth occasionally establishes populations in other habitats, including sound-side beaches, foredune blowouts, interdunal areas, and on replenished beaches. Typical of the species, on Fire Island in New York, seabeach amaranth tends to grow on the ocean beach in bare or sparsely vegetated swales and along overwash zones (National Park Service [NPS] 1998).

No other vascular plant species regularly occupies a lower topographic position than seabeach amaranth (USFWS 1996). Seabeach amaranth's range correlates with a zone of tidal amplitude of 5 or 6 ft and occupies elevations that range from 8 inches (in) to 5 ft above high mean high tide (USFWS 1996). Although it grows in a very low topographical position, it is highly intolerant of inundation by saltwater, and often perishes if exposed (USFWS 1996). The plant is usually found growing on nearly pure silica sand substrate, which is mapped as 'Beach-Foredune Association' or 'Beach (occasionally flooded)' by the U.S. Natural Resources Conservation Service (NRCS).

In areas where it occurs, seabeach amaranth is an important beach stabilizing and dune building species because it acts as a 'sand binder' by trapping wind-blown sand under its lower leaves and branches. This trapped sand accumulates in a mound and eventually buries the lower leaves and stems, while the plant continues to grow. A single large clump of seabeach amaranth can trap a mound of 2 to 3 cubic yards (cy) of sand (USFWS 1996).

Seabeach amaranth has a very low tolerance for vegetative competition and does not occur on well-vegetated sites. However, habitat occupied by seabeach amaranth may be sparsely vegetated with other annual forbs, or less commonly, perennial grasses and scattered shrubs (USFWS 1996). Once other vegetation, such as American beach grass, begins to encroach upon habitat occupied by seabeach amaranth, the amaranth is quickly out competed and the individual or population is replaced by the encroaching vegetation. Scientists believe that availability of water and certain plant species are probably the limiting factors because the more extensive root systems of species such as beach grass are more efficient for the uptake of these resources (USFWS 1996).

Ecologists consider seabeach amaranth a 'fugitive' species because of its ability to escape competition and to quickly occupy new habitat as it becomes available (Randall 2002). Hurricanes and storms that re-shape shorelines may have both a positive and negative effect on the species. For example, a storm event that causes severe beach erosion may displace existing individuals, but also may uncover seed banks that have been buried for years. Following hurricanes Bertha and Fran in 1996, several new populations of seabeach amaranth appeared that were likely linked to the effects of the storms (Randall 2002).

3.2.2 Threats to Species

Habitat loss/alteration, human disturbance, and herbivory all are significant threats to seabeach amaranth.

Habitat Loss/Alteration

Shoreline stabilization is detrimental to pioneer species, such as seabeach amaranth, that require unstable, unvegetated, or 'new' land (USFWS 1996). Construction of both 'hard' and 'soft' shoreline stabilization structures are often associated with deteriorated seabeach amaranth habitat (USFWS 1996).

Hard structures are constructed of stone, concrete, steel, or wood and include rip-rap, seawalls, revetments, groins, terminal groins, and breakwaters. Soft structures include construction using non-permanent materials, such as sand, for replenishing beaches and dune construction, rehabilitation, or enhancement.

Many of these structures, both hard and soft, often occupy the same elevation range that is required by seabeach amaranth. Additionally, when structures such as bulkheads and seawalls are built, wave action and wind often lower the beach profile seaward of the structure, creating an area unsuitable for seabeach amaranth (USFWS 1996). During seabeach amaranth status surveys conducted from 1987 to 1990, no seabeach amaranth populations were observed on shorelines that were associated with bulkheads, sea walls, or rip-rap zones (USFWS 1996).

Beach nourishment and dune stabilization have varying degrees of potential effects on seabeach amaranth. Beach nourishment, for example, may have both a negative and positive effect on seabeach amaranth populations (USFWS 1996). On one hand, an adverse effect of sand placement is burial of the existing seed bank within the placement zone. On the other hand, the new beach created by placement is without other vegetation that might outcompete seabeach amaranth and would likely be at an elevation that is suitable for the reestablishment of seabeach amaranth if there is a seed source nearby.

Human Disturbance

Vehicular use on beaches generally has an adverse effect on seabeach amaranth. The plant is a brittle species and individuals generally do not survive even a single pass by an off road vehicle (ORV) tire (USFWS 1996). In northern beaches, such as in New York, these beaches are relatively narrow and vehicular traffic is often concentrated in the elevation zone required by seabeach amaranth (USFWS 1996). Accordingly, areas open to moderate to heavy ORV use during the seabeach amaranth growing season typically do not have populations of the plant in ORV travel corridors. However, during the dormant season, limited ORV use may actually be beneficial to seabeach amaranth because physical disturbance of the beach helps prevent colonization by perennial species, such as beach grass (USFWS 1996).

Another detrimental vehicle-based activity to seabeach amaranth is beach grooming (USFWS 1996). Mechanical rakes are dragged along the beach surface by a tractor or other vehicle to rid the beach of vegetation, trash, and wrack. This practice is usually carried out on heavily used bathing beaches and results in the exclusion of seabeach amaranth by precluding the plant from becoming established.

Humans use beaches for a variety of activities, including sunbathing, swimming, jogging, walking, birding, and beachcombing. Accordingly, pedestrians walking on beaches occupied by seabeach amaranth have the potential to crush individual plants. However, because most pedestrians prefer to walk on packed sand near the wetted shoreline seaward of seabeach amaranth habitat, the effects of pedestrian traffic are generally negligible (USFWS 1996).

Herbivory

Herbivory by webworms (caterpillars of small moths) may be detrimental to localized populations of seabeach amaranth (USFWS 1996). Although not unheard of in the northern part of seabeach amaranth range, herbivory appears to be a much more common problem in southern populations (USFWS 1996). In South Carolina, four species of webworm are known to consume seabeach amaranth and include beet webworm (*Loxostege similialis*), garden webworm (*Achyra rantilis*), southern beet webworm (*Herpetogramma bipunctalis*), and Hawaiian beet webworm (*Spoladea recurvalis*) (USFWS 1996). The ranges of several of these species extend into New York. In 1994, an infestation of saltmarsh moth (*Estigmene acraea*) caterpillars totally consumed leaves of many seabeach amaranth plants at Jones Beach Island East (USFWS 1996).

4.0 EFFECTS ANALYSIS

4.1 PIPING PLOVER

Recent sightings of piping plover in the vicinity of the Project area and documentation of piping plover within nesting areas in Nassau Beach and Lido Beach indicate that, despite the development and high recreational use of the area by humans, piping plover are utilizing suitable habitats in the Project area (NYSDEC email correspondence). As a result, the USFWS has requested a Potential Effect determination on populations of piping plover related to the implementation the proposed action (USFWS 1995a). Piping plover are typically dependant upon intertidal and upper beach zones, using gradually sloping sparsely vegetated areas of the upper beach and foredune for nesting and intertidal areas for foraging. Habitats such as these are known to be present within the Project area and are likely to experience some impacts as a result of proposed Project activities. The following section provides an evaluation of the potential impacts from No-Action and proposed the Project alternative on populations of piping plover. Affect determinations for the No-Action alternative and for various components of the proposed Project are presented in Table 4.1

4.1.1 No Action

Future habitat conditions in the Project area without the Project would be varied. Based on past experience in coastal areas of New York and New Jersey, the upper beach zone and dunes would continue to erode in many areas and may even be eliminated entirely in areas of severe erosion. This would result in significant loss of habitat upon which the piping plover and other shorebirds/seabirds depend on for nesting habitat. However, in other areas along the shoreline, the upper beach zone would accrete sand and increase in size, thereby potentially increasing available piping plover habitat. Although some accretion may occur in the Project area over time, many areas are expected to experience erosion and loss of upper beach and dune habitats without the proposed Project activities (USACE 1989, 1998, 2002, 2005). The intertidal and subtidal zones would retain their current width and substrate composition. However, the locations of these zones would shift off-shore or on-shore depending on erosion and accretion rates in the area. Accordingly, the overall impact of the No Action alternative on piping plover habitat would likely be negative.

4.1.2 Proposed Action

Although some minor, short-term, impacts to plover food resources and habitat will result from proposed Project modifications, overall improvements to plover habitat can be expected to result from the proposed activity. Therefore, after a full evaluation of plover life history, habitats in the Project area, plover management activities, and proposed Project activities, a Not Likely to Adversely Affect determination was made by the District on populations of piping plover as a result of implementation these proposed activities (Table 4.1). Details of this determination are provided below.

The primary direct impacts resulting from implementation of the Project will be disturbance and direct impact of benthic, immobile invertebrate and plant communities currently living in these areas due to burial from beach fill material. As a result, piping plover will experience some short-term loss of food resources within the beach fill placement. However, the direct placement of beach fill is not expected to cause long-term significant impacts on the piping plover. The area of actual permanent plover habitat loss due to permanent structures is small and would result in a negligible loss of foraging substrate for the species. In addition, although plover would avoid foraging within areas of direct sand placement in the intertidal zone until benthic food sources recolonized the site, recolonization of benthic communities in the intertidal zones typically takes place within six months to two years following beach fill placement activities (USFWS 1991, Burlas et al 2001, Peterson and Manning 2001). Therefore, overall impacts are expected to be short-term and not likely to negatively affect plover populations. Thus, a Not Likely to Adversely Affect determination was made by the DISTRICT as a result of implementation of these proposed activities.

Placement of beach fill and dune restoration is likely to increase overall habitat value for piping plover along the affected beachfront by expanding the area of suitable breeding, nesting and foraging habitat. Therefore, a Potentially Beneficial Impact determination was made by the District for piping plover for this proposed Project activity for the reasons stated below. Studies of beach nourishment projects along the Atlantic Coast have documented that when construction windows and best plover management practices are adhered to, beach nourishment generally provides valuable habitat for beach nesting birds such as the piping plover (NJDEP 1997, USFWS 2004a). Construction activities occurring in the Project area are likely to halt further loss of existing plover nesting habitat and will likely increase the amount of suitable habitat by increasing the size of the upper beach zone. Unpublished data from piping plover monitoring conducted by the District in beach fill placement areas near Shinnecock and the Hamptons, Long Island, NY, shows that piping plover and least terns (species that nest on upper beach habitats) returned to breed on sites within 1 year following construction activities (Cohen et al. 2002, 2003a, 2003b).

Permanent hard structures such as groins, sand fence, access ways, and walkovers also would eliminate any suitable foraging or nesting areas directly within the footprint of these structures. However, the area of overall impact from these structures is expected to be minimal (< 1.0 ac) and most of the habitat that will be impacted is not of high habitat value to plover. Specifically, plover forage primarily in the intertidal zone and nest in the upper beach zone in front of dunes. The areas in which hard structures are proposed include mostly subtidal areas that would be affected from groin placement, and portions of the upper dune that would be affected by sand fence, access ways, and walkovers. Overall impacts directly within the footprint of these structures would be permanent, but are not expected to significantly affect piping plover breeding or foraging activities. Thus, a Not Likely to Adversely Affect determination was made by the District as a result of implementation of these proposed activities.

Other short-term impacts, such as a slight decrease in water quality and an increase in turbidity, also are likely to occur during beach fill and groin construction and rehabilitation activities. Changes in water quality and turbidity may cause some short-term avoidance of the intertidal zone by piping plover during periods of low water quality resulting from construction activities. These impacts to plover foraging activities will be short term and will have a minimal affect on plover because plover are mobile and can utilize unaffected foraging areas nearby. In addition, construction activities will be scheduled to avoid the plover nesting periods (i.e., construction scheduled from approximately September 2 through April 14), which will avoid potential impacts to less-mobile plover chick foraging activities. Plover also are expected to avoid active construction areas due to noise and activities. Limiting construction to September 2 through April 14 will also minimize this impact. Impacts from these activities are expected to be short-term and cause no significant negative affects on plover populations. Therefore, a Not Likely to Adversely Affect determination was made by the District for piping plover for these proposed activities.

Construction of new vehicle and pedestrian access points pose potential threat to piping plover because these activities are likely to provide access to new areas of the beach and may increase vehicle and public use of beach areas. This increase in human activity may disrupt nesting plover in areas in proximity to access points and beach activities. Plover are known to be sensitive to disturbance and experience lower reproductive success in areas where they are disturbed frequently (Flemming et al. 1988, Burger 1991, 1994, Goldin 1992, 1993, Cross and Terwilliger 1993, Collazo et al. 1995).

Despite the fact that much of the Project area is currently highly developed and is used extensively for recreational activities by humans, the District will follow recommendations provided by the NYSDEC, USFWS, and NOAA-Fisheries to reduce the impacts to plover in the Project area (USFWS 1989, 1994, 1999, USACE 1998,). These impact minimization measures are detailed in Section 5 and in summary include the following: pre and post-construction surveys of the Project area to determine the presence of nesting plover; restricting construction activities within areas of known plover populations; education of residents, landowners, beach visitors, and beach managers; three consecutive years of post-construction monitoring of the Project area to document beach use/nesting activities of plover and to deter human use of potential nesting areas; and the use of physical deterrents (signage, restricted vehicle access, and symbolic fencing) to deter human use of potential plover nesting habitat.

Efforts to restrict human access and activities near the nest sites, and use of exclusion devices to reduce predation, are believed to be major contributing factors in nesting success of plovers in coastal areas such as those found in (USFWS 1995b, 2003, Cohen et al. 2002, 2003a, 2003b). In addition, NatureServe (2002) notes that population declines may have been countered with intensive management efforts that include creation of habitat using dredge material. Therefore, a Not Likely to Adversely Affect determination was made by the District on piping plover for proposed Project activities.

4.1.3 Cumulative Effects

The proposed 5-year beach renourishment activities would cause short-term impacts to plover foraging by directly covering the benthic organisms that plover feed on and causing short term availability in benthic species (USFWS 1991, Burlas et al 2001, Peterson and Manning 2001). These impacts are similar to the impacts from initial beach fill activities as discussed above. However, as discussed previously, these impacts will have minimal short-term impact on plover populations. Renourishment activities will provide long-term protection of potential breeding and nesting areas in the upper beach and primary dune areas. To further reduce potential impacts, beach renourishment activities will adhere to recommended construction windows. In addition, the District will conduct pre-nourishment field surveys for active piping plover nesting areas. Beach fill would not be placed within 300 ft of known populations of piping plover or other state or Federally-listed shorebirds/seabirds during the breeding season. Therefore, a Potentially Beneficial Impact determination was made by the District for piping plover from this proposed Project activity.

Occasional maintenance of beach access locations, boardwalks, and lifeguard/comfort stations will be required. These activities have the potential to disturb plover. However, as noted above, the District will conduct surveys to identify the location of nesting plover in the vicinity of these areas. Maintenance activities would be scheduled outside of key breeding and nesting periods should it be determined that activities would take place within an unsuitable distance from nesting plover.

Table 4.1. Summary of Project Effects on Populations of Piping Plover.

Activities	Potentially Beneficial	Not Likely to Adversely Affect	Likely to Adversely Affect	No Effect
No-Action			X	
Project – Preferred Alternative				
Staging Area Construction and Use				X
Beach fill	X			
Terminal Groin Rehabilitation and Extension				X
Groin Rehabilitation				X
Groin Construction		X		
Dune Walkovers, Vehicle Access Structures, and Boardwalk Surface Replacement		X		
Cumulative Impacts				
Periodic re-nourishment	X			
Periodic maintenance of infrastructure		X		
Long term impacts from groins		X		

Groin construction and extension may cause habitat degradation by robbing sand from the down-drift shoreline. For example, the Coastal Barriers Study Group (1987) and the Ocean City, Maryland and Vicinity Water Resources Study Reconnaissance Report (USACE 1994) attribute the accelerated, landward shoreline recession of the north end of Assateague Island in Maryland (the only remaining piping plover breeding area in that state), to cumulative effects on the natural drift system from inlet stabilization and nourishment of the rapidly eroding beaches at Ocean City. However, loss of sand down-drift of a jetty or groin may be partially off-set by habitat accretion on the up-drift side of a structure. Breezy Point at the western end of southern Long Island, New York, serves as an example of concentrated piping plover numbers on the accreting side of a jetty (Goldin 1990). Beaches on the accreting side of jetties may also be subject to plant succession that makes them less attractive to piping plovers over time (NJDEP 1997, USFWS 2004). The District will monitor the long-term effects of groin placement on habitat for known populations of piping plover or other state or Federally-listed shorebirds/seabirds identified in the greater Project area and appropriate ameliorative action would be taken. Therefore, because potential impacts and benefits are offsetting, a Not Likely to Adversely

Affect Impact determination was made by the District for piping plover from this proposed Project activity.

No additional cumulative effects are likely.

4.2 SEABEACH AMARANTH

Seabeach amaranth has not been identified as occurring within the Project area. However, suitable habitat in the Project area has been identified. Therefore, the USFWS has requested a Potential Effect determination on populations of seabeach amaranth prior to the implementation of the proposed action. Seabeach amaranth inhabits dynamic, sparsely vegetated seaward facing beaches at elevations of 8 in to 5 ft above mean high water. Habitat such as this is known to be present within the Project area and is likely to experience some impacts as a result of proposed Project activities. The following section provides an evaluation of the potential impacts from No-Action and proposed Project alternatives on populations of seabeach amaranth. Affect determinations for the No-Action alternative and for various components of the proposed Project are presented in Table 4.2.

4.2.1 No Action

As with the no-action scenario for piping plover, future habitat conditions without the Project would include both loss and accretion of sediment in the upper beach and dune areas. However, much of the Project area is expected to experience erosion and loss of upper beach and dune habitats without the proposed Project activities (USACE 1989, 1998, 2002, 2005). In these areas, the upper beach zone would lose sand and would decrease in size, thereby potentially reducing available seabeach amaranth habitat. The width of intertidal and subtidal zones will remain stable. But, locations of these zones may shift off-shore or on-shore depending on erosion and accretion rates in the area. Accordingly, the overall impact of the No Action alternative on seabeach amaranth habitat would likely be negative

4.2.2 Proposed Action

Implementation of the Project actions will affect the upper, intertidal, nearshore subtidal beach zones and primary dune areas of coastal beaches in the Project area through the direct placement of beach fill and structures such as retaining walls, walkovers, and beach access areas. These activities could bury amaranth communities and historic seed banks. However, because seabeach amaranth has not been identified as occurring in the Project area during site-specific surveys, and no known populations occur within 1 mile of the Project area, a No Effect determination was made by the District on populations of seabeach amaranth related to the implementation of the proposed action. In addition, hard structures such as groins, would not result in any permanent loss of potential habitat because these structures will impact areas of the beach/dune that are not typically suitable for amaranth. A summary of Project activities and their effects on populations of seabeach amaranth are presented in Table 4.2.

Table 4.2. Summary of Project Effects on Populations of Seabeach Amaranth.

Activities	Potentially Beneficial	Not Likely to Adversely Affect	Likely to Adversely Affect	No Effect
No-Action			X	
Project – Preferred Alternative				
Staging Area Construction and Use				X
Beach fill	X			
Terminal Groin Rehabilitation and Extension				X
Groin Rehabilitation				X
Groin Construction				X
Dune Walkovers, Vehicle Access Structures, and Boardwalk Surface Replacement				X
Cumulative Impact				
Periodic re-nourishment	X			

Construction of new vehicle and pedestrian access points pose potential threats to seabeach amaranth because these activities are likely to provide access to new areas of the beach and may increase vehicle and public use of beach areas. This increase in human activity could directly impact unprotected amaranth if they were to occur in the Project area. However, as noted above, amaranth are not known to inhabit the Project area. In addition, similar to the recommendations provided by NYSDEC, USFWS, and NMFS for the piping plover, the District will implement several measures in an effort to minimize potential adverse impacts to existing seabeach amaranth populations (USACE 1998, USFWS 1999). These impact minimization measures are detailed in Section 5 and in summary include the following: pre and post-construction surveys of the Project area to determine the presence/absence of seabeach amaranth; limiting construction activities during the growing season within areas of known amaranth populations (i.e., limited activities from approximately June through November); education of residents, landowners, beach visitors, and beach managers; and the use of physical deterrents to deter human use of potential seabeach amaranth habitat. Because seabeach amaranth has not been identified as occurring in the Project area and because measures will be taken to minimize access to areas that are shown to have amaranth, No Effect determination was made by the District for populations of seabeach amaranth related to the implementation of these actions.

Construction of the Project is likely to increase overall habitat suitability for seabeach amaranth along the affected beachfront. Although the planned beach berm is designed for an elevation of 10 ft NGVD, which is slightly higher than seabeach amaranth's preferred elevation, as the beach berm slopes toward the ocean, there will be a zone that falls within the plants preferred elevation range. Expanding the beach and particularly the zone most suitable for amaranth would likely provide habitat for seabeach amaranth. Therefore, a Potentially Beneficial Impact determination was made by the District for seabeach amaranth from this proposed Project activity.

4.2.3 Cumulative Effects

The proposed 5-year beach renourishment activities will provide long-term protection of potential habitat for seabeach amaranth in the upper beach and primary dune areas. To further reduce potential direct impacts, the District will conduct pre-nourishment field surveys for amaranth. Beach fill material would not be placed within 25 ft of the perimeter of population clusters or individual stems of seabeach amaranth.

Because of the limited extent of disturbance and because the species was not identified as occurring in the Project area, implementation of the proposed action could not reasonably be considered as contributing to cumulative adverse impacts on seabeach amaranth. Therefore, because the proposed Project would serve to protect amaranth habitat, a Potentially Beneficial Impact determination was made by the District for seabeach amaranth from this proposed Project activity.

5.0 RECOMMENDATIONS

To minimize adverse impacts on the piping plover and seabeach amaranth, the USACE will follow recommendations provided by the NYSDEC and USFWS as described below (USACE 1998, USFWS 1999). These measures are expected to minimize potential adverse impacts on numerous other species that may use coastal habitats in the Project area, including several state-listed shorebird species.

5.1 PIPING PLOVER

1) The USACE will conduct surveys during the spring/summer, and prior to construction activities, to identify nesting plover in the Project area and to document all known locations of plover. In addition, the USACE will document any other Federal or state-listed wildlife species observed in the Project area during survey and will initiate consultation with appropriate state and Federal agencies.
2) Symbolic fence and signs will be placed around all plover nests and brood rearing areas located in the construction area to deter use of the area and to protect sites from incidental disturbance from construction activities.
3) The USACE will conduct construction activities near known plover nesting areas from September 2 through April 14 to avoid the key shorebird nesting period.
4) Construction activities will avoid all delineated locations of the species during the breeding season and will undertake all practicable measures to avoid incidental taking of the species.
5) The USACE will reinitiate consultation with the USFWS to identify acceptable alternatives should any plover nest sites be identified within the direct construction footprint.
6) The USACE will monitor the Project area before, during and after construction.
7) The USACE will educate residents, landowners, beach visitors and beach managers on piping plover.

8) The USACE will encourage local agencies to place time restrictions on beach use by vehicles to avoid key nesting and fledging periods.
9) The USACE will conduct follow-up surveys of plover habitat within the Project area. Surveys will be conducted for three consecutive nesting seasons post-construction and a summary report regarding habitat use and nesting will be provided annually to the USFWS.

5.2 SEABEACH AMARANTH

1) The USACE will conduct surveys during July/August to determine the presence/absence of seabeach amaranth within the Project area and to document all known locations of amaranth. In addition, the USACE will document any other Federal or state-listed plant species observed in the Project area during the survey and will initiate consultation with appropriate state and Federal agencies.
2) Symbolic fence and signs will be placed around all seabeach amaranth plants located in the construction area to deter use of the area and to protect plants.
3) The USACE will restrict construction activities in areas of known populations during the growing season (allow limited activities only, from June through November).
4) Construction activities will avoid all delineated locations of the plant and will undertake all practicable measures to avoid incidental taking of the plant.
5) The USACE will reinitiate consultation with the USFWS to identify acceptable alternatives should any seabeach amaranth plants are identified within the direct construction footprint.
6) The USACE will educate residents, landowners, beach visitors, and beach managers on seabeach amaranth.
7) The USACE will conduct follow-up surveys of amaranth habitat within the Project area. Surveys will be conducted for three consecutive growing seasons post-construction and a summary report will be provided annually to the USFWS.

6.0 CONCLUSIONS

It is the USACE's determination that implementing the proposed action in accordance with the standards and guidelines recommended by NYDOS, USFWS and NMFS, will not jeopardize the continued existence or contribute to the loss of viability of either of the Federally-listed endangered or threatened species listed identified by the USFWS. In addition, the proposed action would not significantly contribute to cumulative impacts associated with piping plover and seabeach amaranth. Therefore, the USACE requests USFWS concurrence for a Not Likely to Adversely Affect determination for the piping plover and a Will Not Affect determination for the seabeach amaranth.

As previously discussed, this proposed action would result in impacts to benthic communities (potential burial and habitat disturbances) and water quality (turbidity and dissolved oxygen) during active construction activities. However, these effects would be short-term, as the benthic communities will naturally begin to re-establish shortly after construction is completed, forming a similar community within a period of 6 months to 2 years (USFWS 1991, Burlas et al 2001, Peterson and Manning 2001). These impacts may result in a short-term reduction of forage material for piping plover in the immediate Project area. However, plover will utilize nearby undisturbed areas for feeding. In addition, because sediments in the Project area are sandy, any increased turbidity effects would generally be limited to the period of in-water construction, as this type of substrate tends to settle out of suspension quickly.

The Project would potentially result in direct and/or indirect disturbances to seabeach amaranth, piping plover and other nesting shorebirds/seabirds, including the Federally and state-listed least tern, roseate tern, and the state-listed common tern, if any are present in the Project vicinity during the time of construction. However, these impacts can largely be avoided if the period of construction is limited to periods outside of the piping plover nesting season which occurs from April 15 through September 1, and outside of the growing season for seabeach amaranth which extends form June through November. Therefore, the USACE has incorporated these construction window recommendations, as well as other recommendations from the USFWS, into the Project construction plans. In addition, the USACE will conduct a pre-construction survey for the piping plover and seabeach amaranth and will avoid disturbing these species if any are found within the construction area. As a result, significant adverse impacts to these species are not expected. The USACE is in the process of completing coordination and consultation processes with the USFWS pursuant to the Fish and Wildlife Coordination Act and the ESA.

Because a site-specific survey will be conducted prior to implementation of the Project and NYSDEC, USFWS, and the NOAA-Fisheries Division (formerly known at the NOAA- National Marine Fisheries Service) standards and guidelines (outlined in Section 5.0) would be followed regarding the protection of species and potential habitat, implementation of the proposed action would not adversely affect the piping plover or seabeach amaranth. Implementation of the proposed action would not contribute to the loss of viability of the piping plover or seabeach amaranth and thus, no measures to offset impacts to these species are necessary. When compared to the No Action alternative, implementation of the proposed action would benefit piping plover and seabeach amaranth, as well as other shorebird/seabird species, through habitat improvement and an increase in the availability of suitable habitat.

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Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix D

NYSDOS Coastal Zone Consistency

U.S. Army Corps of Engineers
New York District

STATE OF NEW YORK
DEPARTMENT OF STATE
ONE COMMERCE PLAZA
99 WASHINGTON AVENUE
ALBANY, NY 12231-0001

ANDREW M. CUOMO
GOVERNOR

CESAR A. PERALES
SECRETARY OF STATE

December 30, 2014

Mr. Robert Smith
U.S. Department of the Army - NY District
Jacob K. Javits Federal Bldg. - 26 Federal Plaza
New York, NY 10278-0090

RE: F-94-696/F-98-415 (DA)
U.S Army Corps of Engineers/New York District
Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project
Atlantic Ocean, City of Long Beach, Town of Hempstead, Nassau County
Concurrence - Modification To Previously Reviewed Activity

Dear Mr. Smith:

The Department of State received final information on your proposed modification of the above-referenced activity on November 4, 2014. The Department previously reviewed the original proposal and concurred with your determination that the construction activities at Long Beach will not result in any reasonably foreseeable effects to land and water uses or natural resources of the coastal area.

The proposed modification involves numerous minor modifications, including changes to public access, beach fill and groin construction and rehabilitation, as well as reduced impacts to shorebird habitat, as detailed in the *Draft Environmental Assessment Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Coastal Storm Risk Management Project*. The project as modified would not cause coastal zone effects substantially different than those originally reviewed by the Department. As such, no further consistency review is required.

If you have any questions regarding this matter, please contact us at (518) 474-6000 and refer to our file # F-98-415 (DA).

Sincerely,

Jeffrey Zappieri
Supervisor of Consistency Review
Office of Planning and Development

JZ/dc
Cc: *USACE - New York District -Jodi McDonald, Peter Weppler*
NYSDEC - Sue McCormick

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

**REPLY TO
ATTENTION OF
Planning Division
PL-E
Rm. 2151**

February 15, 2014

Mr. Jeff Zappieri
NYS Department of State
Division of Coastal Resources and Water Front Revitalization
41 State Street
Albany, NY 12231

Re: **F-94-696/ F-98-415(DA)**
Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project

Dear Mr. Zappieri,

Pursuant to the above referenced subject, the USACE New York District (NYD) requests a modification/re-issuance to an existing Consistency Statement, issued by the NYDOS Division of Coastal Resources and Water Front Revitalization in 1998. The NYD is requesting a modification based upon the project has undergone minor modifications and an updated Consistency Statement is required.

For your records and review, we have enclosed the following: (1) a detailed description of the proposed (modified) project and (2) the required, updated, (draft) Supplemental Environmental Assessment (EA) dated 2014. Please reference the original Coastal Zone Management (CZM) Consistency Statement, F-98-415 (DA), and re-issue for current project design. It is our assessment that the updated project does not differ significantly from the original.

We respectfully request that your agency review our proposed project and if any further documentation and/or assistance is needed to complete the modification process, please contact: Mr. Robert J. Smith, Project Biologist, at (917) 790 – 8729.

Sincerely,

Nancy Brighton
Acting Chief, Environmental Analysis Branch

MODIFICATIONS TO THE PROPOSED ACTION

The recommended plan for this Project includes the preferred plan (identified in the 1998 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the Draft Long Beach Limited Reevaluation Report and the Draft EA 2014. The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project Area. The proposed Project modification entails an overall reduction in the Project area, which reduces the amount of fill material needed for beach fill and renourishment activities, and a reduction in dune sand fencing. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 6,000 linear feet (lf) of fill area, a reduction of 3,922,000 cy of fill material needed for initial beach fill and 341,000 cy per yr for re-nourishment activities, a reduction of 15,000 lf of sand fence. Specifically, there will be approximately a reduction of 110 ac of filling in the upper beach zone, 39 fewer acres of filling in the intertidal zone, and 35 fewer acres of filling in the sub-tidal zone.

Structural components of the Project modification include the construction of 57 timber/gravel dune walkovers, extensions of existing dune walkovers and vehicle access ways. Construction of 6 new groins (two of the six groins originally proposed for the Project has been deferred indefinitely, and are not part of the proposed Project modification), the rehabilitation of 17 groins, the rehabilitation and extension of the eastern terminal groin.

In addition to the decrease in the size of the Project Area and the amount of sand material required for the Project, when compared to the original Project, the Project modification would result in minimal construction activities originally proposed within a 136-acre shorebird nesting/foraging area which will be mostly excluded from the Project (Table 1). The proposed Project modification would, however, result in an increase of walkover extensions and vehicle access as well as the rehabilitation of two additional groins, and the rehabilitation and extension of the east jetty. A comparison of components of the original selected plan and the proposed Project modification are shown in Table 1.

Table 1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 linear feet (lf), some within shorebird nesting area	35,000 lf, none within shorebird nesting area	- 6,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cubic yards (cy)	4,720,000 cy	- 3,922,000 cy
Dune plantings	29 acres (ac)	34.0 ac	+5.0 ac

Sand fence	90,000 lf	75,000 lf	- 15,000 lf
Timber dune walkover ADA	13	12	-1
Timber Dune walkovers (from boardwalk) ADA	5	5	0
Timber Dune walkovers (from boardwalk) None ADA	0	6	+6
Timber non-ADA walkovers	6	23	+17
Timber Vehicle and pedestrian access from boardwalk	2	2	0
Gravel surface vehicle and pedestrian access way	2	9	+7
Extension of existing walkovers	12	8	-4
Raised timber vehicular access	1	0	-1
5-yr renourishment	2,111,000 cy/year (yr)	1,770,000 cy/yr	- 341,000 cy/yr
Rehab and 100 ft Extension of terminal groin	0	1	+ 1
New groins	6	4 (6 proposed, but 2 have been deferred)	0
Rehabilitation of existing groins	15	17	+ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

Proposed Action Elements

This proposed action would require beach fill placement, walkover extension/construction, groin extension/construction, and construction of vehicle access areas and walkovers at the locations shown in the appendix. An estimated 700 acres of nearshore, intertidal beach, upper beach and dune habitats in the project area would be disturbed as a result of the proposed action. Elements to be included in the proposed action were selected based upon an evaluation of alternatives as outlined in the *Final Environmental Impact Statement* for this Project and subsequent re-evaluation and modification of the proposed plan as presented in detail in the Draft Long Beach Limited Reevaluation Report. A summary of each element is provided below.

Beachfill

The selected LRR storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 If of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H (1V:3H on landward slope fronting the boardwalk) that will extend along the entire project area; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 If of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Total sandfill quantity of 4,720,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); planting of 34 acres of dune grass and installation of 75,000 If of sand fence

Rehabilitation of Existing Groins

Sixteen groins were proposed for rehabilitation in the plan selected in 1998. However, the existing groins within the Project were re-evaluated in September 2003. The groins were evaluated for structural condition, sand trapping effectiveness, and planform holding effectiveness. As a result of this survey, a total of 17 groins were recommended for rehabilitation, including 15 groins in Long Beach and two groins in Point Lookout.

Rehabilitation was based on a condition survey of the existing groins conducted in September 2003, the plans for rehabilitation of existing groins in the Recommended Plan has been modified to include rehabilitation of those groins that were found in poor or fair condition that would be beneficial to the beach stability. Based on this evaluation, 15 of the 23 groins in the City of Long Beach and 2 groins in Point Lookout should be rehabilitated. The proposed rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward 100-330 feet of each of the groins. A minimum constructible crest width of approximately 13 ft was selected with side slopes of 1V on 2H. A primary armor weight of approximately 5 tons was selected in order to approximately match the existing armor stone order to match the existing armor.

Construction of New Groins

The selected 1998 plan proposed eventual construction of six new groins (all 765 ft long and 70 ft wide) at Point Lookout (USACE 1998). Currently only the first four groins are targeted for immediate construction, whereas the remaining two groins are proposed for deferred construction as needed based on the stability of the existing weldment area. However, based on subsequent re-evaluation of the area, some modifications to the original design of the four new groins have been proposed. The Project requires the immediate construction of a new groin field at Point Lookout that will contain six groins that begin 800 feet west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 feet. Groin lengths vary and range from 380 ft to 800 ft. Groin widths will be 13 ft.

A determination to construct the two westernmost groins will be triggered at a later date within the 50-year Project life and be based on monitoring data. The criterion for construction includes a change from an accreting beach to an eroding beach in the area where the structures are to be located (USACE 2004b). The criteria will be evaluated based upon field measurements and analysis (USACE 2004b).

Point Lookout Terminal Groin Rehabilitation and Extension

During re-evaluation of the proposed Project, the USACE determined that Groin #58 (i.e., West Groin), the terminal groin in Point Lookout, required rehabilitation and extension (USACE 2004b). Accordingly, the District plans to rehabilitate the existing portion of the groin, extend the length an additional 100 feet (currently 200 ft), and extend the width to between 107 and 170 ft (currently widths range from 50 to 107 ft), in accordance with design specifications presented in the 1999 USACE Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, New York Report (Figure 2). Extending the terminal groin may decrease the amount of sediment lost toward the inlet after the beach fill component of the project is carried out (USACE 2004b). It will also possibly retain additional longshore sediment transport without causing large changes in inlet dynamics (USACE 2004b). The median armor weight for the rehabilitated and new portions of Groin #58 is approximately 10 to 10.75 tons (USACE 2004b).

Dune Walkovers, Vehicle Access, and Boardwalk Extensions

Several dune walkovers, vehicle access points and boardwalk extensions are proposed for the City of Long Beach and the Town of Hempstead (USACE 2004b). Construction of these structures will allow the public to gain safe access to the beach without harming the existing and enhanced dune system.

A total of 57 timber dune walkovers (including 17 timber wheelchair accessible), 9 gravel surface vehicle and pedestrian walkovers, 29 timber non ADA compliant, two timber vehicular access ways from the boardwalk, eight extensions to existing walkovers, are currently proposed. Originally, 29 dune walkovers (both timber and gravel) and 12 vehicle access ramps were included in the selected plan (USACE 1995).

Bird Nesting and Foraging Area

The proposed Project modification has limited Project activities from within a 93.4-acre ephemeral pool and a 42.3-acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (Appendix J). Project activities were proposed within this area as part of the original plan that was selected in 1998. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties

(USACE 1998). As a result, construction of a beach berm within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Two new groins were originally proposed within the ephemeral pool and tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred indefinitely, and is not part of the proposed Project modification. No beach fill activities will take place within the bird foraging and nesting area.

POLICY 1 - RESTORE, REVITALIZE, AND REDEVELOP DETERIORATED AND UNDERUTILIZED WATERFRONT AREAS FOR COMMERCIAL, INDUSTRIAL, CULTURAL, RECREATIONAL, AND OTHER COMPATIBLE USES.

The Long Beach project will advance Policy 1 by restoring the natural coastal processes in this dynamic waterfront area while maintaining safe recreational and emergency traffic. The project will enhance recreational opportunities in the area. The Long Beach project will ensure the continued use of the water front area to advance and support recreational activites, fishing and other compatible activities. Enhanced recreational beach areas will result in the placement area.

POLICY 2 - FACILITATE THE SITING OF WATER-DEPENDENT USES AND FACILITIES ON OR ADJACENT TO COASTAL WATERS.

The Long Beach project will advance Policy 2 by enhancing recreational activities which depend on access to coastal waters to name a few: swimming, fishing, boating, wildlife viewing.

POLICY 4 - STRENGTHEN THE ECONOMIC BASE OF SMALLER HARBOR AREAS BY ENCOURAGING THE DEVELOPMENT AND ENHANCEMENT OF THOSE TRADITIONAL USES AND ACTIVITIES WHICH HAVE PROVIDED SUCH AREAS WITH THEIR UNIQUE MARITIME IDENTITY.

The Long Beach project will advance Policy 4 by promoting desirable activities such as recreational activities, fishing and other compatible activities that have made smaller harbor areas appealing as tourist destinations.

POLICY 7 - SIGNIFICANT COASTAL FISH AND WILDLIFE HABITATS WILL BE PROTECTED, PRESERVED, AND WHERE PRACTICAL, RESTORED SO AS TO MAINTAIN THEIR VIABILITY AS HABITATS.

The Long Beach project will advance Policy 7 by protecting and advancing fish and wildlife habitat to assure the survival of these species populations. Long Beach project is a significant foraging area for migratory fowl and this project will protect and enhance this habitat.

POLICY 9 - EXPAND RECREATIONAL USE OF FISH AND WILDLIFE RESOURCES IN COASTAL AREAS BY INCREASING ACCESS TO EXISTING RESOURCES, SUPPLEMENTING EXISTING STOCKS, AND DEVELOPING NEW RESOURCES.

The Long Beach project will advance Policy 9 as Long Beach offers a wide array of recreational activities pertaining to fish and wildlife resources. The project will maintain and increase the recreational use of these resources in a manner which ensures the protection of these species resources and by providing public access to the project area.

POLICY 14 - ACTIVITIES AND DEVELOPMENT, INCLUDING THE CONSTRUCTION OR RECONSTRUCTION OF EROSION PROTECTION STRUCTURES, SHALL BE UNDERTAKEN SO THAT THERE WILL BE NO MEASURABLE INCREASE IN EROSION OR FLOODING AT THE SITE OF SUCH ACTIVITIES OR DEVELOPMENT, OR AT OTHER LOCATIONS.

The Project advances Policy 14 by ensuring the stability of the beach and Inlet navigation while augmenting the natural coastal features providing shore protection and reducing erosion on the eastern side of the inlet.

POLICY 19 - PROTECTS, MAINTAIN, AND INCREASE THE LEVEL AND TYPES OF ACCESS TO PUBLIC WATER-RELATED RECREATION RESOURCES AND FACILITIES.

Long Beach provides a vital recreational outlet for residents of the areas and other parts of Nassau County. On an average summer weekend day Long Beach beaches draw thousands of people for sunbathing, picnicking, swimming, and sport fishing. During the winter months the area is also used to some extent for recreational walks and exercise, nature study, and sport fishing

POLICY 21 - WATER-DEPENDENT AND WATER-ENHANCED RECREATION WILL BE ENCOURAGED AND FACILITATED, AND WILL BE GIVEN PRIORITYOVER NON-WATER-RELATED USED ALONG THE COAST.

The Long Beach project will maintain and boost an existing water-related and water-dependent recreation, as well as increase the general public's access to the coast to enjoy and take advantage of coastal scenery.

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix E

Clean Air Act (CAA)

U.S. Army Corps of Engineers
New York District

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, NY 10278-0090

United States Army Corps of Engineers, New York District
FINAL General Conformity Determination Notice

On October 30, 2012, New York State (DR-4085) and New Jersey State (DR-4086) declared Super Storm Sandy a Major Disaster. In response to the unprecedented breadth and scope of the damages sustained along the New York and New Jersey coastlines, the U.S. Congress passed Public Law (PL) 113-2 "Disaster Relief Appropriations Act 2013", also known as House Resolution (H.R.) 152-2 Title II which was signed into law on January 29, 2013. PL 113-2, which states "That the amounts... are designated by the Congress as being for an emergency requirement pursuant to section 251(b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985", provides funding for numerous projects to repair, restore and fortify the coastline in both states as a result of the continuing emergency as people and property along the coast remain in a vulnerable condition until the coastline is restored and fortified. To protect the investments by the Federal, State, local governments and individuals to rebuild damaged sites, it is imperative that these emergency disaster relief projects proceed as expeditiously as possible.

There are a number of coastal projects that were previously proposed and authorized but unconstructed (ABU). The Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York [WRDA 1996, Section 101] project is an ABU project that is anticipated to start construction during or after October 2014 and this document represents the General Conformity Determination required under 40CFR§93.154 by the United States Army Corps of Engineers (USACE). USACE is the lead Federal agency that will contract, oversee, approve, and fund the project's work, and thus is responsible for making the General Conformity determination for this project.

USACE has coordinated this determination with the New York State Department of Environmental Conservation (NYSDEC) [see NYSDEC letter provided as Attachment A] and the US Environmental Protection Agency, Region 2. The New York, Northern New Jersey, Long Island, Connecticut nonattainment area is currently classified as "marginal" nonattainment for the 2008 8-hour ozone standard, nonattainment of the 2006 particulate matter less than 2.5 microns ($PM_{2.5}$) standard, and maintenance of the carbon monoxide (CO) standard. The area is in the Ozone Transport Region. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NOx) and volatile organic compounds (VOCs).

The equipment associated with this project that is evaluated under General Conformity (40CFR§93.153) includes direct and indirect nonroad diesel sources, such as dredging equipment and land based earth-moving equipment. The primary precursor of concern with this type of equipment is NOx, as VOCs, $PM_{2.5}$, and CO are generated at significantly lower rates. The NOx emissions associated with the project are estimated to range from <1.0, <1.0, 433.3, and 22.8 tons per calendar year for 2014 through 2017, respectively (see emissions estimates provided as Attachment A). The LB project exceeds the NOx trigger level of 100 tons in any calendar year and as a result, the USACE is required to fully offset the emissions of this project. The project does not exceed the ozone related VOC trigger level of 50 tons (for areas in a ozone transport region) in any calendar year, nor the $PM_{2.5}$ and CO related trigger levels of 100 tons in any calendar year.

USACE is committed to fully offsetting the emissions generated as a result of the disaster relief coastal work associated with this project. USACE recognizes that the feasibility and cost-effectiveness of each offset option is influenced by whether the emission reductions can be achieved without introducing delay to the construction schedule that would prevent timely disaster relief.

USACE will demonstrate conformity with the New York State Implementation Plan by utilizing the emission offset options listed below. The demonstration can consist of any combination of options, and is not required to include all or any single options to meet conformity. The options for meeting general conformity requirements include the following:

a. Emission reductions from project and/or non-project related sources in an appropriately close vicinity to the project location. In assessing the potential impact of this offset option on the construction schedule, USACE recognizes the possibility of lengthening the time period in which offsets can be generated as appropriate and allowable under the general conformity rule (40CFR§93.163 and §93.165).
b. Use of Surplus NOx Emission Offsets (SNEOs) generated under the Harbor Deepening Project (HDP). As part of the mitigation of the HDP, USACE and the Port Authority of New York & New Jersey developed emission reduction programs coordinated through the Regional Air Team (RAT). The RAT is comprised of the USACE, NYSDEC, New Jersey Department of Environmental Protection, EPA, and other stakeholders. SNEOs will be applied in concurrence with the agreed upon SNEO Protocols to ensure the offsets are real, surplus, and not double counted.
c. Use of Clean Air Interstate Rule (CAIR) ozone season NOx Allowances with a distance ratio applied to allowances, similar to the one used by stationary sources.

Due to unpredictable nature of dredge-related construction and the preliminary estimates of sand required to restore the integrity of the coastlines, the project emissions will be monitored as appropriate and regularly reported to the RAT to assist the USACE in ensuring that the project is fully offset.

In summary, USACE will achieve conformity for NOx using the options outlined above, as coordinated with the NYSDEC and coordinated through the RAT.

14 Aug 15

Date

David A. Caldwell
Colonel, U.S. Army
Commander

Attachment A

General Conformity Related Emission Estimates

Emissions have been estimated using project planning information developed by the New York District, consisting of anticipated equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$E = hrs \times LF \times EF$$

Where:

E = Emissions per period of time such as a year or the entire project.
hrs = Number of operating hours in the period of time (e.g., hours per year, hours per project).
LF = Load factor, an estimate of the average percentage of full load an engine is run at in its usual operating mode.
EF = Emission factor, an estimate of the amount of a pollutant (such as NO_x) that an engine emits while performing a defined amount of work.

In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$250 \text{ horsepower} \times 0.43 \times 1{,}000 \text{ hours} = 107{,}500 \text{ hphr}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of pollutants than older engines. The NO_x emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{107{,}500 \text{ hphr} \times 9.5 \text{ g } NO_x/\text{hphr}}{453.59 \text{ g/lb} \times 2{,}000 \text{ lbs/ton}} = 1.1 \text{ tons of } NO_x$$

As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Marine engine load factors are primarily from a document associated with the New York and New Jersey Harbor Deepening Project (HDP): "Marine and Land-Based Mobile Source Emission Estimates for the Consolidated Schedule of 50-Foot Deepening Project, January 2004," and from EPA's 1998 Regulatory Impact Analysis (RIA): "EPA Regulatory Impact Analysis: Control of Commercial Marine Vessels." Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

Emission factors have also been sourced from a variety of documents and other sources depending on engine type and pollutant. The NO_x emission factors for marine engines have been developed primarily from EPA documentation for the Category 1 and 2 standards (RIA, "Control of Emission from Marine Engines, November 1999) and are consistent with emission factors used in documenting emissions from the HDP, while the VOC emission factors for marine engines are from the Port Authority of New York and New Jersey's "2010 Multi-Facility Emissions Inventory" which represent the range of marine engines operating in the New Jersey harbor and coastal region in terms of age and regulatory tier level. Nonroad equipment NO_x emission factors have been derived from EPA emission standards and documentation, while the nonroad VOC emission factors have been based on EPA's Diesel Emissions Quantifier (DEQ, accessed at: *www.epa.gov/cleandiesel/quantifier/*), run for moderately old equipment (model year 1995). On-road vehicle emission factors have also been developed from the DEQ, assuming a mixture of Class 8, Class 6, and Class 5 (the smallest covered by the DEQ) on-road trucks.

As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Actual project emissions will be estimated and tracked during the course of the project and will be based on the characteristics and operating hours of the specific equipment chosen by the contractor to do the work.

The following pages summarize the estimated emissions of pollutants relevant to General Conformity, NO_x, VOC, $PM_{2.5}$, SO_2, and CO in sum for the project and by calendar year based on the schedule information also presented (in terms of operating months per year). Following this summary information are project details including the anticipated equipment and engine information developed by the New York District, the load factors and emission factors as discussed above, and the estimated emissions for the project by piece of equipment.

USACE - New York District

NAN - ABU Sandy-Related Projects

General Conformity Related Emission Estimates

Emission Estimates & Supporting Information - Long Beach May 2015

DRAFT

General Conformity-applicable emissions per calendar year based on project duration

	Estimated Emissions, tons per year							
Pollutant	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
NO_x	0.0	0.04	0.17	433.3	22.8	0.0	0.0	0.0
VOC	0.0	0.001	0.005	16.3	0.9	0.0	0.0	0.0
$PM_{2.5}$	0.0	0.002	0.007	22.5	1.2	0.0	0.0	0.0
SO_2	0.0	0.00003	0.0001	0.25	0.01	0.0	0.0	0.0
CO	0.0	0.007	0.030	56.5	3.0	0.0	0.0	0.0

Maximum emissions per year given the project duration as listed in the "project duration" table

	Estimated Emissions, maximum tons per year									
Pollutant		**Water Side**		**Shore Crew Support***			**Groin Construction***			
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Total Dredging**	**Barge**	**Excavator**	**Front-end loader**	**Total Groin**
NO_x	447.1	15.3	68.4	15.2	1.2	547.3	0.2	0.5	0.6	1.3
VOC	17.1	0.4	2.8	0.3	0.02	20.6	0.006	0.010	0.011	0.028
$PM_{2.5}$	23.5	0.6	4.1	0.3	0.02	28.4	0.009	0.009	0.009	0.027
SO_2	0.23	0.01	0.07	0.008	0.0006	0.32	0.0002	0.0003	0.0003	0.001
CO	48.9	2.7	17.7	1.9	0.2	71.4	0.04	0.07	0.07	0.18

Supporting information and data

				Shore crew*		**Groin construction***		
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Barge**	**Excav**	**Front-end loader**
Horsepower	8,000	600	2,000	310	25	20	23	25
Load factors	0.66	0.40	0.80	0.59	0.59	0.40	0.59	0.59
Emission factors								
NO_x	9.7	7.3	4.9	9.5	9.5	7.3	9.5	9.5
VOC	0.37	0.20	0.20	0.19	0.19	0.20	0.19	0.19
$PM_{2.5}$	0.51	0.29	0.29	0.16	0.16	0.29	0.16	0.16
SO_2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
CO	1.06	1.27	1.27	1.21	1.21	1.27	1.21	1.21

* Per NYDEC finding, land-side emissions are accounted for in the applicable SIP and are therefore not considered in the General Conformity evaluation. Accordingly, only barge emissions are included from the groin construction work in the calendar year emission totals.

Project Duration and Working Months per Year

Cu yds	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total Months Dredging**
4,500,000		2	9	9.5	0.5				10
		(groin work)		(dredging and beach work)					

USACE - New York District

NAN - ABU Sandy-Related Projects
General Conformity Related Emission Estimates
Methodology
DRAFT

May 2015

The emission estimating methodology is designed to be conservatively high in terms of calculated horsepower-hours.
Operating parameters and schedules may be revised as project plans are developed in more detail.

Equipment & Engines to be Used	Nominal Horsepower	Operating Hours/day	Operating Days/year	Load Factor	Emission Factors NOx	VOC g/hphr	PM2.5	CO	SO2
Dredge & related									
Dredge engines	8,000	22	assume 30 x 12	0.66	9.7	0.37	0.51	1.06	0.0050
Pump engines	2,000	22	assume 30 x 12	0.80	4.9	0.20	0.29	1.27	0.0048
Dredge auxiliary engines	600	22	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048
Dozer	310	22	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Loader (working dredged material)	25	22	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Groin construction									
Loader (groin construction)	26	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Excavator	23	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Barge aux.	20	10	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048

Terms

Horsepower	hp	Total horsepower of type of dredge likely to be used on projects
Operating hours per day	hrs/day	Operating hours per day based on project engineer's experience
Operating days per year	days/yr	Estimated number of operating days per year based on volume of work, expected production rate, and schedule limitations resulting from environmental windows
Load factor	LF	Load factors from NONROAD model tables for similar equipment
Emission factors	EF	NOx EF derived from emission standards for similar engine types, g/hp-hr
	e.g., dredge Dodge Island equipped with Tier 0 propulsion engines, Tier 2 pump engines	

Calculations

Emissions calculated using the following equation:

Emissions, tons per year = (hp x hrs/day x days/yr x LF x EF)/(453.59 g/lb x 2,000 lbs/ton)

VOC, PM2.5, CO emission factors:

2010 PANYNJ Emissions Inventory, marine vessel emisison factors used as a reasonable surrogate for the variety of vessels in use in the New York/New Jersey area in the absence of specific information regarding the vessels to be used on any specific project.

		VOC	PM2.5	CO
Propulsion (g/kWhr)	Table 5.35	0.50	0.68	1.42
Propulsion (g/hphr)		0.37	0.51	1.06
Auxiliary (g/kWhr)	Table 5.35	0.27	0.39	1.70
Auxiliary (g/hphr)		0.20	0.29	1.27
Off-road: DEQ results for representative 600 hp crawler tractor (MY 1995)				
Default hrs/year:	936	Horsepower: 600		
Emissions, short tons per year:		0.1925	0.1667	1.2671
Estimated EF, g/hphr:*		0.183	0.16	1.21
Conversion factor		1.053 VOC/THC		
Estimated VOC EF, g/hphr:		0.19		

* Hydrocarbons provided by DEQ converted to VOC

Assumed load factor for off-road: 0.59 (from PANYNJ Emissions Inventory)

Conversion factor 0.7457 kW/hp g/kWhr x kW/hp = g/hphr

SO2 emission factors:

Quantification of emissions from ships associated with ship movements between ports in the European Community
Final Report, July 2002, Entec UK Limited. Chapter 2

	g/kWhr	g/hphr	g S/hphr	g SO2/hphr
Medium and high speed auxiliary, distillate fuel (Table 2	217	162	0.0024	0.0048
Medium and high speed propulsion, distillate fuel (Tabl	223	166	0.0025	0.0050

(maneuvering)

ULSD as of 2014: 15 g S/1,000,000 g fuel

Land-side diesel engines exhibit similar fuel consumption characteristice as marine propulsion engines,* so the same SO2 EFs are used.

*Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition
EPA-420-R-10-018 NR-009d July 2010

Table C1. Average Emission Test Results for 1988 to 1995 Model Ye 0.367 lb fuel/hphr

From the text: "Due to lack of data, the brake-specific fuel consumption (BSFC) for the 1988-and-later pre-control (Tier 0) engines is used for all engines, both earlier pre-control engines and later engines subject to emissions standards."

Converted to g/hphr: 167 g/hphr

Emissions have been estimated using project planning information developed by the New York District, consisting of anticipated equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$E = hrs \times LF \times EF$$

Where:

E = Emissions per period of time such as a year or the entire project.
hrs = Number of operating hours in the period of time (e.g., hours per year, hours per project).
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In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$250 \text{ horsepower} \times 0.43 \times 1{,}000 \text{ hours} = 107{,}500 \text{ hphr}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of pollutants than older engines. The NO_x emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{107{,}500 \text{ hphr} \times 9.5 \text{ g } NO_x/\text{hphr}}{453.59 \text{ g/lb} \times 2{,}000 \text{ lbs/ton}} = 1.1 \text{ tons of } NO_x$$

As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Marine engine load factors are primarily from a document associated with the New York and New Jersey Harbor Deepening Project (HDP): "Marine and Land-Based Mobile Source Emission Estimates for the Consolidated Schedule of 50-Foot Deepening Project, January 2004," and from EPA's 1998 Regulatory Impact Analysis (RIA): "EPA Regulatory Impact Analysis: Control of Commercial Marine Vessels." Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

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The following pages summarize the estimated emissions of pollutants relevant to General Conformity, $NO_{x,}$ VOC, $PM_{2.5}$, SO_2, and CO in sum for the project and by calendar year based on the schedule information also presented (in terms of operating months per year). Following this summary information are project details including the anticipated equipment and engine information developed by the New York District, the load factors and emission factors as discussed above, and the estimated emissions for the project by piece of equipment.

USACE - New York District

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General Conformity Related Emission Estimates

Emission Estimates & Supporting Information - Long Beach May 2015

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General Conformity-applicable emissions per calendar year based on project duration

	Estimated Emissions, tons per year							
Pollutant	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
NO_x	0.0	0.04	0.17	433.3	22.8	0.0	0.0	0.0
VOC	0.0	0.001	0.005	16.3	0.9	0.0	0.0	0.0
$PM_{2.5}$	0.0	0.002	0.007	22.5	1.2	0.0	0.0	0.0
SO_2	0.0	0.00003	0.0001	0.25	0.01	0.0	0.0	0.0
CO	0.0	0.007	0.030	56.5	3.0	0.0	0.0	0.0

Maximum emissions per year given the project duration as listed in the "project duration" table

	Estimated Emissions, maximum tons per year									
Pollutant		**Water Side**		**Shore Crew Support***			**Groin Construction***			
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Total Dredging**	**Barge**	**Excavator**	**Front-end loader**	**Total Groin**
NO_x	447.1	15.3	68.4	15.2	1.2	547.3	0.2	0.5	0.6	1.3
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SO_2	0.23	0.01	0.07	0.008	0.0006	0.32	0.0002	0.0003	0.0003	0.001
CO	48.9	2.7	17.7	1.9	0.2	71.4	0.04	0.07	0.07	0.18

Supporting information and data

				Shore crew*		**Groin construction***		
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Barge**	**Excav**	**Front-end loader**
Horsepower	8,000	600	2,000	310	25	20	23	25
Load factors	0.66	0.40	0.80	0.59	0.59	0.40	0.59	0.59
Emission factors								
NO_x	9.7	7.3	4.9	9.5	9.5	7.3	9.5	9.5
VOC	0.37	0.20	0.20	0.19	0.19	0.20	0.19	0.19
$PM_{2.5}$	0.51	0.29	0.29	0.16	0.16	0.29	0.16	0.16
SO_2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
CO	1.06	1.27	1.27	1.21	1.21	1.27	1.21	1.21

* Per NYDEC finding, land-side emissions are accounted for in the applicable SIP and are therefore not considered in the General Conformity evaluation. Accordingly, only barge emissions are included from the groin construction work in the calendar year emission totals.

Project Duration and Working Months per Year

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		(groin work)		(dredging and beach work)					

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The emission estimating methodology is designed to be conservatively high in terms of calculated horsepower-hours.
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Equipment & Engines to be Used	Nominal Horsepower	Operating Hours/day	Operating Days/year	Load Factor	Emission Factors NOx	VOC g/hphr	PM2.5	CO	SO2
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Pump engines	2,000	22	assume 30 x 12	0.80	4.9	0.20	0.29	1.27	0.0048
Dredge auxiliary engines	600	22	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048
Dozer	310	22	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
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Groin construction									
Loader (groin construction)	26	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Excavator	23	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Barge aux.	20	10	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048

Terms

Horsepower	hp	Total horsepower of type of dredge likely to be used on projects
Operating hours per day	hrs/day	Operating hours per day based on project engineer's experience
Operating days per year	days/yr	Estimated number of operating days per year based on volume of work, expected production rate, and schedule limitations resulting from environmental windows
Load factor	LF	Load factors from NONROAD model tables for similar equipment
Emission factors	EF	NOx EF derived from emission standards for similar engine types, g/hp-hr
	e.g., dredge Dodge Island equipped with Tier 0 propulsion engines, Tier 2 pump engines	

Calculations

Emissions calculated using the following equation:

Emissions, tons per year = (hp x hrs/day x days/yr x LF x EF)/(453.59 g/lb x 2,000 lbs/ton)

VOC, PM2.5, CO emission factors:

2010 PANYNJ Emissions Inventory, marine vessel emisison factors used as a reasonable surrogate for the variety of vessels in use in the New York/New Jersey area in the absence of specific information regarding the vessels to be used on any specific project.

		VOC	PM2.5	CO
Propulsion (g/kWhr)	Table 5.35	0.50	0.68	1.42
Propulsion (g/hphr)		0.37	0.51	1.06
Auxiliary (g/kWhr)	Table 5.35	0.27	0.39	1.70
Auxiliary (g/hphr)		0.20	0.29	1.27
Off-road: DEQ results for representative 600 hp crawler tractor (MY 1995)				
Default hrs/year:	936	Horsepower: 600		
Emissions, short tons per year:		0.1925	0.1667	1.2671
Estimated EF, g/hphr:*		0.183	0.16	1.21
Conversion factor		1.053 VOC/THC		
Estimated VOC EF, g/hphr:		0.19		

* Hydrocarbons provided by DEQ converted to VOC
Assumed load factor for off-road: 0.59 (from PANYNJ Emissions Inventory)
Conversion factor 0.7457 kW/hp g/kWhr x kW/hp = g/hphr

SO2 emission factors:

Quantification of emissions from ships associated with ship movements between ports in the European Community
Final Report, July 2002, Entec UK Limited. Chapter 2

	g/kWhr	g/hphr	g S/hphr	g SO2/hphr
Medium and high speed auxiliary, distillate fuel (Table 2	217	162	0.0024	0.0048
Medium and high speed propulsion, distillate fuel (Tabl	223	166	0.0025	0.0050

(maneuvering)
ULSD as of 2014: 15 g S/1,000,000 g fuel

Land-side diesel engines exhibit similar fuel consumption characteristice as marine propulsion engines,* so the same SO2 EFs are used.

*Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition
EPA-420-R-10-018 NR-009d July 2010
Table C1. Average Emission Test Results for 1988 to 1995 Model Ye 0.367 lb fuel/hphr
From the text: "Due to lack of data, the brake-specific fuel consumption (BSFC) for the 1988-and-later pre-control (Tier 0) engines is used for all engines, both earlier pre-control engines and later engines subject to emissions standards."
Converted to g/hphr: 167 g/hphr

USACE - New York District

NAN - ABU Sandy-Related Projects

General Conformity Related Emission Estimates

Emission Estimates & Supporting Information - Long Beach 14-Jan-14

DRAFT

General Conformity-applicable emissions per calendar year based on project duration

	Estimated Emissions, tons per year							
Pollutant	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
NO_x	0.0	0.04	0.17	433.3	22.8	0.0	0.0	0.0
VOC	0.0	0.001	0.005	16.3	0.9	0.0	0.0	0.0
$PM_{2.5}$	0.0	0.002	0.007	22.5	1.2	0.0	0.0	0.0
SO_2	0.0	0.00003	0.0001	0.25	0.01	0.0	0.0	0.0
CO	0.0	0.007	0.030	56.5	3.0	0.0	0.0	0.0

Maximum emissions per year given the project duration as listed in the "project duration" table

	Estimated Emissions, maximum tons per year									
Pollutant		**Water Side**		**Shore Crew Support***			**Groin Construction***			
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Total Dredging**	**Barge**	**Excavator**	**Front-end loader**	**Total Groin**
NO_x	447.1	15.3	68.4	15.2	1.2	547.3	0.2	0.5	0.6	1.3
VOC	17.1	0.4	2.8	0.3	0.02	20.6	0.006	0.010	0.011	0.028
$PM_{2.5}$	23.5	0.6	4.1	0.3	0.02	28.4	0.009	0.009	0.009	0.027
SO_2	0.23	0.01	0.07	0.008	0.0006	0.32	0.0002	0.0003	0.0003	0.001
CO	48.9	2.7	17.7	1.9	0.2	71.4	0.04	0.07	0.07	0.18

Supporting information and data

				Shore crew*		**Groin construction***		
	Dredge	**Auxiliary**	**Pumps**	**Dozer**	**Front-end loader**	**Barge**	**Excav**	**Front-end loader**
Horsepower	8,000	600	2,000	310	25	20	23	25
Load factors	0.66	0.40	0.80	0.59	0.59	0.40	0.59	0.59
Emission factors								
NO_x	9.7	7.3	4.9	9.5	9.5	7.3	9.5	9.5
VOC	0.37	0.20	0.20	0.19	0.19	0.20	0.19	0.19
$PM_{2.5}$	0.51	0.29	0.29	0.16	0.16	0.29	0.16	0.16
SO_2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
CO	1.06	1.27	1.27	1.21	1.21	1.27	1.21	1.21

* Per NYDEC finding, land-side emissions are accounted for in the applicable SIP and are therefore not considered in the General Conformity evaluation. Accordingly, only barge emissions are included from the groin construction work in the calendar year emission totals.

Project Duration and Working Months per Year

Cu yds	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total Months Dredging**
4,500,000		2	9	9.5	0.5				10
			(groin work)	(dredging and beach work)					

USACE - New York District

NAN - ABU Sandy-Related Projects
General Conformity Related Emission Estimates
Methodology
DRAFT 1-Nov-13

The emission estimating methodology is designed to be conservatively high in terms of calculated horsepower-hours.
Operating parameters and schedules may be revised as project plans are developed in more detail.

Equipment & Engines to be Used	Nominal Horsepower	Operating Hours/day	Operating Days/year	Load Factor	Emission Factors NOx	VOC g/hphr	PM2.5	CO	SO2
Dredge & related									
Dredge engines	8,000	22	assume 30 x 12	0.66	9.7	0.37	0.51	1.06	0.0050
Pump engines	2,000	22	assume 30 x 12	0.80	4.9	0.20	0.29	1.27	0.0048
Dredge auxiliary engines	600	22	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048
Dozer	310	22	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Loader (working dredged material)	25	22	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Groin construction									
Loader (groin construction)	26	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Excavator	23	10	assume 30 x 12	0.59	9.5	0.19	0.16	1.21	0.0050
Barge aux.	20	10	assume 30 x 12	0.40	7.3	0.20	0.29	1.27	0.0048

Terms

Horsepower	hp	Total horsepower of type of dredge likely to be used on projects
Operating hours per day	hrs/day	Operating hours per day based on project engineer's experience
Operating days per year	days/yr	Estimated number of operating days per year based on volume of work, expected production rate, and schedule limitations resulting from environmental windows
Load factor	LF	Load factors from NONROAD model tables for similar equipment
Emission factors	EF	NOx EF derived from emission standards for similar engine types, g/hp-hr
	e.g., dredge Dodge Island equipped with Tier 0 propulsion engines, Tier 2 pump engines	

Calculations

Emissions calculated using the following equation:

Emissions, tons per year = (hp x hrs/day x days/yr x LF x EF)/(453.59 g/lb x 2,000 lbs/ton)

VOC, PM2.5, CO emission factors:

2010 PANYNJ Emissions Inventory, marine vessel emisison factors used as a reasonable surrogate for the variety of vessels in use in the New York/New Jersey area in the absence of specific information regarding the vessels to be used on any specific project.

		VOC	PM2.5	CO
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Off-road: DEQ results for representative 600 hp crawler tractor (MY 1995)				
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Emissions, short tons per year:		0.1925	0.1667	1.2671
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Conversion factor		1.053 VOC/THC		
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* Hydrocarbons provided by DEQ converted to VOC
Assumed load factor for off-road: 0.59 (from PANYNJ Emissions Inventory)
Conversion factor 0.7457 kW/hp g/kWhr x kW/hp = g/hphr

SO2 emission factors:

Quantification of emissions from ships associated with ship movements between ports in the European Community
Final Report, July 2002, Entec UK Limited. Chapter 2

	g/kWhr	g/hphr	g S/hphr	g SO2/hphr
Medium and high speed auxiliary, distillate fuel (Table 2	217	162	0.0024	0.0048
Medium and high speed propulsion, distillate fuel (Tabl	223	166	0.0025	0.0050

(maneuvering)
ULSD as of 2014: 15 g S/1,000,000 g fuel
Land-side diesel engines exhibit similar fuel consumption characteristice as marine propulsion engines,* so the same SO2 EFs are used.
*Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition
EPA-420-R-10-018 NR-009d July 2010
Table C1. Average Emission Test Results for 1988 to 1995 Model Ye 0.367 lb fuel/hphr
From the text: "Due to lack of data, the brake-specific fuel consumption (BSFC) for the 1988-and-later pre-control (Tier 0) engines is used for all engines, both earlier pre-control engines and later engines subject to emissions standards."
Converted to g/hphr: 167 g/hphr

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix F

NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION (NYSOPRHP) CORRESPONDENCE

U.S. Army Corps of Engineers
New York District

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO ATTENTION OF

14 June 1993

Environmental Analysis Branch
Environmental Assessment Section

Ms. Julia S. Stokes
Deputy Commissioner for Historic Preservation
New York State Office of Parks, Recreation, and
Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island
P.O. Box 189
Waterford, New York 12188-0189

Dear Ms. Stokes,

The New York District, Corps of Engineers (Corps), has been authorized to construct a beach nourishment project along the length of Long Beach Island, Nassau County, New York (Figure 1). This project is needed to replace portions of the beach that have undergone severe erosion and to protect existing development from further erosion. The current project area includes the shore and near-shore sand placement area as well as an offshore borrow area located approximately 2000 feet south of the eastern end of Long Beach Island (Figure 1 and 2). The proposed project will not impact the salt marshes situated on the northeast side of Long Beach Island.

Current project plans call for the placement of sand dredged from the offshore borrow site to be placed on Long Beach Island. This material will be placed above the mean high water mark to widen the beach berm to a width of 110 feet and to construct dunes in certain areas. Two portions of Long Beach Island, the westernmost portion of Atlantic Beach and a section of Lido Beach, are not being considered as part of the initial nourishment project, although they will be included as part of the subsequent maintenance cycle. As the project is currently scheduled, the beach maintenance program will last for 50 years, with beach nourishment occurring every five years.

Two structures, the Granada Towers and the U.S. Post Office, are listed on the National Register of Historic Places (NRHP). One private residence located on Washington Boulevard is listed on the historic structures inventory maintained by the New York State Office of Parks, Recreation, and Historic Preservation because it is considered to be one of the first private homes built in Long Beach. None of these structures will be affected by this project.

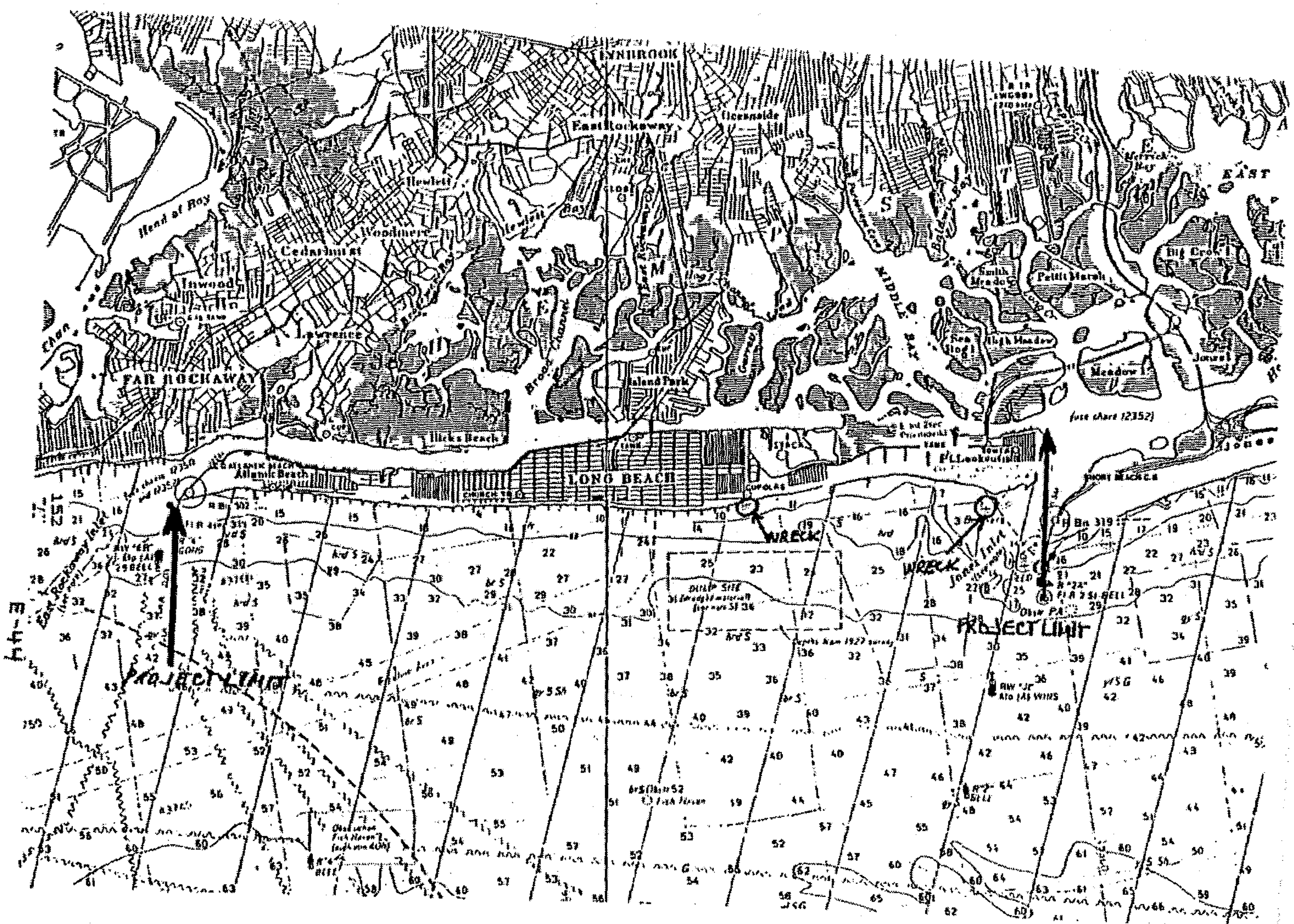

Figure 1: Project Map
Long Beach Island, Nassau unty,
New York.

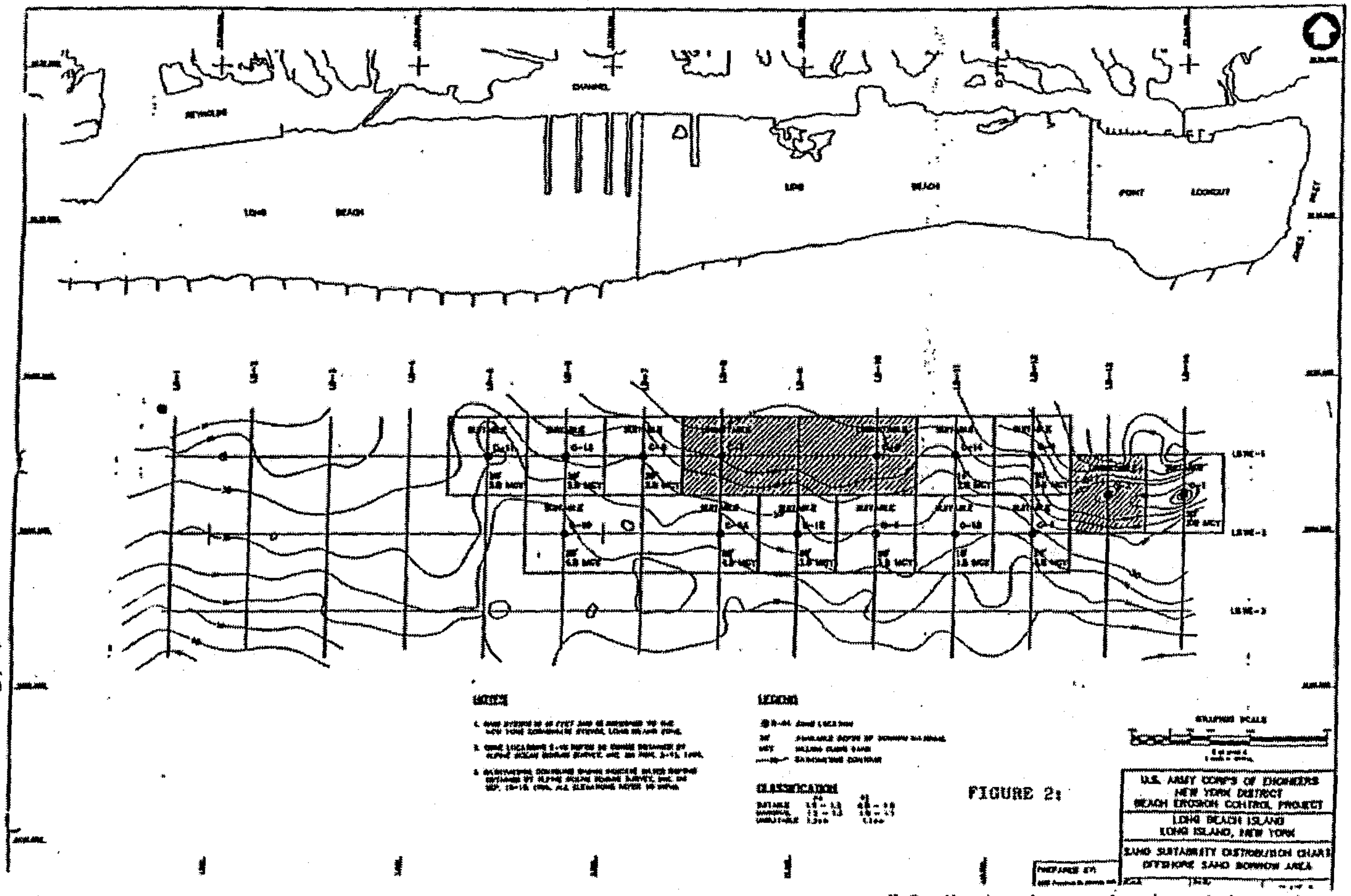

FIGURE 2:

N.B. Map has been reduced; not to scale.

To determine if there were any other potentially NRHP eligible properties located within the project area, the Corps had a cultural resources study prepared as part of this project (Attachment 1). An extensive history and prehistory of the Long Beach Island area was compiled and a pedestrian survey was also conducted for this report. This study found that there were no prehistoric/contact period occupations or archaeological sites on Long Beach. In addition, the location of the 19th and early 20th century structures would be located north of the present beach zone and that no significant remains of the project area's history would be located at the site of the present beach. Since the proposed project involves the deposition of sand, no sites will be disturbed.

The cultural resources study also examined the potential for shipwrecks to be located in the near-shore placement area and the offshore borrow area. Marine charts of the project area show two wrecks within the near-shore sand placement zone in the Lido Beach/Point Lookout areas. These wrecks, however, are not listed on the National Oceanic and Atmospheric Administration's (NOAA) Automated Wreck and Obstruction Information System (AWOIS) listing for the project area. Mark J. Friese, Hydrographic Surveys Branch, NOAA, stated that the AWOIS is often not updated to include information from their charts. There is the potential, then, for the two wrecks to be located in the eastern section of the project area. An underwater investigation of the near-shore area in the vicinity of the two wrecks will be conducted during the next phase of the project.

A number of marine accidents or wrecks have occurred within and near the borrow site. In the next phase of this project, the Corps is planning to conduct a remote sensing survey of the proposed borrow area to determine if any wrecks are present.

On the basis of current project plans and pending review by your office, the Corps is of the opinion that the "Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Beach Nourishment Project" will have no effect on historic properties located onshore. Please provide us with Section 106 comments for the onshore portion of this project as pursuant to 36 CFR 800.5.

The remote sensing survey of the borrow site using a magnetometer and side scan sonar will be conducted as part of the next phase of the project. In addition, an underwater survey of the near-shore area in the location of the two wrecks will also be conducted. The results of these surveys will be coordinated with your office when this work is completed.

If your or your staff have any questions or require further information about this project, please contact Ms. Nancy J. Brighton, Project Archaeologist, (212)264-4663. Thank you for your assistance.

Sincerely,

Bruce A. Bergmann
Chief, Planning Division

Attachments

Enclosure 3

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

Orin Lehman
Commissioner

June 23, 1993

Mr. Bruce A. Bergmann
Chief, Planning Division
Department of the Army
Corps of Engineers
New York District Office
Jacob K. Javits Federal Building
New York, New York 10278-0090

Dear Mr. Bergmann:

Re: CORPS
Long Beach Erosion Control
Long Beach Island, Nassau County
92PR2416

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the Cultural Resources Reconnaissance Report in accordance with Section 106 of the National Historic Preservation Act of 1966 and the relevant implementing regulations.

Based upon this review, the SHPO concurs with the recommendations of the the report. It is the opinion of the SHPO that no further investigations are warranted for the on-shore area of the project. We look forward to receiving the results of the surveys of the off-shore borrow areas when that work is completed.

If you have any questions, please call James Warren of our Project Review Unit at (518) 237-8643 ext. 280.

Sincerely,

Julia S. Stokes
Deputy Commissioner for
Historic Preservation

JSS/RDK:gc

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO ATTENTION OF

November 27, 1995

Environmental Analysis Branch
Environmental Assessment Section

Mr. J. Winthrop Aldrich
Deputy Commissioner for Historic Presrvation
New York State Office of Parks, Recreation, and
Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island
P.O. Box 189
Waterford, New York 12188

RE: CORPS
Long Beach Erosion Control
Long Beach Island, Nassau County
92PR2416

Dear Mr. Aldrich,

Enclosed is a draft copy of the report entitled "Remote Sensing Survey, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York" (Enclosure 1). The report provides a description of the remote sensing survey of the borrow area to be utilized to provide sand for the hurricane and storm protection for Long Beach Island. During the course of the survey, 19 targets or anomalies were identified. Four of them have been identified as belonging to a pipe and thirteen others represent modern debris. The remaining two targets have been identified as potentially significant cultural resources. As currently planned, the targets and anomalies identified as potentially significant cultural resources will be avoided during dredging.

The draft report for the underwater investigations, for which your office has provided comments on an interim report, is currently being prepared. It will be submitted to your office for review when it is complete.

Please review this report and provide comments by January 8, 1996. If you have any questions or require additional information, please contact Ms. Nancy Brighton, (212)264-4663 or by fax (212)264-5472.

Sincerely,

Stuart Piken, P.E.
Chief, Planning Division

Enclosure

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

November 28, 1995

Stuart Piken, P.E.
Department of the Army
N.Y. District Corps of Engineers
Jacob K. Javits Federal Building
New York, NY 10278-0090

Dear Mr. Piken:

Re: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County
92PR2416

Thank you for providing this office with a copy of your draft report on the remote sensing survey of the intended borrow area involved in this project. The State Historic Preservation Office concurs with the findings of this report and believes that it is unlikely that significant cultural resources exist in the borrow area. In addition, several of the questions addressed to you in my November 02 letter are satisfactorily answered by Amy Mitchell of Panamerican Consultants in her October 05 memorandum to Nancy Brighton of your staff. At this point in time, the only unresolved issue in our Section 106 review of this project concerns the eligibility of the steam tugboat wreck and its location in relationship to dredging and placement of soils. Amy Mitchell indicates that the tugboat site is located 1000 feet offshore, placing it, we believe, well outside the limits of intended soil deposition or dredging. If this statement is correct, no further investigations or submissions will be necessary for this office to issue a no effect finding. If, however, you find that the tugboat site will be impacted by this project, information supporting the eligibility or non-eligibility of this site will need to be forwarded to this office for a determination.

Thank you for your continuing consultation with the State Historic Preservation Office. When responding, please be sure to refer to the OPRHP project review number (PR) noted above. If you have any questions, please feel free to contact me at (518) 237-8643 ext. 258.

Sincerely,

Robert D. Kuhn, Ph.D.
Historic Preservation Coordinator
Field Services Bureau

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

Bernadette Castro
Commissioner

February 21, 1996

Stuart Piken, P.E.
Chief, Planning Division
Environmental Assessment Section
Department of the Army
New York District, Corps of Engineers
Jacob K. Javits, Federal Building
New York, New York 10278-0090

Re: Long Beach Erosion Control
Long Beach, Nassau Co.
92PR2416

Dear Mr. Piken:

Thank you for providing our office with an update on this shore stabilization project together with copies of the final remote sensing survey report and the draft archaeological report documenting the remains of a wooden steam tug located at Jones Inlet. Based on the information provided, we concur with Panamerican Consultants' recommendations that the tugboat no longer retains sufficient integrity to meet the criteria for listing on the National Register. For the reasons outlined in the same recommendations, the suspected remains of three other vessels in the project area could not be identified or evaluated. In the case of the unnamed wreck and the barge, a determination of eligibility will not be required since neither site appears to be impacted by the project. However, in the case of the Mexico, we concur with the recommendations of the consultants and the Corps that further efforts be made to locate, identify and evaluate the site prior to construction. The 1826 Mexico, if located, is likely to be eligible for listing given its historical associations, age and the circumstances of its accidental loss in 1837.

We look forward to continuing coordination with your office on this and other cultural resources issues in New York State. Please feel free to contact me at 518-237-8643 ext. 258 or Dr. Kuhn, Program Coordinator at ext. 255 if you have any questions.

Sincerely,

Mark L. Peckham
Historic Preservation
Program Analyst

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

November 18, 1997

Environmental Analysis Branch
Environmental Assessment Section

Mark Peckham
Historic Preservation Program Analyst
Historic Preservation Field Services Bureau
New York State Office of Parks, Recreation and
Historic Preservation
Peebles Island
P.O. Box 189
Waterford, New York 12188-0189

RE: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County
92PR2416

Dear Mr. Peckham,

Reference is made to the underwater inspection of four shipwrecks in the near shore placement area for the above subject and the comments provided by your office (Enclosures 1 and 2). The inspection recommended a remote sensing survey of the near shore area of the proposed study area to ensure the identification of any remains of vessels that may lie along the Long Beach shoreline. In June 1997, Panamerican Consultants, Inc., under contract to the U.S. Army Corps of Engineers, New York District, completed a remote sensing survey of the near shore area of Long Beach Island. Enclosed is the draft report entitled "Remote-Sensing Survey, Near-Shore Project Area, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project" that presents the results of this investigation (Enclosure 3).

The remote-sensing data identified 26 anomalous features that fit the criteria for potentially significant submerged resources. The majority of these features has only a magnetic signature indicating they are buried beneath the seabed. These resources should not be impacted by the placement of sand along the near-shore area and the placement of additional sand in this area should further protect any targets that represent historic shipwrecks. No further work is recommended for these targets if the proposed storm reduction project activities do not disturb the sea floor.

There are four targets with associated sidescan sonar images that represent potentially significant submerged cultural resources protruding from the sea floor that might be impacted by the placement of fill. One of the targets is a tug that was investigated in 1996. No further work is recommended for this target. The three other targets, however, are unidentified. One target is a cluster of four anomalies; one of which has a sidescan return that may be an anchor. This cluster is in the general area that local informants believe is the site of the *Mexico*. It is recommended that these three target areas, represented by six anomalies, be assessed by qualified underwater archaeologists to determine the nature of these anomalies and their historical significance.

The Corps concurs with the report's recommendations because of the potential significance of these targets. At this time, however, current proposed project plans are limited to work on the jetty at the eastern end of the Long Beach Island. The jetty project will be coordinated with your office when the proposed plans have been developed. If project plans change to include storm damage protection consisting of the placement of sand along the shoreline, then this office will conduct the recommended underwater archaeological survey. The results of that effort will be coordinated with your office.

Please review the attached report and provide comments. If you have any questions or require additional information, please contact Ms. Nancy Brighton (212) 264-4663. Thank you for your cooperation.

Sincerely,

John Sassi, P.E.
Chief, Planning Division

Enclosures

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

Bernadette Castro
Commissioner

December 01, 1997

Mr. John Sassi, P.E.
Chief, Planning Division
Department of the Army
New York District Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090

Re: Long Beach Erosion Control
Long Beach, Nassau Co.
92PR2416

Dear Mr. Sassi:

Thank you for your letter of November 18 and the attached remote sensing report by Panamerican Consultants, Inc. We concur with the recommendations outlined in the report and endorsed in your letter and look forward to continuing consultation as construction plans develop. Please feel free to contact me at 518-237-8643 ext. 258 if I can be of any assistance.

Sincerely,

Mark L. Peckham
Historic Preservation
Program Analyst

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

January 20, 2005

Christopher Ricciardi
U.S. Army corps of Engineers - Planning Division
Jacob K. Javits Federal building
26 Federal Plaza- Room 2131
New York, NY 10278-0090

Dear Mr. Ricciardi,

Re: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County, NY
05PR00126 (formerly 92PR2416)

Thank your for requesting the comments of the New York State Historic Preservation Office (SHPO) with regard to the potential for thIs project to affect significant historical/cultural resources. SHPO has reviewed your agencies correspondence of December 22, 2004 and the report "*Phase II Underwater Inspection of Seven Targets in the Eastern Portion of the Long Beach Project, Nassau County, New York - Draft Report*" prepared by Panamerican Consultants in December 2004. SHPO con curs with the findings and recommendations of that report. We have assigned Unique Site Number A05901.000450 to the Marble Wreck Site, which has been determined eligible for the National Register of Historic Places. We request that you have a completed archaeological site inventory form prepared and submitted for this site.

Our review in included a review of the Mitigation Plan included as Appendix C of the report. We concur with the Data Recovery Plan presented, however we would like to request that a protocol for the treatment of humans remains be added as well as a protocol for disseminating the results of the investigations to the public. Public dissemination may take the form of publications, presentations, displays, web sites or other measures appropriate for a particular site. Please provide some discussion/options for this site. The revised plan should be included as part of an Memorandum of Agreement (MOA) that will be developed to mitigate the adverse effects of your project. Please contact me to discuss preparation of the MOA.

Please contact me at extension 3291, or by e-mail at douglas.mackey@oprhp.state.ny.us, if you have any questions regarding these comments.

Sincerely

Douglas P. Mackey
Historic Preservation Program Analyst
Archaeology

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

3 March 2005

Environmental Analysis Branch

Ruth Pierpont, Director
New York State Office of Parks, Recreation & Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189

RE: CORPS
Long Beach Island Erosion Control
Long Beach, Nassau County
05PR00126 (formerly 92PR2416)

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District (Corps), is pleased to furnish you with a copy of the final report, *Phase II Underwater Inspection Of Seven Targets In The Eastern Portion Of The Long Beach Project, Nassau County, New York.* This report details the Phase II Underwater Inspection of targets covered in the Limited Reevaluation Report (LRR) that the Corps is currently undertaking. This report serves as an update to the original Environmental Impact Statement that was completed in 1998. At this time, the Corps is unclear as to whether or not the project will move beyond the LRR and into construction. If the Long Beach Project is to progress beyond the LRR, the Corps will initiate formal consultation for the creation of the Memorandum of Agreement, as recommended, with regard to the Phase III Mitigation work.

The current proposed project is the rehabilitation and construction of four groins and the extension of the Jones Inlet jetty. Work undertaken for the report included: sonar and physical investigation by divers of the targets uncovered and a determination for the potential of National Register eligibility. The report investigated and identified seven targets in the revised project area, with one Target (number 50) being identified as potentially eligible for inclusion on the National Register for Historic Places/Shipwrecks and recommended Phase III Archaeological Mitigation for it.

The Corps is pleased that your office concurred with the recommendation in the report as well as offered insightful comments to the future of the project. Once again, we will work with your office if the project should proceed forward.

Thank you, Douglas Mackey and Mark Peckham for your participation in the Section 106 process for this particular aspect of the Long Beach Project. If you have any questions, please contact the Project Archaeologist, Dr. Christopher Ricciardi, at (917) 790-8630.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Enclosure

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, N.Y. 10278-0090

Reply to
Environmental Analysis Branch

September 10, 2013

Ruth Pierpont, Director
New York State Office of Parks, Recreation & Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Long Beach Island Storm Damage Reduction
Long Beach, Nassau County
05PR00126 (formerly 92PR2416)

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District (District) has developed a plan to restore the shoreline and provide shoreline protection to Long Beach Island, a barrier island located between Jones Inlet and East Rockaway Inlet, in Nassau County, New York (Enclosure 1). The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project (Project) covers of approximately 29,000 linear feet of shoreline and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach. The plan consists of dune and berm construction, planting of dune grass and installation of sand fencing. Also included in the project is construction of dune walkovers, vehicle accessways, retaining walls, and lifeguard stations as well as the rehabilitation of 18 existing groins including the terminal groin at Point Lookout and the construction of 7 new groins. The project shall also include advanced nourishment and periodic renourishment at 5 year intervals for the 50 year life of the project.

The District has carried out cultural resources and remote sensing investigations to determine whether the project will have an adverse impact on cultural resources. The following is a list of relevant reports:

1) *Underwater Inspection of Four Ship Wrecks, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project, 1996, prepared by Panamerican Consultant, Inc..*
2) *Remote Sensing Survey, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York. 1996. Prepared by Panamerican Consultants, Inc. (An investigation of the Sand Borrow Area)*

3) *Remote-Sensing Survey, Near-Shore Project Area, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project, 1998, prepared by Panamerican Consultants, Inc.*
4) *Phase II Underwater Inspection of Seven Targets in the Eastern Portion of the Long Beach Project, Nassau County, New York – February,* 2005, *prepared by Panamerican Consultants, Inc.*

The remote sensing and dive inspection surveys of the study area and sand borrow area resulted in the identification of two shipwrecks within the near shore sand placement area vicinity, the *Mexico* Wreck and the *Marble* Wreck, and one anomaly of interest. At this time the anomaly, number 18, identified during the 1998 near shore remote sensing survey requires further investigation, the *Mexico* is considered potentially eligible for the National Register of Historic Places (NRHP) but requires further investigation to determine its NRHP eligibility and the *Marble*, which was subject to dive investigation in the 2005 survey, has been determined potentially eligible for the NRHP. Section 106 consultation was carried out with your office regarding this project as part of the feasibility study and environmental impact statement which were completed in 1995. Also, coordination was carried out following the 2005 underwater inspections for the subsequent re-evaluation of the selected alternative which was carried out to address changes to the shoreline, the project scope, and to address environmental concerns.

In accordance with the recommendations of the surveys and the consultation comments received from your office, the New York District has prepared, for review and comment, a fact sheet summarizing the previous investigations, coordination with your office, and the project plans as well as a draft Programmatic Agreement (PA) (Enclosures 2 and 3). The draft PA stipulates how the anticipated adverse impacts shall be managed as this project moves forward. A Data Recovery Plan, developed in 2005 for the *Marble*, is included as an attachment to the PA. The New York District plans to begin construction of this project in the fall of 2014. Considering this short consultation period the New York District has begun the process of awarding a contract for a survey of the three resources, which shall fulfill the requirements outlined in Stipulation A of the draft PA. The current investigation shall include a refinement remote sensing survey of the anomaly and wreck sites, diver investigation of anomalies, and diver assessment of the Marble Wreck Site, the Mexico Wreck Site, and Anomaly 18. A determination shall be made as to the NRHP eligibility of each site so that plans for further investigations may be developed as well as mitigation plans if necessary.

We ask that you and your staff review and comment on the enclosed draft PA and supporting documentation provided as soon as possible pursuant to 36 CFR Part 800.5(e)(4). We are currently preparing input to the Limited Re-evaluation Report and the supplemental EA and will include this draft PA in the Appendices. If you or your staff require additional information or have any questions, please contact Carissa Scarpa, Project Archaeologist, at (917)790-8612.

Sincerely,

L. Houston

Leonard Houston,
Chief, Environmental Analysis Branch

Enclosures

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, N.Y. 10278-0090
May 20, 2015

Reply to
Environmental Analysis Branch

Ruth Pierpont, Director
New York State Office of Parks, Recreation & Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189

Re: CORPS
Long Beach Island Storm Damage Reduction
Long Beach, Nassau County
05PR00126 (formerly 92PR2416)

Dear Ms. Pierpont:

The U.S. Army Corps of Engineers, New York District (District) has finalized plans to restore the shoreline and provide shoreline protection to Long Beach Island, a barrier island located between Jones Inlet and East Rockaway Inlet, in Nassau County, New York (Enclosure 1). The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project (Project) covers of approximately 29,000 linear feet of shoreline and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach. The plan consists of dune and berm construction, pedestrian and vehicular accessways, as well as the rehabilitation of existing groins including the terminal groin at Point Lookout and the construction of at least four new groins. The project will also include advanced nourishment and periodic renourishment at five-year intervals for the 50 year life of the project.

The District has carried out cultural resources and remote sensing investigations to determine whether the project will have an adverse impact on cultural resources (Enclosure 2). The following is a list of relevant reports:

1) *Underwater Inspection of Four Ship Wrecks, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project, 1996, prepared by Panamerican Consultant, Inc..*
2) *Remote Sensing Survey, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York. 1996. Prepared by Panamerican Consultants, Inc. (An investigation of the Sand Borrow Area)*

3) *Remote-Sensing Survey, Near-Shore Project Area, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project, 1998, prepared by Panamerican Consultants, Inc.*
4) *Phase II Underwater Inspection of Seven Targets in the Eastern Portion of the Long Beach Project, Nassau County, New York – February*, 2005, *prepared by Panamerican Consultants, Inc.*
5) *Remote Sensing Survey and Dive Inspection of Two Shipwrecks and Two Anomalies in Connection with the Long Beach Storm Damage Reduction Project. Under Contract to Moffat and Nichol. Prepared for US Army Corps of Engineers, New York District. 2014, prepared by Panamerican Consultants, Inc.*

The remote sensing and dive inspection surveys within the Area of Potential Effect (see Enclosure 1) has resulted in the identification of two shipwrecks, the *Mexico* and the Marble Wreck, and one anomaly, Anomaly 18. At that time Anomaly 18, identified during the 1998 near shore remote sensing survey, required further investigation. The *Mexico* and Marble Wreck were considered potentially eligible for the National Register of Historic Places (NRHP) but required further investigation to determine their NRHP eligibility. Section 106 consultations was carried out with your office regarding this project as part of the feasibility study and environmental impact statement that were completed in 1995 as well as in the 2005 underwater inspections for the subsequent re-evaluation of the selected alternative, which was carried out to address changes to the shoreline, the project scope, and environmental concerns.

This project was never constructed and the additional investigations identified in 2005 were never completed. In October 2012, Hurricane Sandy caused significant damage to Long Beach and the original project was once again re-evaluated. As part of this re-evaluation, some project elements were revised and an additional survey was conducted to determine the current condition of the wrecks (Panamerican Consultants 2014). According to current project plans and the results of the most recent survey, the *Mexico* and the Marble Wreck will be outside the construction work limits and the Area of Potential Effect (see Enclosure 2). Neither wreck will be affected by the sand placement, the rehabilitation of groins or the construction of the new groins. The Marble Wreck is located west of the terminal groin at Point Lookout, however, as currently designed, the groin will be rebuilt and extended to the west of the existing jetty (see Figures 7 through 9 in Enclosure 2). Anomaly 18 as well as Anomaly 29 was also re-located by magnetometer. Probing did not encounter anything buried at least eight to ten feet beneath the sand. Anomaly 18 is located within the current Area of Potential Effect for sand placement only. Placement of sand in this location would have no adverse effect on the object represented by this anomaly, which is buried at least eight feet beneath the ocean bottom. Anomaly 29 is currently located outside the Area of Potential Effect and current work limits for sand placement, groin construction and/or rehabilitation and the offshore borrow area. The project will have no affect on the object represented by this buried anomaly (see Figures 1 through 4 in Enclosure 2).

The District is not proposing to conduct any additional investigations at this time and will not need to execute a Memorandum of Agreement/Progammatic Agreement or implement a Data Recovery Plan as anticipated in 2005 and 2013. Both wrecks will be outside the project Area of Potential Effect. To assist in protecting these areas during construction, the District has identified these sites on project plans as "environmentally sensitive areas". In addition, the specifications include prohibitions on anchoring, dragging anchors, laying pipe, or doing any activity that would disturb the ocean bottom, if the contractor crosses these areas to access the sand placement or groin rehabilitation areas.

Please review the enclosed report describing the current condition of the wrecks (Panamerican Consultants 2014). Based on the current project plans, the District has determined the project would have no adverse effect on the National Register eligible wrecks and have implemented additional protections against any indirect effects of work boats traveling over these areas to the APE. Please provide comments in accordance with Section 106 of the National Historic Preservation Act, as amended. If you or your staff require additional information or have any questions, please contact Nancy Brighton, Project Archaeologist, at (917)790-8703.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

June 24, 2015

Ms. Nancy Brighton
US Army Corps of Engineers, New York District
Room 2151
26 Federal Plaza
New York, NY 10278

Re: USACE
Long Beach Island Storm Damage Reduction Project
Shoreline of Long Beach Island, Point Lookout to the City of Long Beach Boundary
15PR02633
05PR00126 (formerly 92PR2416)

Dear Ms. Brighton:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the Long Beach Island Storm Damage Reduction Project in accordance with Section 106 of the National Historic Preservation Act of 1966. In general, we concur with the findings and recommendations of the report *Remote Sensing Survey and Dive Inspection of Two Shipwrecks and Two Anomalies in Connection with the Long Beach Storm Damage Reduction Project* prepared by Panamerican Consultants in April 2015. We agree that the Marble Wreck (SHPO Unique Site Number [USN] 05901.000450) and the possible wreck site of the *Mexico* (USN 05901.001368) both appear to be eligible for the New York State and National Registers of Historic Places.

Under the proposed workscope submitted to our office, the Marble Wreck site and possible *Mexico* site will be avoided with the designation of "Environmentally Sensitive Areas" where ocean bottom disturbance will be prohibited during construction. Based upon this review, it is the SHPO's opinion that your project will have no adverse effect on archaeological and/or historical resources listed in or eligible for the New York State and National Registers of Historic Places.

Thank you for your continuing consultation with our office. If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above. If you have any questions, please feel free to contact me at (518) 268-2192 or via email (daria.merwin@parks.ny.gov).

Sincerely,

Daria Merwin

Daria Merwin, Ph.D.
Survey and Evaluation Unit

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix G

Essential Fish Habitat (EFH)

U.S. Army Corps of Engineers
New York District

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

Peter Weppler, Acting Chief
Coastal Ecosystem Section
Planning Division
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278-0900

APR - 2014

ATTN: Robert Smith, Project Biologist
RE: Draft Environmental Assessment, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Risk Management Project – Hurricane Sandy Limited Reevaluation Report

Dear Mr. Weppler:

We have reviewed the draft environmental assessment (DEA) for the Jones Inlet to Rockaway Inlet Coastal Storm Risk Management Project dated February 2014, as well as the essential fish habitat (EFH) assessment included as an appendix to the document. The project area encompasses 6.4 miles of Atlantic Ocean shoreline along Long Beach Island, NY including the Town of Hempstead and the City of Long Beach. The DEA describes modifications made to the project since the issuance of the Record of Decision in 1998. These modifications include a 6000 linear foot (lf) reduction in the length of the project, as well as reductions in the initial and renourishment fill quantities and the acreages of dune planting and intertidal and subtidal fill. In addition, fifty-seven timber/gravel walk overs, extensions of the existing dune walkovers and vehicle access ways, four new groins, the rehabilitation of 17 existing groins and the rehabilitation and extension of the terminal groin are also planned. Material for the beach nourishment portion of the project will be dredged from an 1194-acre offshore borrow near Jones Inlet.

As you are aware, the Magnuson-Stevens Act (MSA) requires Federal agencies to consult with one another on projects such as this. Because this project affects EFH, the process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. We offer the following comments for your consideration.

Essential Fish Habitat

The EFH assessment included in the DEA evaluates the potential impacts to EFH that could result from construction of the proposed project. According to information in the DEA, you have avoided areas identified as prominent shoal habitats and "Seaside Lumps" and "Fish Havens" as part of the borrow site screening process. Overall, the dredging and placement of sand along the coastline will have adverse effects on EFH and federally managed species due to the entrainment of early life stages in the dredge, alteration or loss of benthic habitat and forage species, and altered forage patterns and success due to increased, noise, turbidity and sedimentation. We agree that some effects will be temporary and others can be minimized using some of the management practices mentioned in the EFH assessment such as dredging in the fall to avoid sensitive life stages of certain species, not dredging deep holes and leaving similar substrate in place to allow for recruitment of living marine resources.

Over the 50-year life of the project, the EFH in the project area will be adversely affected numerous times as each dredging and beach renourishment event occurs. Currently, there is no specified reporting of acres affected annually or notification to us when construction commences for each project segment or cycle. During the life of this project EFH designations may be modified, the status of a species' stock may change in a manner that warrants additional management measures, or other new information may become available that may change the basis of our EFH conservation recommendations. To ensure that we meet our joint responsibilities to protect, conserve and enhance EFH and minimize adverse effects to living marine resources and their habitats, you should notify us prior to the commencement of each dredging event so that we may confirm that the EFH determinations and EFH conservation recommendations remain valid and a full reinitiation of the EFH consultation is not required. This notification should be done prior to the solicitation of bids for the contract so sufficient time is allowed for any recommended modifications to be including in the bid documents. It should also include the location of the segment to be nourished, volumes of sand to be dredged, depth of sand to be removed and the boundaries of the dredging within the borrow area. We also request annual reporting of the acres of area dredging, volumes removed and depth of removal so that the adverse effects to EFH can be quantified on an annual basis.

We agree with and support your plans to conduct surf clam surveys prior to construction so that areas of high densities of surf clams can be identified and avoided, and included in the planned biological monitoring program. We request that you provide us with copies of the survey and sampling results so that we may monitor the recovery of the borrow area and the cumulative effects of repeated dredging in the borrow area.

Essential Fish Habitat Conservation Recommendations
Pursuant to Section 305 (b) (4) (A) of the MSA, we recommend the following EFH conservation recommendations be incorporated into the project:

1. Notification should be provided to us prior to commencement of each dredging event and should include the location of the segment to be nourished, volumes of sand to be dredged, depth of sand to be removed and the boundaries of the dredging within the borrow area.

2. Annual reporting to us of the acres of borrow area disturbed, the location of the dredging, cubic yardage removed, depth of removal and post-dredging bathymetry of the borrow area.

3. Areas of high surf clam densities within the borrow area should be avoided.

Please note that Section 305 (b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including the measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305 (b) (4) (B) of the MSA also indicates that you must explain your reasons for not following our recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate or offset such effect pursuant to 50 CFR 600.920 (k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for the above EFH conservation recommendations.

Endangered Species Act

A number of federally listed threatened or endangered species under our jurisdiction are known to occur in the vicinity of the project area. Listed sea turtles are also found seasonally in the waters off of New York, typically between from May through November, with the highest concentration of sea turtles present from June to October. The species that are likely to be present include the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead (*Caretta caretta*) sea turtles, as well as endangered Kemp's ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*) and green (*Chelonia mydas*) sea turtles. In addition, endangered Atlantic sturgeon (*Acipenser oxyrhynchus oxyrinchus*) are known to occur within the nearshore, coastal waters of the Atlantic Ocean, primarily using these bodies of water throughout the year as a migratory pathway to and from spawning, overwintering, and/or foraging grounds throughout their range.

The federally endangered North Atlantic right, humpback, and fin whales, are seasonally present in the waters off New York; however, these ESA listed species of whales are not expected to occur in the shallow, near shore waters of eastern Long Island, and thus, are not expected to occur in the action are project area.

Section 7 of the Endangered Species Act of 1973 (ESA), as amended requires federal agencies to consult with us to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or adversely modify or destroy designated critical habitat. You requested emergency ESA Section 7 consultation (50 CFR § 402.05) with us on March 22, 2013, for shoreline restoration/rehabilitation activities in need along several shorelines of New York and New Jersey, including the Atlantic coast of Long Island. Via a letter dated April 2, 2013, we formalized the emergency ESA Section 7 consultation process with you for these actions and began the emergency consultation process.[1] Pursuant to CFR § 402.05, emergency Section 7

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[1] On March 6, 2014, the New York Corps requested that we append several additional emergency actions to be covered under our April 2, 2013, letter to the Corps (pers. communication, Jenine Gallo, New York District Corps of Engineers, email dated March 6, 2014). All of these projects fall within the already-exempted ecological boundaries

consultation shall be initiated by you as soon as practicable after either: (1) the emergency response is completed (preferably within 30 days) or (2), the emergency is under control. neither of these triggers for the initiation of consultation has been met, the emergency consultation remains open for this action. We look forward to continued coordination with your office on this and other emergency projects covered under the April 2, 2013, letter. Should you have any questions about the emergency ESA Section 7 process, or ESA section consultation in general, please contact Danielle Palmer at (978) 282-8468 or by e-mail (Danielle.Palmer@noaa.gov).

We look forward to continued coordination with your office on this project as it moves forward. If you have any questions or need additional information, please do not hesitate to contact Karen Greene at karen.greene@noaa.gov or (732) 872-3023.

Sincerely,

Louis A. Chiarella,
Assistant Regional Administrator
for Habitat Conservation

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along both the New York and New Jersey Sandy-impacted shorelines identified by project name in the April 2013 letter, however they were not specifically identified by the Corps by name or specific congressional authorization at the time the 2013 letter was written either due to a lack of transparency about the application of the new law (P.L. 113-2 was only recently interpreted by USACE-HQ) and/or due to the identification and/or acceleration of certain reaches or segments of some projects ((pers. communication, Jenine Gallo, New York District Corps of engineers, email dated 3/6/2014). The Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, project was included in this list provided to us on March 6, 2014.

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

February 27, 2014

Mr. Christopher Boelke
Field Office Supervisor
NOAA/NMFS/Habitat Conservation Division
55 Great Republic Drive
Gloucester, MA 01930-2276

Subject: **Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project**

Dear Mr. Boelke:

With the passage of the Hurricane Sandy Disaster Relief Appropriations Act of 2013 (Public Law 113-2), the U.S. Army Corps of Engineers has been given the authority and funding to complete ongoing coastal storm damage risk reduction projects and studies in the Northeast. As part of the planning and implementation process for the Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project, the New York District has been updating engineering and design efforts, physical surveys, and environmental compliance.

We would like to initiate coordination on an Essential Fish Habitat (EFH) report for the above project in accordance with the Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267) in September 2005. This letter is a request for your office to provide an EFH assessment. Please find attached the updated plans and specifications and project description for your review. The District recognizes your heavy workload and appreciates your prompt response to the project description and the required funding to complete your reassessment. Please review the information and provide any comments regarding any new potential project impacts on Essential Fish Habitat.

I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917 790-8729.

Sincerely,

Leonard Houston
Chief, Environmental Analysis Branch

Attachments

Introduction

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), the New York District, U.S Army Corps of Engineers, is providing this assessment of the potential effects of beach renourishment, the rehabilitation of 17 groins and the construction of six new groins (two deferred) as part of the Storm Damage Reduction Project, Project area, NY on Essential Fish Habitat (EFH). The renourishment requires the dredging of an intermediate borrow area offshore of the proposed construction location. The National Marine Fisheries Service (NMFS) has identified EFH within two 10-minute x 10-minute squares (Table 3). The study area contains EFH for various life stages for 27 species of managed fish.

The councils, with assistance from NMFS, are required to delineate "essential fish habitat" for all managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The regulations further clarify EFH by defining "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish (either currently or historically) and their associated physical, chemical, and biological properties; "substrate" to include sediment, hard bottom, and structures underlying the water; and, areas used for spawning, breeding, feeding, and growth to maturity" to cover a species' full life cycle. Prey species are defined as being a forage source for one or more designated fish species, and the presence of adequate prey is one of the biological properties that can make a habitat essential. Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH. According to NMFS, the contents of an EFH assessment should include:

1) A description of the proposed action;
2) Analysis of the effects (including cumulative) of the proposed action on EFH, the managed fish species, and major prey species;
3) The federal agency's views regarding the effects of the action on EFH; and,
4) Proposed mitigation, if applicable.

This EFH assessment includes:

- a description of the proposed action;
- a description of the existing environment;
- a listing of EFH-designated species and life history stages for the three zones covered in this assessment;
- a summary of the diets and feeding habits of EFH species that are known or suspected to occupy proposed nearshore borrow areas in Long Beach;
- an analysis of the potential direct and indirect impacts of sand mining on EFH in the Borrow area;
- recommendations for minimizing potential impacts;
- a plan for monitoring changes benthic prey populations;

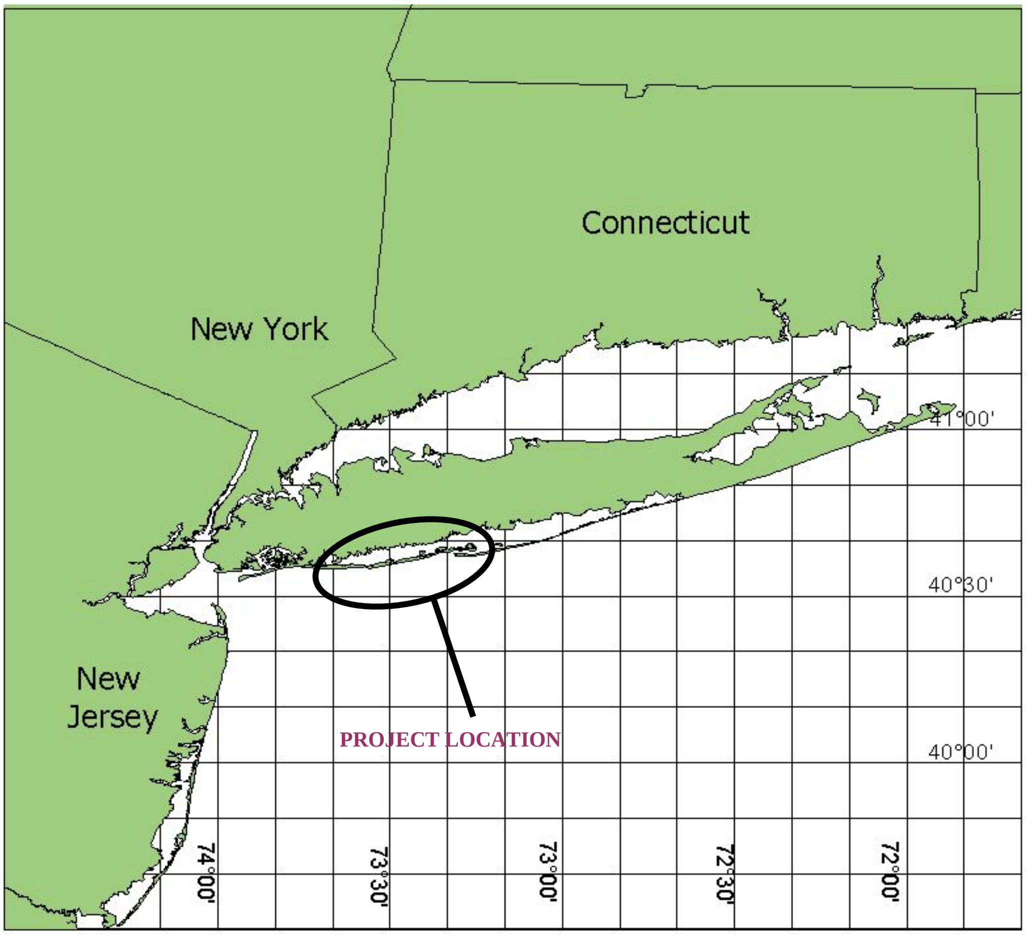


FIGURE 1

This EFH assessment includes all pelagic and benthic fish habitat in off of Project area 1,000 feet seaward of mean low water (MLW) and coastal and open Atlantic Ocean. This EFH assessment considers the effects that sand mining and placement could have on EFH within the Project area borrow area and project.

Project History and Authorization

The U.S. Army Corps of Engineers (USACE), New York District (District), is proposing to implement a cost-effective solution designed to restore the shoreline and provide shoreline protection for Project area, a barrier island located between Jones Inlet and East Rockaway Inlet, in Nassau County, New York (Figure 1). The Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Project area, New York Storm Damage Reduction Project (Project), covers approximately 6.7 miles (of which 6.4 miles represents protection provided by the selected plan) of oceanfront along Project area, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach.

In 1965, the USACE evaluated various storm protection options for the area and presented findings in the Beach Erosion Control and Interim Hurricane Study for the Atlantic Coast of Long Island, New York: Jones Inlet to East Rockaway Inlet (USACE 1965). Local interests did not support the plan and the project was terminated in 1971. Since that time, beach erosion and storm damage have continued in the area. At the request of the local interests following Hurricane Gloria in 1985, the USACE conducted a Reconnaissance Study (completed in 1989), and subsequently a Feasibility Study (completed in February of 1995), to evaluate an array of structural and non-structural measures to provide flood and storm protection for the Project area (USACE 1989, 1995, 1998, 1999).

As a result of the Feasibility Study, several alternatives were evaluated and a final plan was selected. The plan, as presented in the Final Feasibility Study and Final Environmental Impact Statement (FEIS) for the Project, included widening of the existing beach with the hydraulic placement of beach fill material, rehabilitation of 16 groins at Long Beach, construction of six new groins west of Point Lookout at Lido Beach, and construction/rehabilitation of numerous dune walkovers and dune access points (USACE 1995, 1998). The December 1998 Record of Decision (ROD) (filed in the Federal Register, January 1999) granted approval of the plan as presented in the 1998 FEIS and was signed on December 23, 1998.

Subsequent to the 1998 release of the FEIS for the Project, the proposed alternative was re-evaluated. The re-evaluation was conducted to address changes to the shoreline since the 1998 evaluation and changes in the Project scope (i.e., a reduction in the size of the Project area), and to address environmental concerns expressed by agencies and/or interest groups (USACE 1998). Furthermore, this re-evaluation allowed incorporation of advancements in engineering evaluation methods. As a result of project re-evaluation, several modifications were made to the plan that was selected in 1998 and are presented in the 2013 EA (USACE 2013). The proposed Project modification is intended to provide a long-term, cost-effective solution for reducing erosion and maintaining the protective dune and beach berm in this area.

When compared to the original Project that was presented in the 1998 FEIS and approved through a Record of Decision in 1999, the proposed Project modification includes several new structural features and activities that are in addition to those proposed in the original Project (Table 1). The currently proposed Project represents a modification to the original approved Project that has reduced the overall amount of beach fill, dune fill, dune plantings, sand fence, and fill required for renourishment activities. In addition, the proposed project modification also has excluded most Project activities within a 136-acre shorebird foraging/nesting area. Although, the Project has increased the number of proposed boardwalk walkovers and vehicular ramps and now includes a 100-foot extension of groin 58 (i.e., East Groin), these changes are overall insignificant relative to the original approved Project and will have no significant negative environmental impacts.

In the 1995 FEIS, it was determined that offshore, near shore and onshore components of the Project could potentially cause some minor adverse impacts to water quality, aquatic habitats and species (i.e., benthic organisms, fish and their habitat), potential threat to several endangered marine and terrestrial species (i.e., sea turtles, piping plover, sea beach amaranth), cultural resources (i.e., shipwrecks), and socio-economic impacts to recreational activities during construction (i.e., noise and restrictions to construction areas). Similar potential impacts are likely under the currently proposed Project. However, it is the physical extent (i.e., acreage of impacts) that has changed which translates to less overall impacts throughout the Project area relative to the original approved Project. No significant negative impacts, in addition to those described in the 1995 FEIS and highlighted below, are expected from the currently proposed Project modification. No new natural resources or endangered species have been identifying within the project area since the 1995 EIS.

The District has concluded that, similar to the original Project, the Project modification will still result in some short-term negative impacts to water quality, terrestrial and aquatic habitats and the species that utilize the habitats. There also is a possibility that cultural resources could be affected, however, studies to determine potential impacts are ongoing at this time. In addition, it has been determined that the proposed Project would exceed the Federal de minimis thresholds for NO_x air emissions and we are working with the state to obtain air credits to offset these impacts.

Impacts to other environmental resources in the proposed Project Area are expected to be minor and less than those that would have resulted from the original Project. Specifically, the modification will include the placement of unvegetated hard structures (buildings, groins, and beach access walkovers, ramps) in dune/upper beach, intertidal, and subtidal areas. These structures will permanently cover the substrate beneath the footprint and non-mobile benthic species and will limit the use of the area directly within the structure footprint for foraging by shorebirds and wading birds and some fish species. However, these impacts are not significant because of the followng: affected species will utilize other suitable habitat for foraging activities; the existing upper beach and dune areas in these locations are currently of relatively low value to most wildlife species and do not support any Federal or state-listed species; the direct loss of benthic species and vegetation will be minimal and would not affect populations; and groins are likely to reduce the overall rate of beach loss and erosion in the Project Area and will increase the forage base for many fish species by increasing invertebrate biomass. The changes in the conditions of the resources are not significant, and the proposed impacts on these resources as a result of the authorized project are not significantly different than those described in the FEIS which was approved for the original Project (USACE 1998).

The use of BMP construction procedures and mitigation measures, pre-construction surveys for species of special concern in the Project Area, post-construction surveys to monitor affects of groins on coastal processes and species, and avoidance of key breeding/nesting and spawning periods, will reduce potential for negative impacts. Furthermore, implementation of the proposed Project will have significant overall beneficial impacts to the environment and surrounding communities, including benefits to aquatic habitats and species, an increase in the availability of suitable habitat for Federal and state-listed species and a diversity of shorebird communities, improved shoreline stabilization and flood protection, and recreational opportunity.

Based on a thorough evaluation of potential impacts performed for the 1998 FEIS and this SEA, it has been determined that with the exception of anticipated high NO_x emission levels, there will be no significant adverse impacts due to implementation of the proposed Project modification. Comments from agencies and interested parties have been addressed and all practicable means to avoid or minimize adverse environmental effects have been incorporated into the recommended plan.

Purpose of Proposed Project

The purpose of the Project modifications are:
1) To reduce the threat of future damage to the shoreline due to wave attack, recession, and inundation from storms;
2) Mitigate or prevent the effect of long-term erosion;
3) Provide an economically justified plan;
4) Preserve, restore, and maintain existing ecological resources and habitats for native fish and wildlife, where possible; and,
5) Preserve or mitigate for the loss of historical, archaeological, and cultural resources in the Project area, if present.

Modifications to the Proposed Action

The recommended plan for this Project includes the preferred plan (identified in the 1995 Feasibility Report and subsequent 1998 FEIS filing) with post-Feasibility modifications as detailed in the EA (USACE 2013). The recommended plan provides the most comprehensive, effective, and cost-effective solution to provide storm protection in the Project area.

The proposed action is a modification to the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Island of Long Beach, New York Storm Damage Reduction Project that received a favorable Record of Decision (ROD) in 1998. When compared to the original Project, the Project modification entails an overall reduction in the Project area, which results in a reduction of 6,000 linear feet (lf) of project area, a reduction of 4,072,000 cy of fill material needed for initial beach fill and 341,000 cy per yr for renourishment activities, a reduction of five acres (ac) of dune plantings and a reduction of 15,000 lf of sand fence. Specifically, there will be a reduction of 110 ac of filling in the upper beach zone, 39 fewer acres of filling in the intertidal zone, and 35 fewer acres of filling in the sub-tidal zone.

The selected storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 If of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East

Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H (1V:H3 on landward slope fronting the boardwalk) that will extend along the entire project area; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 lf of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Total sand fill quantity of 4,720,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); 5) planting of 34 acres of dune grass and installation of 75,000 lf of sand fence

In addition to the decrease in the size of the Project Area and the amount of sand material required for the Project, when compared to the original Project, the Project modification would result in minimal construction activities originally proposed within a 136-acre shorebird nesting/foraging area which will be excluded from the Project (Table 1). A comparison of components of the original selected plan and the proposed Project modification are shown in Table 1.

Table 1. Summary Comparison of the Original Proposed Project and the Currently Proposed Project Modifications.

Component	Original Project	Project Modification	Change
Beach fill material (for creation of beach berm, sand barrier and a dune)	41,000 linear feet (lf), some within shorebird nesting area	35,000 lf, none within shorebird nesting area	- 6,000 lf
Borrow area sand removal (i.e., total sandfill quantity, excluding 5-year renourishments)	8,642,000 cubic yards (cy)	4,720,000 cy	- 3,922,000 cy
Dune plantings	29 acres (ac)	34.0 ac	+5.0 ac
Sand fence	90,000 lf	75,000 lf	- 15,000 lf
Timber dune walkover ADA	13	12	-1
Timber Dune walkovers (from boardwalk) ADA	5	5	0
Timber Dune walkovers (from boardwalk) None ADA	0	6	+6
Timber non-ADA walkovers		23	+17
Timber Vehicle and pedestrian access from boardwalk	2	2	0

Gravel surface vehicle and pedestrian access way	2	9	+7
Extension of existing walkovers	12	8	-4
Raised timber vehicular access	1	0	-1
5-yr renourishment	2,111,000 cy/year (yr)	1,770,000 cy/yr	- 341,000 cy/yr
Rehab and 100 ft Extension of terminal groin	0	1	+ 1
New groins	6	4 (6 proposed, but 2 have been deferred)	0
Rehabilitation of existing groins	15	17	+ 2
Impacts to shorebird nesting/foraging area	136 ac	0 ac	No impacts

Beachfill

The selected storm damage reduction plan including changes from the authorized project, comprises approximately 35,000 lf of dune and beach fill and generally extends from the eastern end of the barrier island at Point Lookout to the western boundary of the City of Long Beach, including an incidental taper into East Atlantic Beach. This component of the Project includes the following: 1) a dune with a top elevation of +14 ft above NAVD, a top width of 25 ft, and landward and seaward slopes of 1V:5H (1V:H3 on landward slope fronting the boardwalk) that will extend along the entire project area; 2) in Point Lookout, a beach berm extending a minimum of 110 ft from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, then sloping at 1V:20H to intersection with existing bathymetry; 3) In the Nickerson Beach area in the Town of Hempstead, dune only (no berm) placed along approximately 5,000 lf of shoreline. Existing berm will remain undisturbed to allow for bird nesting and foraging; 4) In Lido Beach and the City of Long Beach, a stepped beach berm extending 40 ft. from the seaward toe of the recommended dune at an elevation of +9 ft NAVD, a 1V:10H slope downward to +7 ft NAVD, a 130 ft flat berm at +7 ft NAVD, then sloping 1V:30H to intersection with existing bathymetry; Total sand fill quantity of 4,720,000 cy for the initial fill placement, including tolerance, overfill and advanced nourishment (based on 2013 post-Hurricane Sandy survey); 5) planting of 34 acres of dune grass and installation of 75,000 lf of sand fence

Rehabilitation of Existing Groins

Sixteen groins were proposed for rehabilitation in the plan selected in 1998. However, the existing groins within the Project were re-evaluated in September 2003. The groins were evaluated for structural condition, sand trapping effectiveness, and planform holding effectiveness. As a result of this survey, a total of 17 groins were recommended for rehabilitation, including 15 groins in Long Beach and two groins in Point Lookout.

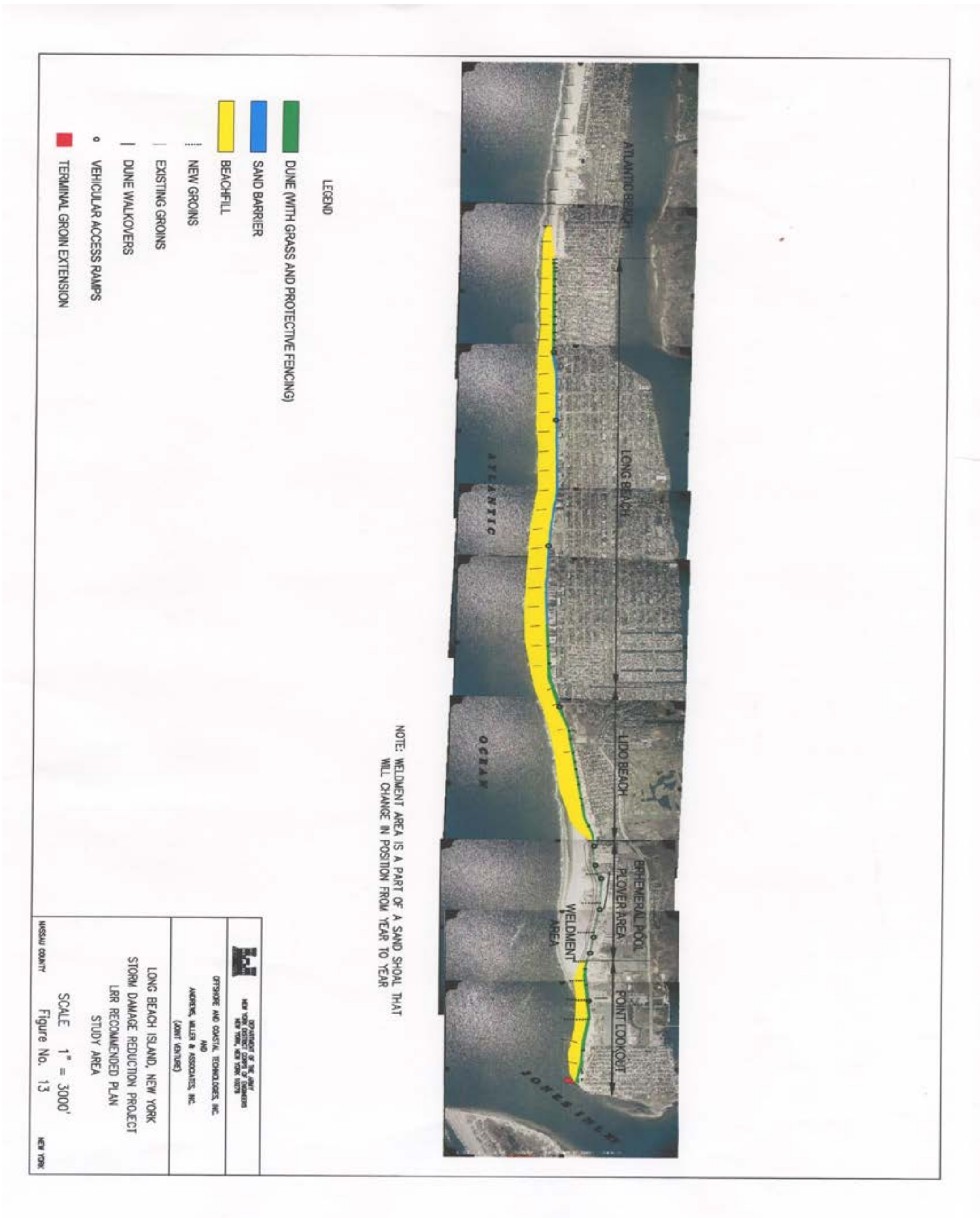
Rehabilitation was based on a condition survey of the existing groins conducted in September 2003, the plans for rehabilitation of existing groins in the Recommended Plan has been modified to include rehabilitation of those groins that were found in poor or fair condition that would be beneficial to the beach stability. Based on this evaluation, 15 of the 23 groins in the City of Long Beach and 2 groins in Point Lookout should be rehabilitated. The proposed rehabilitation would consist of repositioning existing armor stone and adding additional armor stone along the seaward 100-330 feet of each of the groins. A minimum constructible crest width of approximately 13 ft was selected with side slopes of 1V on 2H. A primary armor weight of approximately 5 tons was selected in order to approximately match the existing armor stone order to match the existing armor.

Construction of New Groins

The selected 1998 plan proposed eventual construction of seven new groins (all 765 ft long and 70 ft wide) at Point Lookout (USACE 1998). Currently only the first four groins are targeted for immediate construction, whereas the remaining three groins are proposed for deferred construction as needed based on the stability of the existing weldment area. However, based on subsequent re-evaluation of the area, some modifications to the original design of the four new groins have been proposed. The Project requires the immediate construction of a new groin field at Point Lookout that will contain seven groins that begin 800 feet west of existing Groin 55 in Point Lookout. The four groins would be constructed with tapered lengths and spaced at an interval of 800 feet (USACE 2004b). Groin lengths vary and range from 380 ft to 800 ft. Groin widths will be 13 ft.

A determination to construct the three westernmost groins will be triggered at a later date within the 50-year Project life and be based on monitoring data (USACE 2004b). The criterion for construction includes a change from an accreting beach to an eroding beach in the area where the structures are to be located (USACE 2004b). The criteria will be evaluated based upon field measurements and analysis (USACE 2004b).

Figure 2. Location of Elements Within the Project area Project Area



Point Lookout Terminal Groin Rehabilitation and Extension

During re-evaluation of the proposed Project, the USACE determined that Groin #58 (i.e., West Groin), the terminal groin in Point Lookout, required rehabilitation and extension (USACE 2004b). Accordingly, the District plans to rehabilitate the existing portion of the groin, extend the length an additional 100 feet (currently 200 ft), and extend the width to between 107 and 170 ft (currently widths range from 50 to 107 ft), in accordance with design specifications presented in the 1999 USACE Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, New York Report (Figure 2). Extending the terminal groin may decrease the amount of sediment lost toward the inlet after the beach fill component of the project is carried out (USACE 2004b). It will also possibly retain additional longshore sediment transport without causing large changes in inlet dynamics (USACE 2004b). The median armor weight for the rehabilitated and new portions of Groin #58 is approximately 10 to 10.75 tons (USACE 2004b).

Dune Walkovers and Vehicle Access Structures, and Boardwalk Extensions

Several dune walkovers, vehicle access points and boardwalk extensions are proposed for the City of Long Beach and the Town of Hempstead (USACE 2004b). Construction of these structures will allow the public to gain safe access to the beach without harming the existing and enhanced dune system.

A total of 57 timber dune walkovers (including 17 timber wheelchair accessible), 9 gravel surface vehicle and pedestrian walkovers, 29 timber non ADA compliant, two timber vehicular access ways from the boardwalk, eight extensions to existing walkovers, are currently proposed. Originally, 29 dune walkovers (both timber and gravel) and 12 vehicle access ramps were included in the selected plan (USACE 1995).

Bird Nesting and Foraging Area

The proposed Project modification has excluded Project activities from within a 93.4-acre ephemeral pool and a 42.3-acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (USACE 2005a). Project activities were proposed within this area as part of the original plan that was selected in 1995. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties (USACE 1998). As a result, construction of a beach berm within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Two new groins were originally proposed within the ephemeral pool and tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred indefinitely, and is not part of the proposed Project modification. Supplemental NEPA documentation would be prepared to address construction of the two deferred groins as appropriate. No beach fill activities will take place within the bird foraging and nesting area.

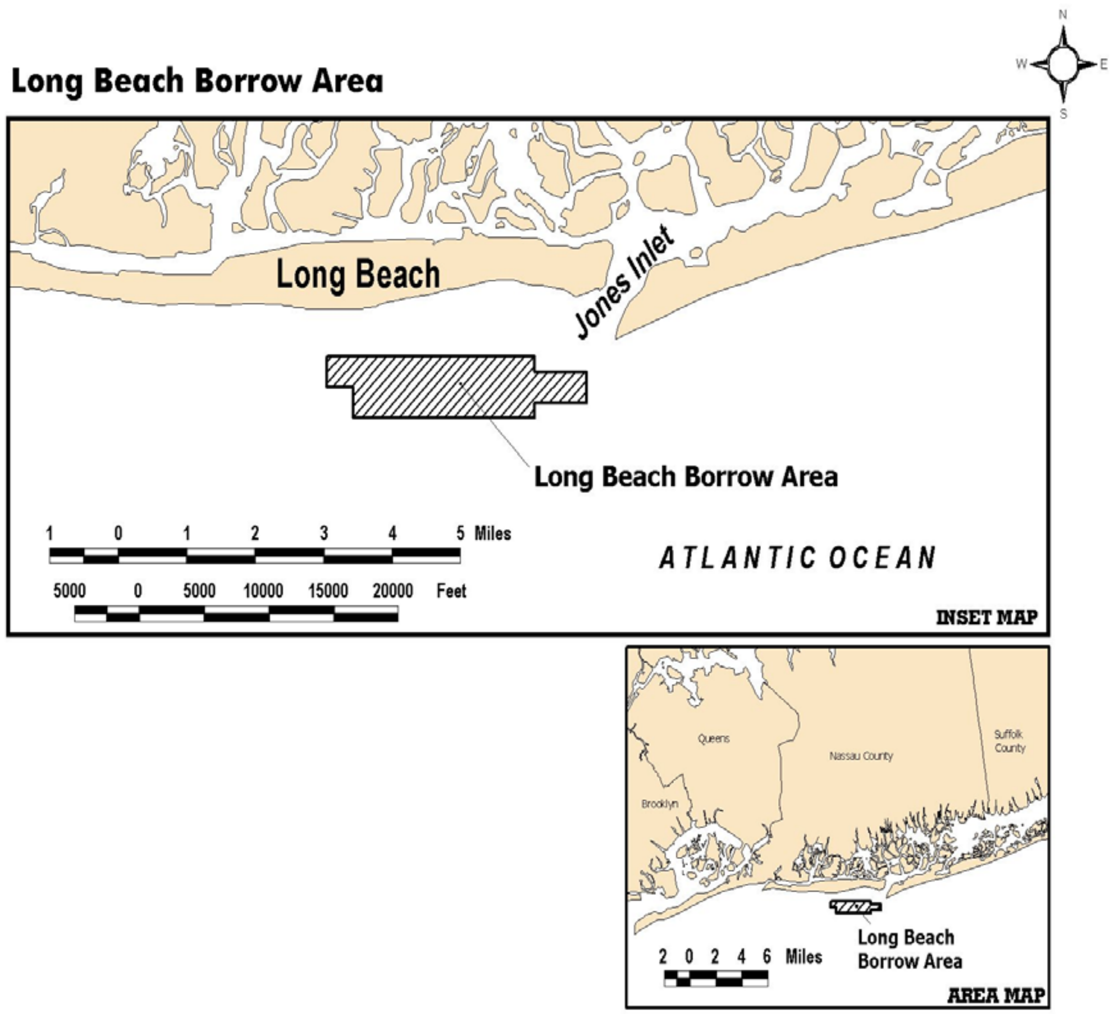
Sand Removal from Offshore Borrow Area

An offshore borrow area, located approximately 1.5 miles south of Long Beach Island (Figure 3) between 25 feet mean low water and about 60 feet mean low water, has been identified as a potential source of sand material for beach fill and dune construction activities (USACE 2004b). Approximately 4,720,000 cy of material will be removed from this area. The original plan selected in 1998 proposed 8,642,000 cy of sand removal (USACE 1998).

Habitat Characteristics – Borrow Area

The borrow site, where beach fill sediments will be dredged, is located in waters between 25 MLW to about 60 ft MLW. The sediments at the borrow site have been found to be predominantly fine to coarse sand typically with only a trace of silts. The important biological resources of this area are the benthos and fin-fisheries. This habitat supports diverse benthic fauna, which serve as prey for demersal fish species present in this area. The nearshore area provides a migratory pathway and spawning, feeding and nursery areas for many species common to the Mid-Atlantic region. Additionally, phytoplankton in this zone is an important food source for filter-feeding bivalves. A sand faunal community is found in the proposed borrow area sediments. Polychaetes worms and blue mussels are the most numerous macrobenthic organisms. The most import invertebrate is the commercially valuable surf clam (*Spisula solidissima*). Additionally, gastropods, amphipods, isopods, sand dollars, starfish, and decapod crustaceans are found in the site. Important recreational species found in the borrow area include Atlantic mackerel (S*comber scomblrus*), black sea bass (*Centropristes striatus*), winter flounder (*Psuedopleuronectes americanus*), summer flounder (*Paralichthys dentatus*) and scup (*Stenotumus chrysops*).

Figure 2



Effects on Habitat – Borrow Area

The physical effects of dredging would be the removal of existing sediments resulting in a depression or significant bathymetric low in the seafloor that may persist for several years, dependent on sediment availability and current dynamics in the area. Fine-grained sediments often collect within these lows resulting in a modified habitat for bottom-feeding benthic species, plus a change to epifaunal species that favor finer-grained sediments. In estuaries or embayments with constrained hydrodynamics, reduced bottom water flow may result in lowered dissolved oxygen levels, as could an increased organic content of muds. This may result in finfish populations avoiding this zone. Additionally, during the physical process of removing the sediments, the loss of benthic invertebrate prey species may occur. Small motile and sedentary epifaunal species (*e.g.,Polychaetes*), would be most vulnerable to hydraulic dredging, resulting in decreased prey in this area. A dynamic commercial surf clam industry is located along the south coast of Long Island, including the study zone. However, a stock assessment of the borrow area showed low surf clam population densities (USACE, 2003). However, advance notice of construction to fisherman should allow for a viable local harvest, thereby minimizing any financial impact to the industry. Additionally, allowable weekly vessel yields are tied to the NYSDEC-calculated stock size, maintaining a buffer population that protects both the resource and industry.

Due to the nature of the water quality (typically clean well-oxygenated), hydrodynamics (good tidal flow and periodic wind-driven bottom waters) and the sediments (fine-grained sands with trace quantities of silts), there should be minimal localized turbidity or decreases DO at the borrow area. Additionally, studies performed in the Lower Bay of New York Harbor have shown the benthic community structure is disrupted by dredging, but can reach a new equilibrium within 12 months (Conover *et al.*, 1995; Cerrato and Sheier, 1984).

Dredging Operation

The size of the offshore borrow area is approximately 1,194 acres; however, this entire area would not be needed for initial construction and renourishment operations, throughout the life of the project. Typically, dredging operations are configured to go no deeper than 20 feet below existing grade. Generally, dredging operations do not specifically contour slopes between the bottom contours, and the existing surface. Slopes are created by the natural slumping of material in response to the material type. As a result of dredging operations, the side slopes are expected to generally slope between 1V:3H and 1V:5H. The configuration of these side slopes would not be expected to interfere with gear used in commercial fishing operations. Based upon the available material within the borrow area, dredging operations could be configured as 5 to 10 foot dredge depths, and still allow for sufficient material for dredging operations. To determine the worst-case for impacts the physical, maximum area of disturbance was considered for initial construction 262 acres with a 33-advance fill.

The use of a cutterhead suction dredge will be the type of equipment used to gather the material and place it on the beach. There are two main components of a cutter suction dredger; the cutterhead and the dredging pump. The cutterhead, which is situated at the entrance of the suction pipe, is used to agitate soft materials or to cut harder materials in order that they may be in a suitable state for removal by hydraulic means.

The cutters are usually rotated at between 10 and 30 rpm, and the rotary motor is located either directly behind the cutter in a submersible drive unit, or with the main power unit of the dredger. The dredging pump in the body of the dredger creates a vacuum in the suction pipe and draws the material up the pipe and through the pump. The material is then discharged by being pumped through a pipeline.

When in operation the cutter suction dredger makes use of two stern spuds, which are arranged to allow the dredger to advance in steps towards the dredging face. In each dredging position the dredger is swung from side to side by means of side wires. The cutter suction dredger is connected to the shore by floating pipelines and this must be arranged so as to allow the dredger to advance forward as far as possible without having to stop dredging.

Effects on Designated EFH Species in Project Area

Summary of Essential Fish Habitat (EFH) Designation

Two 10’ x 10’ Square Coordinates:

Boundary	North	East	South	West
Coordinate	40 ☐ 40.0	73 ☐ 30.(	40 ☐ 30.0	73 ☐ 40.(
Boundary	North	East	South	West
Coordinate	40 ☐ 40.0	73 ☐ 40.(	40 ☐ 30.0	73 ☐ 50.(

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay affecting the following: south of Jones Beach State Park, East Bay, Great I., Deep Creek Meadow, Sloop Channel, Cuba I., Big Crow I., Jones Inlet, Garrett I., Meadow I., High Meadow, Sea Dog I., Baldwin Bay, Merrick Bay, Middle Bay, Island Park, NY., eastern Long Beach, NY., Point Lookout, NY., Wantaugh Bellmoe, NY., Freeport, NY., Rockville Center, NY., Baldwin, NY., Lynbrook, NY., East Rockaway, NY., Smith Meadow, NY., Pettit Marsh, western Hempstead Bay, and Oceanside, NY. Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: Western Long Beach, NY., Hewlett, NY., Woodmere, NY., Cedarhurst, NY., Lawrence, NY., Inwood, NY., Far Rockaway, NY., East Rockaway Inlet, eastern Jamaica Bay, Brosewere Bay, Grassy Bay, Head of Bay, Grass Hassock Channel, eastern Rockaway Beach, Atlantic Beach, Howard Beach, J. F. K. International Airport, Springfield, NY., and Rosedale, NY., along with many smaller islands.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic salmon *(Salmo salar)*				X
Atlantic cod *(Gadus morhua)*				
haddock *(Melanogrammus aeglefinus)*				
pollock *(Pollachius virens)*			X	
whiting *(Merluccius bilinearis)*	X	X	X	
offshore hake *(Merluccius aProject areadus)*				
red hake *(Urophycis chuss)*	X	X	X	
witch flounder *(Glyptocephalus cynoglossus)*				
winter flounder *(Pleuronectes americanus)*	X	X	X	X

yellowtail flounder *(Pleuronectes ferruginea)*				
windowpane *(Scopthalmus aquosus)*	X	X	X	X
American plaice *(Hippoglossoides platessoides)*				
ocean pout *(Macrozoarces americanus)*				
Atlantic sea scallop *(Placopecten magellanicus)*				
Atlantic sea herring *(Clupea harengus)*			X	X
monkfish *(Lophius americanus)*	X	X		X
bluefish *(Pomatomus saltatrix)*			X	X
long finned squid *(Loligo pealei)*	n/a	n/a	X	
short finned squid *(Illex illecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus triacanthus)*	X	X	X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X
summer flounder *(Paralicthys dentatus)*			X	X
scup *(Stenotomus chrysops)*	n/a	n/a	X	X
black sea bass *(Centropristus striata)*	n/a		X	X
surf clam *(Spisula solidissima)*	n/a	n/a		
ocean quahog *(Artica islandica)*	n/a	n/a		
spiny dogfish *(Squalus acanthias)*	n/a	n/a		
tilefish *(Lopholatilus chamaeleonticeps)*				
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X
sand tiger shark *(Odontaspis taurus)*		X		
blue shark (*Prionace glauca)*				X

dusky shark *(Charcharinus obscurus)*		X		
sandbar shark *(Charcharinus plumbeus)*		X	X	X
tiger shark *(Galeocerdo cuvieri)*		X		
Winter Skate			X	X
Little Skate			X	X

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

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

Since mining of sand in shoals may result in a significant habitat alteration, it is proposed that these areas be avoided or the flatter areas surrounding the prominent shoals be mined. Prominent shoal habitat was avoided as part of the borrow site screening process. This was accomplished by avoiding sites with prominent shoal habitat such as the "Seaside Lumps" and "Fish Heaven", which are considered important sport and commercial fishing grounds (Long and Figley, 1982). Other physical alterations to EFH involve substrate modifications. An example would be the conversion of a soft sandy bottom into a hard clay bottom through the removal of overlying sand strata. This could result in a significant change in the benthic community composition after recolonization, or it could provide unsuitable habitat required for surf clam recruitment or spawning of some finfish species. This could be avoided by correlating vibracore strata data with sand thickness to restrict dredging depths to avoid exposing a different substrate. Based on vibracore data, dredging depths would be considered to minimize the exposure of dissimilar substrates.

Habitat Utilization of Identified EFH Species for Representative Life Stages

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic Salmon (*Salmo salar)* (Bigelow, 1963)				**Habitat**: Pelagic in Mid-Atlantic **Prey:** herring, alewives, smelts, capelin, small mackerel, sand lace, and small codshellfish.
Whiting (*Merluccius bilinearis)* (Morse et al. 1998)	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-150 m.	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-130 m. (Morse et al. 1998)	**Habitat:** Bottom (silt-sand) nearshore waters in preferred depths from 150-270 m in spring and 25-75 m in fall. **Prey:** fish, crustaceans (euphasids, shrimp), and squids (Morse et al. 1998)	
Red hake *(Urophycis chuss)* (Steimle et al. 1998)	**Habitat:** Surface waters, May – Nov.	**Habitat:** Surface waters, May –Dec. Abundant in mid-and outer continental shelf of Mid-Atl. Bight. **Prey:** copepods and other microcrustaceas under floating eelgrass or algae.	**Habitat:** Pelagic at 25-30 m and bottom at 35-40 m. Young inhabit depressions on open seabed. Older juveniles inhabit shelter provided by shells and shell fragments. **Prey:** small benthic and pelagic crustaceans (decapod shrimp, crabs, mysids, euphasiids, and amphipods) and polychaetes).	
Pollock (Pollachius virens) (Fahay, 1998)			**Habitat:** Bottom (rocks, pebbles, or gravel) winter for Mid-Atlantic **Prey:** shellfish, crabs, and other crustaceans (amphipods) and polychaetes, squid and fish (capelin redfish, herring, plaice, haddock	
Winter Flounder (Pseudopleuronectes americanus) (Pereira et. al., 1998)	**Habitat:** Been reported as sand, muddy sand,	**Habitat:** arvae are found inshore **Prey:**Nauplii, invertebrate	**Habitat:** Young of the year (YOY) are demersal, nearshore low	**Habitat:** Demersal offshore (in spring) except when spawning where they are in shallow inshore waters (fall). **Prey:** Amphipods, Polychaetes,

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	mud and gravel, although sand seems to be the most	eggs, protozoans, polychaetes	(primarily inlets and coves) energy shallows with sand, muddy sand, mud and gravel bottoms. **Prey:** YOY Amphipods and annelids JUV – Sand dollar, Bivalve siphons, Annelids, Amphipods	Bivalves or siphons, Capelin eggs, Crustaceans
Windowpane *(Scopthalmus aquosus)* (Chang, 1998)	**Habitat:** Surface waters <70 m, Feb-July; Sept-Nov.	**Habitat:** Initially in pelagic waters, then bottom <70m,. May-July and Oct-Nov. **Prey:** copepods and other zooplankton	**Habitat:** Bottom (fine sands) 5-125m in depth, in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae	**Habitat:** Bottom (fine sands), peak spawning in May , in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae
Atlantic mackerel (*Scomber scombus)*	**Habitat:** Eggs pelagic, distributed at depths ranging from 10- 325 m, majority from 30- 70 m; depth varies with season, egg diameter, thermocline.	**Habitat:** Most distributed at depths from 10-130 m, usually at < 50 m. Depth varies diurnally, also with age and with thermocline; i.e., newly hatched larvae found between 5-10 m during the day, however, as they grow they're at depths closer to the surface.	**Habitat:** Depth varies seasonally. Offshore in fall, most abundant at ~ 20-40 m, range from 0-320 m. In winter, 50-70 m. Spring, although dispersed through water column, concentrated 30-90 m. Move higher in summer to 20-50 m, range from 0-210m.	**Habitat:** Depth changes seasonally, perhaps influenced by prey availability. Fall: 10-340 m, > 50% at 60-80 m. Winter: ~ 50% at 20-30 m. Spring: down to 380 m, ~ 25% at 60-170 m. Summer: > 60% at 50-70 m. Larger fish deeper than smaller ones. Distribution may also be correlated with downwelling events and onshore advection of warm surface water.
Atlantic sea herring *(Clupea harengus)* (Reid et al., 1998)			**Habitat:** Pelagic waters and bottom, < 10 C and 15-130 m depths **Prey:** zooplankton (copepods, decapod larvae, cirriped larvae, cladocerans, and pelecypod larvae)	**Habitat:** Pelagic waters and bottom habitats; **Prey:** chaetognath, euphausiids, pteropods and copepods.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Monkfish *(Lophius americanus)* (Steimle et al., 1998)	**Habitat:** Surface waters, Mar. – Sept. peak in June in upper water column of inner to mid continental shelf	**Habitat:** Pelagic waters in depths of 15 – 1000 m along mid-shelf also found in surf zone **Prey:** zooplankton (copepods, crustacean larvae, chaetognaths)		
Bluefish *(Pomatomus saltatrix)*			**Habitat:** Pelagic waters of continental shelf and in Mid Atlantic estuaries from May-Oct.	**Habitat:** Pelagic waters; found in Mid Atlantic estuaries April – Oct.
Long finned squid *(Loligo pealei)*	n/a	n/a	**Habitat:** Inhabit upper 10 m at depths of 50-100 m on continental shelf. Found in coastal inshore waters in spring/fall, offshore in winter. Migrate to surface at night. Ontogenetic descent: at 45 mm, chromatophores are concentrated on dorsal rather than ventral surface, indicating a change from inhabiting surface waters to demersal lifestyle. **Prey:** Primary prey varies with size: < 4.0 cm: plankton, copepods; 4.1-6.0 cm: euphausiids, arrow worms; 6.1-10.0 cm: crabs, polychaetes, shrimp. Cannibalism observed in specimens larger than 5 cm ML (small *Illex illecebrosus* were found in 49 of 322	

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			Loligo stomachs).	
Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*	**Habitat:** Surface waters from continental shelf into estuaries and bays; collected to about 60 m deep in shelf waters. Common in high salinity zone of estuaries and bays from MA through VA. MARMAP Survey: collected in surface waters in 10- 1250 m of water.	**Habitat:** Surface waters from continental shelf into estuaries and bays; collected to about 60 m deep in shelf waters; common in high salinity zone of estuaries and bays; may spend day deeper in the water column and migrate to the surface at night. MARMAP Survey: collected in surface waters in water 10-1750 m deep.	**Habitat:** Pelagic waters in 10 – 360 m **Prey:** Feed mainly on planktonic prey, including thaliaceans, squids, copepods, amphipods, decapods, coelenterates, polychaetes, small fishes, and ctenophores.	**Habitat:** From surface waters to depths of 270-420 m on continental shelf; into coastal bays and estuaries; common in inshore areas, including the surf zone, and in high salinity and mixed salinity zones of bays and estuaries. NEFSC Trawl Survey: collected on continental shelf in 10-360 m of water; most collected in < 180 m. **Prey:** Feed mainly on planktonic prey, including thaliaceans, squids, copepods, amphipods, decapods, coelenterates, polychaetes, small fishes, and ctenophores.
Summer flounder *(Paralicthys dentatus)*			**Habitat:** Demersal waters (mud and sandy substrates)	**Habitat:** Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, offshore in cold months
Scup *(Stenotomus chrysops)*	n/a	n/a	**Habitat:** Demersal waters	**Habitat:** Demersal waters offshore from Nov – April
Black sea bass *(Centropristus striata)*	n/a		**Habitat:** Demersal waters over rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas and wintere off shore at depths of 1-38 m in shell beds and shell patches	**Habitat:** Demersal waters over structured habitats (natural and man-made), and sand and shell areas and winters off shore at depths of 25-50 m in shell beds and shell patches.
Sand tiger shark (*Odontaspis Taurus*)		**Habitat:** Shallow coastal waters, bottom or demersal		
Ocean quahog *(Artica islandica)*	n/a	n/a		
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
King mackerel *(Scomberomorus cavalla)*	**Habitat:** Pelagic waters with sandy shoals of capes	**Habitat:** Pelagic waters with sandy shoals of capes	**Habitat:** Pelagic waters with sandy shoals of capes	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	ocean-side waters from the surf to the shelf break zone
Spanish mackerel *(Scomberomorus maculates)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Cobia *(Rachycentron canadum)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Dusky shark *(Charcharinus obscurus)*		**Habitat:** Shallow coastal waters		
Sandbar shark *(Charcharinus plumbeus)*		**Habitat:** Shallow coastal waters	**Habitat:** Coastal and pelagic waters	**Habitat:** Shallow coastal waters
Tiger shark *(Galeocerdo cuvieri)*		**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters	**Habitat:** This sharks inhabits coastal waters close to shore to outer continental shelf and offshore including oceanic island groups.
Little skate (Leucoraja erinacea) (NEFMC 2004)			**Habitat:** bottom habitats with a sandy or gravelly substrate or mud, generally found from the shore to 137 meters, with the highest abundance from	**Habitat:** bottom habitats with a sandy or gravelly substrate or mud within the same range as the juveniles

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			73-91 meters. Most juveniles are found between 4-15 □C	
Winter skate (Leucoraja ocellata) (NEFMC 2004)			sand and gravel or mud. shoreline to about 400 meters and are most abundant at depths less than 111 meters. The temperature range for these skates is from -1.2 □ 21 □C, w most found from 4-16 □C, depending on the season.	**Habitat:** sand and gravel or mud substrate.found shoreline to 371 meters, but are most abundant at less than 111 meters. The temperature range is also very similar, with a range from –1.2 □ 20 □C, with m and from 5-15 □C.

Biological impacts on EFH are more indirect involving the temporary loss of benthic food prey items or food chain disruptions. The following table provides a brief description of direct or indirect impacts on the designated Federally managed species and their EFH with respect to their life stage within the designated EFH squares that encompasses the entire project impact area.

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

Table 2 - Direct and Indirect Impacts on Identified EFH Species for Representative Life Stages

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
1. Atlantic Salmon *(Salmo salar)*				**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts**: Minor indirect adverse effects on food chain through disruption of benthic community, however, salmon are highly migratory
2. Whiting (Merluccius bilinearis)	Eggs are pelagic and are concentrated in depth of 50 – 150 meters, therefore no direct or indirect effects are expected.	Larvae are pelagic and are concentrated in depth of 50 –150 meters, therefore no direct or indirect effects are expected.	**Direct:** Occur near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	
3. Red hake *(Urophycis chuss)*	Eggs occur in surface waters; therefore, no direct or indirect effects are expected.	Larvae occur in surface waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	
4. Pollock (Pollachius virens)			**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirec**t: Temporary disruption of benthic food prey organisms	
5. Winter flounder (Pseudop*leuronectes americanus*)	Eggs are demersal in very shallow waters of coves and inlets in Spring. Dredging may have some effect on eggs if construction occurs during Spring.	Larvae are initially planktonic, but become more bottom-oriented as they develop. Potential for some to become entrained during dredging in borrow areas.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
6. Windowpane flounder *(Scopthalmus*	Eggs occur in	Larvae occur in pelagic	**Direct:** Physical habitat	**Direct:** Physical habitat

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
aquosus)	surface waters; therefore, no direct or indirect effects are expected.	waters; therefore, no direct or indirect effects are expected.	in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
7. Atlantic Mackerel *(Scomber scombrus*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Juvenile mackerel are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms
8. Atlantic sea herring *(Clupea harengus)*			**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** None, prey items are planktonic	**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** None, prey items are primarily planktonic
9. Monkfish *(Lophius americanus)*	Eggs occur in surface waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.		
10. Bluefish *(Pomatomus saltatrix)*			**Direct:** Juvenile bluefish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Adult bluefish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
11. Long finned squid *(Loligo pealei)*	n/a	n/a	**Direct:** squid tend to be demersal during the day and pelagic at night (Hammer, 2000). There is a potential for entrainment.	
12. Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
13. Atlantic butterfish *(Peprilus tricanthus)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Juvenile butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	Indirect Impacts: None anticipated.		disruption of benthic food prey organisms.	relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
14. Summer flounder *(Paralicthys dentatus)*			**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
15. Scup *(Stenotomus chrysops)*	N/a	n/a	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
16. Black sea bass *(Centropristus striata)*	N/a		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some mortality of juveniles could be expected from entrainment into the dredge. Some intertidal and subtidal rocky habitat may be impacted due to sand partially covering groins and potential shipwrecks along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some intertidal and subtidal rocky habitat may be impacted due to sand partially covering groins and potential shipwrecks along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.
17. Sand tiger shark *(Odontaspis taurus)*		**Direct:** Physical habitat in borrow site should remain basically similar to predredge conditions. Mortality from dredge unlikely because embryos are reported up to 39 inches in length (. Therefore, the newborn may be mobile enough to avoid a dredge or placement areas.		

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
		Indirect: Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
18. Ocean quahog *(Artica islandica)*	n/a	n/a		
19. Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
20. King mackerel *(Scomberomorus cavalla)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
21. Spanish mackerel *(Scomberomorus maculatus)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
22. Cobia *(Rachycentron canadum)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
23. Dusky shark *(Charcharinus obscurus)*		**Direct:** Physical habitat in borrow site should remain basically similar to predredge conditions. Mortality from dredge unlikely because embryos are reported up to 3 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
24. Sandbar shark *(Charcharinus plumbeus)*		**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of larvae	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Juveniles are mobile and are	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults are highly mobile and are

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
		may be possible from entrainment into the dredge or burial in nearshore, but not likely since newborns are approx. 1.5 ft in length (pers. conv. between J. Brady-USACE and H.W. Pratt-NMFS) and are considered to be mobile. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
25. Tiger shark *(Galeocerdo cuvieri)*		Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Mortality from dredge or fill placement unlikely because newborn are reported up to 1.5 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
26. Little Skate			**Direct:** Juvenile skate are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
27. Winter Skate			**Direct:** Juvenile butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.

*Sharks are neonate = larvae

Of the 27 species identified with Fishery Management Plans, the proposed project could have immediate direct impacts on habitat for winter flounder eggs and larval stages and entrainment of juvenile black sea bass, whiting, red hake, pollock, winter flounder, windowpane, atlantic sea herring, long finned squid, summer flounder, and scup. This is attributable to the benthic or demersal nature of these species and their affected life stages. However, the affect on benthic food-prey organisms present in the borrow areas and sand placement areas is considered to be temporary as benthic studies have demonstrated recolonization following dredging operations within 13 months to 2 years. Minor elevation differences resulting from dredging may even serve to enhance bottom habitat for a number of these species.

Published information on life history and habitat requirements for EFH-designated species or life history stages that were not collected in bottom trawl surveys of the borrow areas was compiled in order to provide a more complete listing of species to include in this assessment. Based on this information the following EFH-designated species and life history stages were identified as probable occupants of the borrow area:

- Adult scup are often caught over soft, sandy bottoms (Steimle *et al*. 1999a) and most scup occupying Sandy Hook Bay in the summer are young adults (Wilk and Silverman 1976);
- Adult butterfish are common in nearshore open coastal areas, including the surf zone, and occur in sheltered bays and estuaries in the mid-Atlantic region during the summer (Cross *et al*. 1999);
- Juvenile and adult Atlantic mackerel (*Scomber scombrus*) are found in bays and estuarine waters from New Jersey to Canada and are common in saline waters of the PROJECT AREA in the spring and fall (Studholme *et al*. 1999);
- Adult Atlantic herring are common in PROJECT AREA in the winter and early spring (Reid *et al*. 1999);
- Adult and early juvenile sandbar sharks (*Charcharinus obscurus*) can occur in shallow, intertidal waters and bear live young in shallow bays and estuaries of the east-central U.S. in the summer (Compagno 1984);
- Juvenile red hake are found in Sandy Hook Bay during the spring and early summer, in much reduced numbers (Able and Fahay 1998) and Reid *et al.* (1979) suggest that juveniles in Long Island Sound prefer silty, fine sand sediments;
- Adult hake occur in the project area during the cooler months (Stone *et al.* 1994) and are abundant in offshore waters of Raritan Bay (Wilk *et al.* 1998);
- Adult Atlantic herring occupy mid-Atlantic continental shelf waters in the winter and early spring;

The species and life history stages that are not believed to occupy the proposed borrow areas are king mackerel juveniles and adults, adult spanish mackerel, adult cobia, and early juvenile dusky shark (*Charcharinus obscurus*). King mackerel (*Scomberomorus cavalla*), cobia, and spanish mackerel are southern species that are near the northern limit of their range and rare in project area. They would therefore be rare in project area and only occur in the warmer months, but are not common in estuarine embayments like RBSHB (Reid *et al*. 1999). Reproducing dusky sharks tend to avoid estuaries (Compagno 1984).

Diets and Prey for EFH-Designated Species

Project area

Polychaete annelids and amphipods are primary food items for winter flounder and scup (Table 3). These prey organisms were commonly found in the propose project borrow area offshore surveys conducted in June of 1993, (Appendix). The tube-dwelling polychate *Asabellides oculata* sp., was the most abundant species collected in the June 1993 survey and the second most abundant species collected was *Gammarus lawrencius sp.* Small benthic crustaceans are also an important food source for many EFH designated fish species like windowpane, scup, black sea bass, and red hake. Piscivorous (fish-eating) EFH species like bluefish and summer flounder also have an abundant supply of small forage fish such as bay anchovies (*Anchoa mitchilli*), atlantic menhaden (*Brevoortia tyrannus*), silversides (*Menidia menidia*), and alewives (*Alosa pseudoharengus*) in Project area. These species were commonly caught in bottom trawls in Project area borrow area in 1985-86 (NYSOGS, 1992).

Table 3. Prey Species for Primary EFH-Designated Species

Species	**Life Stage**	**Principal Prey**	**Source**
Bottom Feeders			
Winter Flounder	J, A	Polychaetes, amphipods, (*Ampelisca abdita*) and small crustaceans (*Crangon*), sand dollars, and bivalves	Pereira et al. (1999)
Windowpane	J,A	Small crustacean, (mysids, decapod shrimp) and fish larvae	Chang et al. (1999)
Pollock	J,A	Benthic invertebrates: decapod crustaceans polychaetes, amphipods, pandalid shrimp	Fahay et al. (1999)
Sandbar shark	J,A	Small bottom fishes, small mollusks and crustacean	Compagno (1984)
Winter skate	J	Polychaetes and amphipods are the most important prey items, followed by decapods, isopods, bivalves and fish	Packer et al. (2003)
Winter skate	A	Polychaetes and amphipods are the most important prey items, followed by decapods, isopods, bivalves and fish.	Packer et al. (2003)
Little skate		Invertebrates: decapod crustaceans and amphipods are the most important prey items, followed by polychaetes. Isopods, bivalves, and fishes are of minor importance	Packer et al. (2003)
Little skate	J	Invertebrates: crustaceans and amphipods are the most important prey items for the little skate, followed by polychaetes. Isopods, bivalves, and fishes are of minor importance	Packer et al. (2003)

Bottom and Pelagic Feeders			
Summer flounder	J	YOY (<100mm) polychaetes, small crustaceans. Older juveniles same plus small fish	Packer et al. (1999)
Summer flounder	A	Crustaceans, bivalves, marine worms, sand dollars, hydroids & variety of fish	Packer et al. (1999)
Scup	J	Polychaetes, amphipods, small crustaceans, small mollusks, fish eggs and larvae	Steimle et al. (1999)
Scup	A	Small crustacean, polychaetes, mollusks, small squid, hydroids, sand dollars, and small fish	Steimle et al. (1999)
Black sea bass	J	Small crustacean (isopods, amphipods, small crab sand shrimp, copepods, mysids) and small fish	Steimle et al. (1999)
Black sea bass	A	Crabs, mysids, polychaetes, caridean shrimp, and small bait fish	Steimle et al. (1999)
Red hake	J	Polychaetes and small benthic & pelagic crustaceans (decapods, shrimp, crabs, mysids, euphausids, and amphipods	Steimle et al. (1999)
Atlantic salmon	A	Variety of fish, including some that are bioluminescent. smolts eat zooplankton (euphasids, amphipods, decapods, etc.); at sea the diet consisting primarily of sand lance, herring, capelin and shrimp.	Atlantic salmon unlimited
Pelagic Feeders			
Whiting	J	Crustaceans, other small fish (mackerel, menhaden and squid)	Morse et al. (1999)
Bluefish	J	Polychaetes and crustaceans but mainly a variety of fish species	Fahay (1999)
Bluefish	A	Variety of fish species	Fahay (1999)
Butterfish	J,A	Zooplankton	Cross et al. (1999)
Atlantic herring	J,A	Zooplankton	Reid et al. (1999)
Atlantic mackerel	J	Small crustaceans (copepods, amphipods, mysids shrimp, and decapod larvae.	Studholme et al. (1999)
Atlantic mackerel	A	Small crustaceans (copepods, amphipods, mysids shrimp, and decapod larvae, also squid and a variety of fish species.	Studholme et al. (1999)
King mackerel	J,A	A variety of pelagic fish species	Godcharles and Murphy (1983)
Spanish mackerel	J,A	A variety of pelagic fish species	Godcharles and Murphy (1983)
Cobia	J,A	Variety of fish, squid, and crustaceans	National Audubon Society (1983)
Longfin squid	J	Crustaceans, small fish, and even smaller members of it's own species.	Cargnelli *et al.* 1999

A – Adult J – Juvenile

Potential Direct/Indirect Impacts, Cumulative, and Mitigation

Dredging and placement activities in the project area are not expected to have any significant or long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the designated EFH species that occupy the borrow areas. However, the proposed activity would have immediate, short-term, direct and indirect impacts on EFH for some of the designated fish species and life history stages that occur in the immediate vicinity of the borrow and placement areas. This section identifies the direct and indirect impacts that could result from dredging and makes recommendations for minimizing these impacts.

Direct Impacts

Due to the mobility of larger fish, direct impacts from suction dredging and placement would be limited to eggs, larvae, small fish, and benthic invertebrates which would be removed by the dredge. The EFH designated species most likely to suffer mortality from dredging are juvenile winter flounder and windowpane. Mortality of young-of-the-year (YOY) juvenile windowpane and winter flounder would be highest in the spring, just after they settle to the bottom and metamorphose. During that time of year, YOY juveniles are <50 millimeters (mm) long and not capable of avoiding a suction dredge. Mortalities of small flounder would be minimized if dredging was restricted to the fall (October-December), after they are larger and start to move into deeper water (Pereira *et al*. 1999) and would be less plentiful on shallow borrow areas. Dredging in the fall would also minimize any possible impacts on pelagic fish eggs and larvae produced by EFH-designated species since most of them spawn in the spring.

Unlike any of the other EFH-designated species winter flounder deposit their eggs on the bottom in nearshore waters in depths of 1 to 15 ft on mud, sand, and gravel substrates along the Atlantic coast of New York during the winter (peak spawning in February and March) (Pereira *et al.* 1999). There is a high probability that dredging on borrow areas in the winter would cause the mortality of winter flounder eggs. If dredging was restricted to the fall October- December), any risk of removing winter flounder eggs would be eliminated. Borrow pits left behind after dredging ceases would eventually provide good spawning habitat for winter flounder since the sand that would accumulate in them is substrate for eggs.

Indirect Impacts

As a result of sand removal (suction dredging) and placement of the material, the most immediate, indirect effect on EFH areas would be the loss of benthic invertebrate prey species. Small motile and sedentary epifaunal species (*e.g.*, small crabs, snails, tube-dwelling amphipods), and all infaunal species (*e.g.*, polychaetes), would be most vulnerable to suction dredging and burial.

The EFH-designated species most vulnerable to the loss of prey organisms are winter flounder, windowpane, scup, and black sea bass. Winter flounder are obligate bottom feeders, preying primarily on infaunal polychaetes and tube-dwelling amphipods. The removal of benthic prey organisms will affect them more directly than any other EFH species. Windowpane have larger mouths than winter flounder and feed primarily on small crustaceans (*i.e.*, mysid and decapod shrimp) and fish larvae. These are motile prey organisms that live in the water column or near the bottom and could, to some extent, avoid being removed by the dredge. Scup and black sea bass feed on a variety of benthic infaunal and epifaunal organisms that would be affected by dredging. The immediate impact of prey removal would be negligible since bottom feeding EFH species would re-locate to nearby areas with intact benthic food resources. It would also be a temporary condition, lasting only as long as it takes for benthic organisms to re-colonize the dredged area. In addition, the dislocation of some benthic prey organisms into the water column by the dredge will attract fish to the area to feed (Brinkhuis 1980).

The removal of sand leaves a depression or hole (borrow pit) in the sea floor that can persist for years. The rate at which borrow pits fill up will depend on the amount of sediment that is available and the direction and strength of currents in the area. Borrow pits can modify the habitat for benthic, bottom-feeding fishes since they are deeper than the surrounding sea floor and act as traps for fine grained sediments. Accumulation of mud can cause a change in benthic community structure that favors certain species of fish. Also, if circulation of bottom water in the pits is reduced, DO can fall to low enough levels (<2-3 ppm) that fish will avoid them all together. High organic contents of mud accumulating in pits could also cause oxygen depletion.

Studies performed in the Lower Bay of New York Harbor have shown that benthic community structure is disrupted by dredging, but can reach a new equilibrium fairly rapidly. Cerrato and Scheier (1984) found that the borrow pits on the West Bank of the Ambrose Channel had distinctly different habitats from a nearby undredged control site. The benthic fauna at the control site was more diverse (*i.e.*, more species) and, in general, more stable (less susceptible to seasonal shifts in species composition and abundance) through time, whereas there were fewer species in the borrow pits, but some of them were very abundant. In a related study, Conover *et al.* (1985) found that fish, including some EFH-designated species, were actually more abundant in borrow pits. Of the EFH designated species, butterfish (mostly juveniles) were more abundant in the borrow pits, as were winter flounder (in the fall). Red hake were more abundant in one of the borrow pits and the largest catches of windowpane were made in one of the pits in the spring. Summer flounder were generally more abundant in the borrow pits.

In addition, Conover *et al.* (1985) also examined the stomach contents of winter flounder in the three sampling sites and related them to benthic populations identified by Cerrato and Scheier (1984). The results indicated that, despite changes in the species composition of benthic communities after dredging, the feeding success of winter flounder in the pits was not affected. Winter flounder, like many other bottom-feeding species, are selective feeders that adapt their diets to whatever prey species are readily available. These results suggest that the feeding success of other bottom-feeding EFH species is also likely to not be affected by changes in benthic community structure caused by dredging.

The degree to which water quality is degraded, or temperature and salinity changes in borrow pits depends on the depth of the pit, the circulation of water through the pit, and the amount of fine sediment and organic matter that accumulates in the pit. Conover *et al*. (1985) determined that summer water temperatures tended to be lower in borrow pits and salinities consistently higher (generally by 1-3 ppt, but by 7.3 ppt in January). More importantly, DO concentrations measured between June and November did not vary between sites.

Bottom currents along the project area shore are strong, thus it is likely that DO levels near the bottom of borrow pits in project area would not be reduced, There is, in fact, so much sand that is transported west along the outer New York coast that any hole created by dredging would fill in naturally within a very short time. If fine sediments accumulate in them, the benthic invertebrate community will change from a sand-dominated to a mud-dominated fauna. However, as long as water quality is not degraded, there would be no adverse impact on EFH. In fact, if summer water temperatures in borrow pits are lower than on adjacent shoal areas, EFH might be improved. Monitoring of DO levels in borrow pits would indicate whether or not remedial action needs to be taken to improve habitat quality. Limiting the depth to which dredging would proceed and/or filling the borrow pits, partially or totally, with clean fill when oxygen concentrations drop to unacceptable levels after dredging would reduce the possibility of DO concentration levels falling below 2-3 ppm.

Cumulative Impacts

Given the growth capacity of EFH-designated fish populations within project borrow area and the expected recolonization rates of benthic prey species, there would be no expected cumulative effects from dredging of the borrow area. Cumulative impacts can be avoided by dredging at times of year when EFH-designated species are not spawning.

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

It should be noted, however, that some fishery habitat might be slightly impacted over time in the nearshore area. As previously discussed, 17 nearshore groins will be rehabilitated and 4 new groins will be constructed along with the extension of the terminal groin 58 which will provide some form of hard structure for fish habitat. These targets could be impacted over time as the construction template stabilizes into the design template to meet existing conditions. This is accomplished through the migration of sand from the placement site seaward. This migration of sand has the potential to cover part, or all of any hardened structure within the nearshore area. It is anticipated that these impacts would be minor and would most likely only result in an accumulation of sand around the bottom of any given structure.

Steps taken to minimize impacts during construction are also fairly standard among the District's beach restoration projects. Dredging windows are employed when necessary, dredging is conducted in a manner to avoid creating deep pits, dredging locations within borrow areas are rotated when possible to reduce impacts, buffer areas are established around cultural targets within borrow areas, and borrow areas are chosen to minimize impacts to shellfish and fisheries resources. With the inclusion of these measures in all projects, cumulative impacts for the District activities are expected to be minimized to the greatest extent possible.

Monitoring

The District plans to conduct a biological monitoring program (BMP) to evaluate the effects of dredging clean sand for flood control/shoreline stabilization construction activities for five years. The offshore area to be evaluated is the borrow area (Figure 2) and it will be compared to the 1994 date collected as well as comparing the date to East Rockaway benthic date. The offshore and nearshore components will focus on benthic infauna, grain size, and water quality. The following provides a brief outline of the District's proposed BMP for the offshore borrow areas in the project area. A more detailed plan will be developed prior to implementation.

The collection of benthic fauna is scheduled to occur every spring and fall for five continuous years: one year of pre-construction, one year during construction, and three years of post construction. The BMP will involve establishing fifty evenly-spaced sampling stations in the borrow area. Prior to the initial sampling events, Differential Georeferenced Positioning System (DGPS) coordinates will be established to ensure that subsequent sampling events will be conducted at the same locations. At each benthic station, water quality will be collected (at the bottom, mid-depth, and surface) and one benthic and grain size sample will be collected using a ¼ cubic yard Smyth-MacIntyre spring-loaded benthic grab. Each benthic sample will be preserved in a 10% formaldehyde solution and shipped to a pre-approved laboratory for analysis. The laboratory will sort, identify, weigh, and numerate species to the lowest practicle identification level (LPIL). Grain size samples will be analyzed to determine the percentage of sand, silt, and clay.

Appendix

Plan Sheets

Atlantic Coast of Long Island
Jones Inlet to East Rockaway Inlet

Long Beach Island, New York
Coastal Storm Risk Management Project
Hurricane Sandy Limited Reevaluation Report

Appendix H

ENVIRONMENTAL COMPLIANCE STATEMENT

U.S. Army Corps of Engineers
New York District

Environmental Compliance

Federal Policies	Compliance
Abandoned Shipwreck Act of 1987	Full
Archaeological and Historic Preservation Act of 1979, as amended	Full
CBRA	Full
Clean Air Act OF 1977, as amended	Full
Clean Water Act of 1977, as amended	Full
Coastal Zone Management Act of 1972, as amended	Full
Endangered Species Act of 1973, as amended	Full
Estuary Protection Act (PL 90-454)	N/A
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act 0f 1958, as amended	Full
Floodplain Management (E.O.11988)	N/A
Gateway National Recreation Area 1972 Legislation	N/A
Land and Water Conservation Fund Act of 1965, as amended	Full
Marine Protection, Research and Sanctuary Act of 1969, as amended	N/A
National Environmental Policy Act of 1969, as amended	Full
National Historic Preservation Act of 1966, as amended	Full
Rivers and Harbors Appropriation Act of 1899, as amended	N/A
Toxic Substances Control Act (PL-94-469), as amended	N/A
Watershed Protection and Flood Prevention Act, as amended	N/A
Wild and Scenic River Act, as amended	N/A

Executive Orders, Memoranda

Protection of Wetlands (E.O. 11990)	Full
Environmental Effects Abroad of Major Federal Actions (E.O. 12114)	N/A
Impacts Upon Prime and Unique Farmlands (CEQ Memo 8-30-76)	N/A
Protection and Enhancement of the Cultural Environment (E.O. 11593)	N/A

Atlantic Coast of Long Island
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Appendix I

Mailing List

U.S. Army Corps of Engineers
New York District

NYS Department of State
Division of Coastal Resources
and Water Front Revitalization
41 State Street
Albany, NY 12231

Mr. Christopher Boelke
National Marines Fishery Service
Milford Lab
212 Rogers Ave.
Milford, CT 06460

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045

Field Supervisor
U.S. Fish and Wildlife Service
P.O. Box 608
Islip, NY 11751

NYSDEC
Building 40 SUNY
Stony Brook NY, 11790-2356

Grace Musumeci
EPA, 25th Floor
290 Broadway
NY, NY 10007-3809

NYCDEC
47 – 40 21st Street
Long Island City NY 11101
Hunters Point Plaza

Director of Environmental Coordination
Office of the Nassau County Executive
One West Street
Mineola, New York 11501

Ruth Pierpont
New York State Office of Parks,
Recreation & Historic Preservation
Historic Preservation
Field Services Bureau
Peebles Island, P.O. Box 189
Waterford, NY 12188-0189

NYSDEC
Bureau of Flood Protection
625 Broadway, 4th Floor
Albany, NY 12233-3507

Steve Zahn
NYCDEC
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Long Island City, NY 11101
Hunters Point Plaza

Ron Masters
Town of Hempstead
Dept. of Conservation and Waterways
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City of Long Beach
Department of Public Works
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Long Beach, New York 11561

Taobi Silva
Chair
Natural Resources
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Southampton, New York 11969

Kellie Poolaw
Director
Delaware Nation
Environmental Program
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Anadarko, OK 73005

Tamara Francis-Fourkiller
Cultural Preservation Director/Tribal
Historic Preservation Officer
NAGPRA/Cultural Preservation
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Anadarko, OK 73005

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Environmental Program (DTEP)
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Brice Obermeyer
Director
Delaware Tribe Historic Preservation
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1200 Commercial Street
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Sherry White
Tribal Historic Preservation Office
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Band of Mohicans
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Bowler, WI 54416

Greg Bunker
Environmentalist
Stockbridge-Munsee Community
Band of Mohicans
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Bowler, WI 54416

Atlantic Coast of Long Island
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Appendix J

Endangered Species Coordination - Additional

U.S. Army Corps of Engineers
New York District

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

Peter Weppler, Acting Chief
Coastal Ecosystem Section
Planning Division
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278-0900

APR - 2014

ATTN: Robert Smith, Project Biologist
RE: Draft Environmental Assessment, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Risk Management Project – Hurricane Sandy Limited Reevaluation Report

Dear Mr. Weppler:

We have reviewed the draft environmental assessment (DEA) for the Jones Inlet to Rockaway Inlet Coastal Storm Risk Management Project dated February 2014, as well as the essential fish habitat (EFH) assessment included as an appendix to the document. The project area encompasses 6.4 miles of Atlantic Ocean shoreline along Long Beach Island, NY including the Town of Hempstead and the City of Long Beach. The DEA describes modifications made to the project since the issuance of the Record of Decision in 1998. These modifications include a 6000 linear foot (lf) reduction in the length of the project, as well as reductions in the initial and renourishment fill quantities and the acreages of dune planting and intertidal and subtidal fill. In addition, fifty-seven timber/gravel walk overs, extensions of the existing dune walkovers and vehicle access ways, four new groins, the rehabilitation of 17 existing groins and the rehabilitation and extension of the terminal groin are also planned. Material for the beach nourishment portion of the project will be dredged from an 1194-acre offshore borrow near Jones Inlet.

As you are aware, the Magnuson-Stevens Act (MSA) requires Federal agencies to consult with one another on projects such as this. Because this project affects EFH, the process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. We offer the following comments for your consideration.

Essential Fish Habitat

The EFH assessment included in the DEA evaluates the potential impacts to EFH that could result from construction of the proposed project. According to information in the DEA, you have avoided areas identified as prominent shoal habitats and "Seaside Lumps" and "Fish Havens" as part of the borrow site screening process. Overall, the dredging and placement of sand along the coastline will have adverse effects on EFH and federally managed species due to the entrainment of early life stages in the dredge, alteration or loss of benthic habitat and forage species, and altered forage patterns and success due to increased, noise, turbidity and sedimentation. We agree that some effects will be temporary and others can be minimized using some of the management practices mentioned in the EFH assessment such as dredging in the fall to avoid sensitive life stages of certain species, not dredging deep holes and leaving similar substrate in place to allow for recruitment of living marine resources.

Over the 50-year life of the project, the EFH in the project area will be adversely affected numerous times as each dredging and beach renourishment event occurs. Currently, there is no specified reporting of acres affected annually or notification to us when construction commences for each project segment or cycle. During the life of this project EFH designations may be modified, the status of a species' stock may change in a manner that warrants additional management measures, or other new information may become available that may change the basis of our EFH conservation recommendations. To ensure that we meet our joint responsibilities to protect, conserve and enhance EFH and minimize adverse effects to living marine resources and their habitats, you should notify us prior to the commencement of each dredging event so that we may confirm that the EFH determinations and EFH conservation recommendations remain valid and a full reinitiation of the EFH consultation is not required. This notification should be done prior to the solicitation of bids for the contract so sufficient time is allowed for any recommended modifications to be including in the bid documents. It should also include the location of the segment to be nourished, volumes of sand to be dredged, depth of sand to be removed and the boundaries of the dredging within the borrow area. We also request annual reporting of the acres of area dredging, volumes removed and depth of removal so that the adverse effects to EFH can be quantified on an annual basis.

We agree with and support your plans to conduct surf clam surveys prior to construction so that areas of high densities of surf clams can be identified and avoided, and included in the planned biological monitoring program. We request that you provide us with copies of the survey and sampling results so that we may monitor the recovery of the borrow area and the cumulative effects of repeated dredging in the borrow area.

Essential Fish Habitat Conservation Recommendations
Pursuant to Section 305 (b) (4) (A) of the MSA, we recommend the following EFH conservation recommendations be incorporated into the project:

1. Notification should be provided to us prior to commencement of each dredging event and should include the location of the segment to be nourished, volumes of sand to be dredged, depth of sand to be removed and the boundaries of the dredging within the borrow area.

2. Annual reporting to us of the acres of borrow area disturbed, the location of the dredging, cubic yardage removed, depth of removal and post-dredging bathymetry of the borrow area.

3. Areas of high surf clam densities within the borrow area should be avoided.

Please note that Section 305 (b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including the measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305 (b) (4) (B) of the MSA also indicates that you must explain your reasons for not following our recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate or offset such effect pursuant to 50 CFR 600.920 (k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for the above EFH conservation recommendations.

Endangered Species Act

A number of federally listed threatened or endangered species under our jurisdiction are known to occur in the vicinity of the project area. Listed sea turtles are also found seasonally in the waters off of New York, typically between from May through November, with the highest concentration of sea turtles present from June to October. The species that are likely to be present include the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead (*Caretta caretta*) sea turtles, as well as endangered Kemp's ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*) and green (*Chelonia mydas)* sea turtles. In addition, endangered Atlantic sturgeon (*Acipenser oxyrhynchus oxyrinchus)* are known to occur within the nearshore, coastal waters of the Atlantic Ocean, primarily using these bodies of water throughout the year as a migratory pathway to and from spawning, overwintering, and/or foraging grounds throughout their range.

The federally endangered North Atlantic right, humpback, and fin whales, are seasonally present in the waters off New York; however, these ESA listed species of whales are not expected to occur in the shallow, near shore waters of eastern Long Island, and thus, are not expected to occur in the action are project area.

Section 7 of the Endangered Species Act of 1973 (ESA), as amended requires federal agencies to consult with us to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or adversely modify or destroy designated critical habitat. You requested emergency ESA Section 7 consultation (50 CFR *§* 402.05) with us on March 22, 2013, for shoreline restoration/rehabilitation activities in need along several shorelines of New York and New Jersey, including the Atlantic coast of Long Island. Via a letter dated April 2, 2013, we formalized the emergency ESA Section 7 consultation process with you for these actions and began the emergency consultation process.[1] Pursuant to CFR *§* 402.05, emergency Section 7

[1] On March 6, 2014, the New York Corps requested that we append several additional emergency actions to be covered under our April 2, 2013, letter to the Corps (pers. communication, Jenine Gallo, New York District Corps of Engineers, email dated March 6, 2014). All of these projects fall within the already-exempted ecological boundaries

consultation shall be initiated by you as soon as practicable after either: (1) the emergency response is completed (preferably within 30 days) or (2), the emergency is under control. neither of these triggers for the initiation of consultation has been met, the emergency consultation remains open for this action. We look forward to continued coordination with your office on this and other emergency projects covered under the April 2, 2013, letter. Should you have any questions about the emergency ESA Section 7 process, or ESA section consultation in general, please contact Danielle Palmer at (978) 282-8468 or by e-mail (Danielle.Palmer@noaa.gov).

We look forward to continued coordination with your office on this project as it moves forward. If you have any questions or need additional information, please do not hesitate to contact Karen Greene at karen.greene@noaa.gov or (732) 872-3023.

Sincerely,

Louis A. Chiarella,
Assistant Regional Administrator
for Habitat Conservation

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along both the New York and New Jersey Sandy-impacted shorelines identified by project name in the April 2013 letter, however they were not specifically identified by the Corps by name or specific congressional authorization at the time the 2013 letter was written either due to a lack of transparency about the application of the new law (P.L. 113-2 was only recently interpreted by USACE-HQ) and/or due to the identification and/or acceleration of certain reaches or segments of some projects ((pers. communication, Jenine Gallo, New York District Corps of engineers, email dated 3/6/2014). The Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, project was included in this list provided to us on March 6, 2014.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

APR - 2 2013

Leonard Houston, Chief
Department of the Army
New York District, Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090
Attn: Planning Division

Dear Mr. Houston,

Your March 22, 2013, letter informed us of the U.S. Army Corps of Engineers (USACE), New York District's (District) need to undertake emergency rehabilitation activities within the District's Areas of Responsibility affected by Hurricane Sandy.[1] Specifically, the emergency activities will involve the rehabilitation of federally authorized, and constructed hurricane or shore protection projects that were damaged as a result of Hurricane Sandy. The USACE is requesting emergency consultation pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, and implementing regulations for this emergency response (see 50 CFR § 402.05).

Where emergency actions are required that may affect species and/or critical habitats listed by us, an emergency section 7 consultation may be conducted (50 CFR § 402.05). An emergency is a situation involving an act of God, disasters, casualties, national defense or security emergencies, etc., and includes response activities that must be taken to prevent the imminent loss of human life or property. You have informed us that the rehabilitation activities resulted from a natural disaster and that immediate emergency response activities are necessary to prevent the imminent loss of human life and/or property.

Emergency Response Proposed by USACE

At this time, under PL 84-99 and PL 113-2, the following shoreline restoration/rehabilitation activities will be undertaken:

- Atlantic Coast of New York City - Rockaway Inlet to Norton Point (Seagate), Brooklyn Coney Island Area Shore Protection Project;
- Atlantic Coast of New York City- East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, New York;
- Atlantic Coast of Long Island - Fire Island Inlet to Montauk Point, New York:
  > Moriches to Shinnecock Reach (Westhampton Interim Shore Protection Project)
  > West of Shinnecock Inlet Interim Shore Protection Project.

[1] Emergency rehabilitation activities will be undertaken under the USACE's Public Law (PL) 84-99: Flood and Coastal Storm Emergencies, and PL 113-2: The Disaster Relief Appropriations Act-2013.

- Atlantic Coast of New Jersey, Sea Bright to Ocean Township Beach Erosion Control Project, Sea Bright to Manasquan Inlet NJ; and
- Raritan Bay and Sandy Hook Bay, NJ Hurricane and Storm Damage Reduction (Borough of Keansburg, East Keansburg and Laurence Harbor).

At this time, exact details of the work to be undertaken at each location is unknown; however, in general, sand material, necessary for shoreline/beach restoration will be obtained via the removal of sand from an offshore borrow area or inlet via a dredge (type of dredge still to be determined for each project). A general overview of the work to be undertaken, as well as the measures to be implemented to minimize potential effects to ESA listed species during mechanical or hydraulic dredging operations, is provided in your March 22, 2013, correspondence.

Potential Impacts to NMFS Listed Species

ESA listed sea turtles, including leatherbacks, greens, Kemp's ridley and the Northwest Atlantic Distinct Population Segment (DPS) of loggerheads occur seasonally off the coast of New York and New Jersey. These species are most likely to be present near the project sites between May and the end of November. Dredging operations that may be undertaken in the borrow areas or inlets have the potential to affect these species via entrainment/impingement, the reduction in available forage, and/or alterations to habitat.[2]

Atlantic sturgeon originating from any of the five listed DPSs may be present near the project sites. Atlantic sturgeon originating from the Gulf of Maine DPS are threatened; Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, Carolina and South Atlantic DPSs are endangered. In-water work that results in the alteration of habitat or loss of benthic resources may affect Atlantic sturgeon. Dredging can also affect this species via entrainment and/or impingement, the alteration of habitat, and the reduction of forage.

ESA listed whales, including North Atlantic right, humpback and fin whales are seasonally present off the coast of New York and New Jersey. Depending on the location of the offshore borrow area or inlet to be used as a source of sand, vessel interactions (i.e., vessel strikes) are possible during a vessel's transit to and from the borrow or inlet area, to the shoreline in need of restoration.

As dredging operations will be undertaken within the waters of New York or New Jersey, as noted above, interactions with listed species are possible and thus, the minimization and monitoring measures you provided us in your March 22, 2013, letter should be implemented throughout all phases of operation so long as they do not hinder the emergency response. In addition, during all phases of the emergency response, we request that you contact us if any marine mammals, sea turtles or sturgeon are observed, alive or dead. These notifications should be provided by e-mail (incidental.take@noaa.gov) and phone (Danielle Palmer, 978-282-8468). Whenever possible, photographs should be taken and provided to NMFS. Dead bodies should be retained until disposition procedures can be discussed with us.

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[2] Sea turtles are known to be vulnerable to entrainment/impingement in hopper dredges. Sea turtles, however, are not known to be vulnerable to entrainment in cutterhead dredges presumably because they are able to avoid the relatively small intake and low intake velocity.

Emergency Section 7 Consultation
As soon as practicable after either: (1) the emergency response is completed (preferably within 30 days) or (2), the emergency is under control, the USACE should initiate consultation with us. The following information is necessary to initiate the consultation:

- a description of the emergency, including:
  - maps of the shorelines/beaches renourished; borrow areas and inlets used for sand; and
  - ESA mitigation/monitoring activities implemented throughout the activities; and

- an evaluation of the impacts of the emergency response on affected species and their habitats, including documentation of how our recommendations were implemented, and the results of the implementation.

Once this information is received, we will be able to complete the emergency consultation. Depending on the nature of the effects, this consultation may be informal and conclude with a "not likely to adversely affect" determination, or formal, concluding with issuance of a Biological Opinion. If you have any questions concerning the section 7 consultation requirements or these comments, please contact Danielle Palmer at 978-282-8468.

Sincerely,

John K. Bullard
Regional Administrator

EC: Rusanowsky, Boelke, Chiarella - F/NER3
Houston, USACE NAD

File Code: Sec 7 USACE NY-Emergency initiation-LI and NJ shoreline restoration bundle (Sandy)

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO ATTENTION OF

Planning Division

March 22, 2012 (should be 2013)

John K. Bullard - Regional Administrator
Northeast Regional Office
NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

Attention: Mary Colligan, Assistant Regional Administrator
Protected Species Division
Lou Chiarella, Assistant Regional Administrator
Habitat Conservation Division

Dear Mr. Bullard:

This letter is in reference to the March 8, 2013 meeting/conference call on the emergency activities occurring within the U.S Army Corps of Engineers, New York District's (District) Areas of Responsibility (AOR) that were a result of Super Storm Sandy. These activities include the rehabilitation of federally authorized and constructed hurricane or shore protection projects under Public Law (PL) 84-99, Flood and Coastal Storm Emergencies and PL 113-2, The Disaster Relief Appropriations Act - 2013. As you are aware, it is critical that the District moves out quickly to return protection to the communities and infrastructure before the upcoming storm season is within the AOR. It was a disappointment that our respective staffs did not meet in person at the Milford Lab, but weather conditions dictated prudence as far as not driving such long distances under those adverse conditions. Under the circumstances the conference call was the next best thing and I feel the group was successful in accomplishing our respective goals.

This letter is intended to execute one of the more immediate tasks that came out of that call by identifying a number of projects proceeding under our emergency authority contained in PL84-99 and PL 113-2. This request is specifically for:

- Atlantic Coast of New York City - Rockaway Inlet to Norton Point (Seagate), Brooklyn Coney Island Area Shore Protection Project;
- Atlantic Coast of New York City- East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, New York;
- Atlantic Coast of Long Island - Fire Island Inlet to Montauk Point, New York
    - Moriches to Shinnecock Reach (Westhampton Interim Shore Protection Project)
    - West of Shinnecock Inlet Interim Shore Protection Project.
- Atlantic Coast of New Jersey, Sea Bright to Ocean Township Beach Erosion Control Project, Sea Bright to Manasquan Inlet NJ; and
- Raritan Bay and Sandy Hook Bay, NJ Hurricane and Storm Damage Reduction (Borough of Keansburg, East Keansburg and Laurence Harbor).

As discussed, the above referenced projects are high priority emergency response actions intended to protect life and property in the most vulnerable, hardest hit portions of the coast before the next storm season threatens them. As that storm season is fast approaching time is of the essence, with projects scheduled to begin as early as this May to restore the damaged projects and return the authorized level of protection to the affected areas.

Endangered Species Act Consultation

Where emergency actions are required that may affect ESA-listed species and/or critical habitats, an emergency Section 7 consultation may be conducted (50 CFR§ 402.05). An emergency is a situation involving an act of God, disasters, casualties, national defense or security emergencies, etc., and includes response activities that must be taken to prevent the imminent loss of human life or property. The District is requesting emergency consultation pursuant to Section 7 of the ESA of 1973, as amended, for the above projects proceeding under PL84-99 and PL 113-2.

In accordance with those procedures, the District will continue to coordinate with your offices to minimize impacts to listed species. The District requests that your office provides us with a list of measures to be incorporated into the proposed actions that will serve to minimize and monitor effects to listed species during the emergency response activities. Because consultation on the effects of these beach nourishment projects on listed whales and sea turtles has been previously completed, the District expects many of the measures will already be included in the project description (refer to Attachment 1). Pursuant to the emergency consultation procedures, once the emergency response is completed, the District will provide you with a biological assessment that contains a description of the activities that were carried out and an assessment of any impacts on listed species, including documentation of any take that occurred.

A description of the emergency actions is attached (Attachment 2). It is important to stress that each of the actions is intended to restore the storm-damaged projects to their authorized conditions; no changes to the beach dimensions or new borrow areas will be employed and will utilize the same protective measures and conservation recommendations that the District put in place following the District's previously completed consultations (Attachment 1). It is the District's belief that these measures will be as protective of Atlantic sturgeon as they proved to be for the listed species that were successfully consulted on originally. Consequently, the District would very much appreciate your office confirming the initiation of emergency consultation for these activities as soon as possible.

Following the initiation of emergency consultation for the activities authorized under PL 84-99 and PL 113-2, the District will seek to initiate consultation for the next group of projects designed to address the impacts of Super Storm Sandy by quickly moving into construction projects that Congress has already authorized, but had not yet appropriated funds to build. These projects, funded under the PL 113-2, are intended to extend protection to areas deemed at risk to future storms. These actions are to be expedited as soon as their Plans and Specifications can be updated to reflect current conditions. As such, the District will be requesting that consultation be completed as expeditiously as possible. As highlighted in the attached table (Attachment 3), the District would like to bundle the consultation requests for projects to be executed later his year, and separately bundle those likely to be constructed in 2014. As with the emergency projects, the District will follow the designs authorized by Congress and apply the protective measures and conservation recommendations that came out of the prior consultations prior to their respective authorization. The District will shortly be providing you the details needed to initiate these consultations.

Essential Fish Habitat Coordination

Since all of the projects in the groups discussed up to now have completed coordination under the Magnusson-Stevens Act (MSA), and all are to be built to the same specifications identified during that coordination, no further action is intended to be initiated for Essential Fish Habitat (EFH) except to confirm our intent to implement the conservation measures identified during the authorization process for each of the projects. The last group of Sandy-related projects to be funded under the Sandy Relief Bill includes expedited completion and authorization/construction of ongoing studies for coastal protection in areas not covered by the first two groups. As these studies are not likely to be completed until 2014 and their recommended actions implemented shortly after, there is more time for them to complete consultation under ESA and MSA. It is hoped that our close collaboration to expedite the authorized projects will serve to quicken this process while ensuring the appropriate protection for listed species and EFH. This coordination will be coordinated via separate correspondence.

The District looks forward to our close collaboration as our respective staffs work toward achieving our respective missions. The District has every reason to expect these missions to be complimentary and encourage you to contact me as soon as there are any issues or questions that could enhance this effort, or delay it. For further questions or comments, please contact me at 917-790-8702/leonard.houston@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353

Digitally signed by WEPPLER.PETER.M.1228647353
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=WEPPLER.PETER.M.1228647353
Date: 2013.03.22 17:24:58 -04'00'

Leonard Houston, Chief
Environmental Analysis Branch

Enclosures

CF:
CENAN-EOC
Tavolaro, Deputy Chief, Operations Division, CENAN

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

May 13, 2015

Colonel Paul E. Owen
District Engineer
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Dear Colonel Owen:

The U.S Fish and Wildlife Service (Service) is in receipt of your letter dated May 1, 2015, requesting the Service to adopt the conference opinion on the U.S. Army Corps of Engineers' (Corps) Fire Island Inlet to Moriches Inlet Stabilization Project for the red knot (*Calidris canutus rufa*; threatened) as a biological opinion. The Corps has indicated that it concurs with the Service's conference opinion and all reasonable and prudent measures contained therein.

By receipt of this letter, your agency is provided formal notice that the Service has adopted the above referenced conference opinion as a biological opinion. Since all of the provisions in the opinion will be implemented as described, no further action is necessary at this point in time.

We appreciate and recognize all of the Corps' efforts during the consultation period to provide additional information and clarification of project features. In addition, we appreciate the detailed comments and feedback on both the piping plover biological opinion and red knot conference opinion your agency provided to the Service in your correspondence dated February 20, 2105, as well as the joint interagency field visit that was held on February 27, 2015, to further discuss the project and implementation of the project's avoidance and minimization measures, conservation measures, and reasonable and prudent measures. We hope to continue to build off the close cooperative relationship our agencies have developed and fostered in order to meet our respective and joint agency missions and responsibilities under the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*).

If you have any questions, please have your staff contact Steve Papa, of the Long Island Field Office, at (631) 286-0485.

Sincerely,

Patricia Cole

for David A. Stilwell
Field Supervisor

cc: NYSDEC, Stony Brook, NY (M. Gibbons)

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NY 10278-0090

Environmental Branch

01 MAY 2015

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Coastal Storm Risk Management Project

Dear Mr. Stilwell:

The U.S. Army Corps of Engineers, New York District (District) is in receipt of the U.S. Fish and Wildlife Service's (Service) March 31, 2015 response to the District's February 20, 2015 comments on the Biological Opinion and Conference Opinion (BO) on the effects on the threatened piping plover (*Charadrius melodus;* Atlantic Coast population), the threatened seabeach amaranth (*Amaranthus pumilus*; threatened), and the rufa red knot (*Calidris canutus rufa*; now listed as threatened) for the above referenced project. The District has reviewed the Service's response and acknowledging that there is a need to provide coastal storm protection to the residents of Long Beach expeditiously, concurs with the Reasonable and Prudent Measures (RPMs) contained within the BO. As the Conference Opinion for the red knot was developed prior to the listing of the species, and the District concurs with the RPMs contained within it, the District requests that the Conference Opinion be considered as a BO issued through formal consultation.

The District appreciated how the Service expedited the formal consultation process by providing a BO earlier than scheduled, but remains concerned that it became a greater disadvantage than the time saver it was meant to be. The Service decision to produce a Final BO as its November 24, 2014 submittal (not the Draft BO the District was expecting), caused the District to lose the opportunity to provide comment and feedback. In hindsight, clearer communication must occur between our two agencies on these critical decisions associated with formal consultation under Section 7 of the Endangered Species Act.

If you any questions, please contact Mr. Peter Weppler – Chief, Environmental Analysis Branch at 917-790-8634.

Sincerely,

Paul E. Owen
Colonel, U.S. Army
District Engineer New York District

cc. USFWS-LIFO

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, New York 13045

March 31, 2015

Colonel Paul E. Owen
District Engineer
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278

Dear Colonel Owen:

This is in response to the your letter dated February 20, 2015, providing the U.S. Army Corps of Engineers' (Corps) comments on the endangered species conservation measures, reasonable and prudent measures (RPMs), and terms and conditions, contained in the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) for the Corps' Jones Beach Inlet to East Rockaway Inlet, Long Beach Island, New York Coastal Storm Risk Management Project.

We believe that some of your comments may have been the result of discrepancies or contradictory statements in the Corps' Biological Assessment (BA). We have attempted to address these and discuss them further in our response that follows. In terms of the significance of the changes the Corps is requesting relative to the conservation measures, RPMs, terms and conditions, or conclusion sections of the piping plover Opinion and red knot conference opinion and their impacts on the Opinion's effects analysis, it will be necessary for the Corps to reinitiate consultation under section 7 of the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) in order to amend the Opinion. The "Reinitiation Clause" in the Opinion, (page 96; reproduced below) provides the conditions for reinitiation of consultation:

> "This concludes formal consultation on the action(s) outlined in the BA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of

incidental take is exceeded, any operations causing such take must cease pending reinitiation."

The red knot conference opinion was developed prior to the listing of the species under the ESA. Therefore, the Corps may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation as the species has since been listed as threatened. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used in the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary for this project.

Please be advised that the incidental take statement provided in the conference opinion does not become effective until the conference opinion is adopted as the biological opinion issued through formal consultation. No take of the species may occur between the listing of the species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

Service Response to the Corps' Comments

Corps' Comment (1):

Pg 5, under the section "Description of the Proposed Project,": There is no mention of the 136 acres (preservation area) the District has set aside for habitat preservation. Was this area accounted for within the BO's analysis? The District believes that the Service misinterpreted the conservation measures contained within the BA. Most of the measures were to be applied within the designated 136-acre (ac) preservation area of which the majority of the Long Beach Island piping plover population is located.

Service Response:

The Service agrees that the Opinion does not refer to the 136 ac as a Corps-designated habitat preservation area. The BA did not stipulate that lands would be set aside for habitat preservation, and be managed as such by the federal government. The BA does make specific statements relative to prohibiting certain construction activities in the 136 ac, but makes no reference to protecting the areas as a preserve:

- Section 2.0 of the BA entitled, "Proposed Federal Action," states the following: "...the Project modification would result in limited construction activities originally proposed within a 136-acre shorebird nesting/foraging area which will be excluded from the Project (Table 1). The proposed Project modification would, however, result in an increase of walkover extensions and vehicle access as well as the rehabilitation of two additional groins, and the rehabilitation and extension of the east jetty."

- Section 2.1.7 of the BA, entitled, "Bird Nesting and Foraging Area," states:

  "The proposed Project modification has limited Project activities (intermitted dune repair) within a 93.4 acre ephemeral pool and a 42.3 acre tern/piping plover nesting area located in Point Lookout, near the Jones Inlet ebb shoal attachment point (Appendix J). Project activities were proposed within this area as part of the original plan that was selected in 1995. However, the USACE reevaluated proposed Project activities in direct response to concerns regarding shorebird habitat from Federal and State agencies and other interested parties (USACE 1995). As a result, construction of a beach berm within the bird nesting/foraging area has been eliminated from the proposed Project to allow for the continued unimpeded use of the area as shorebird nesting and foraging habitat. Two new groins were originally proposed within the tern/piping plover nesting area. However, based on a re-evaluation of the Project, construction of these groins has been deferred. No beach fill activities will take place within the bird foraging and nesting area."

As the land is locally-owned and managed, the Service requests clarification on the terms of habitat preservation and how the Corps plans to ensure protection of piping plover habitat in this parcel. We note that this area is also used for Town and County human recreation. While a small portion is known locally as the "sanctuary," the entire 136 ac supports a mix of human recreation and shorebird use.

Service Response to *"Was this area accounted for in the BO?"*

Yes. The Service considered the Corps' decision to eliminate initial beach nourishment within the 136 acre area during initial construction. We also considered that the 136 ac would experience adverse effects from other project features such as dune construction, beach grass planting, sand fence installation, dune walkover construction, vehicle access corridor construction, and increases in recreation. Other activities such as the construction of groins A-D, rehabilitation of the terminal and two existing groins in Point Lookout, as well as dune and beach nourishment activities proposed on adjacent beaches and their impacts to this area were also considered. The Service noted in the Opinion that future ESA consultation would be needed should the Corps opt to construct the two deferred groins in this area, due to downdrift erosional impacts stemming from construction of groins A-D (see U.S. Fish and Wildlife Service 2014b at pp 75-76).

Overall, the Service agrees with the Corps that in order to avoid adverse effects to piping plovers and their habitats, areas should be preserved and protected from large-scale beach nourishment and groin construction projects. We appreciate the Corps' project condition which eliminated beach nourishment and deferred construction of two groins in the 136 ac as part of the initial construction, but note that piping plovers also use the beaches east and west of this area. All of these considerations were factored into the Opinion.

Service Response to *"The District believes that the Service misinterpreted the conservation measures contained within the Biological Assessment (BA). Most of the measures were to be applied within the designated 136 acre preservation area of which the majority of the Long Beach Island piping plover population is located."*

The Service notes that the BA did not stipulate that conservation measures were limited to the 136 ac. Section 5.0 of the Biological Assessment, entitled "Recommendations" (U.S. Army Corps of Engineers 2014), which provides the Corps' avoidance and minimization measures, does not mention the 136 ac, but does refer to the "Project Area." We understood the project area to be defined in Section 1.3 of the BA, entitled, "Project Area Description," which states:

> "The Project Area covers approximately 6.7 miles (of which 6.4 miles represents coastal storm risk management provided by the selected plan), 35,500 linear feet (lf) of the Long Beach barrier island. The Project Area is situated within Nassau County, New York, and from east to west includes the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach) and the City of Long Beach (USACE 2006)."

Overall, the Service appreciates the Corps' clarification that <u>most</u> of the conservation measures were meant to be applied to the 136-ac preservation area. The Corps should furnish additional clarification as to which measures do or do not apply to this area, should be applied elsewhere, or will be delegated to the local cost share sponsors by the Corps, when consultation is reinitiated.

<u>Corps' Comment (2)</u>:

Pg 30, Part 4, under section "Conservation": No major construction between June 1 - November 1 to protect seabeach amaranth. The District agrees to a no work window from March 31 to August 31 within in the 136 acre preservation as presented in the BA. To date, the District is unaware of a total "no work window" for seabeach amaranth within the States of New York and New Jersey and has been successful in utilizing monitors and collecting seed. The District cannot concur with this conservation measure as written.

<u>Service Response</u>:

This comment references the "Conclusion" section of the seabeach amaranth Opinion, wherein the Service determined that the proposed project would not jeopardize the continued existence of seabeach amaranth, based on a consideration of several factors. One of the factors was "the Corps will not undertake major construction activities from June to November which spans a major portion of the germination and growing period for seabeach amaranth."

As stated in the BA, Section 5 (Recommendations), subsection 5.2 (Seabeach Amaranth), No. 3, the Corps will "Restrict construction activities in areas of known populations during the growing season (allow limited activities only from June to November). This statement is supported by Section 6.0 (Conclusion) of the BA which states:

> "...impacts can largely be avoided if the period of construction is limited to periods outside of the piping plover nesting season which occurs from April 1 through September 1, **and outside of the growing season for seabeach amaranth which extends from June through November. Therefore, the USACE has incorporated these construction window recommendations, as well as other recommendations from the USFWS, into the Project construction plans** (emphasis added in bold)."

If the Corps wishes to rescind these conservation measures, then the BA should be amended and resubmitted during reinitiation of consultation.

Corps' Comment (3):

Pg 83, Piping Plover Conservation Measure No. 10: "Beach Fill would not be placed within 1,000 m of known populations of piping plover or other state or federally-listed shorebird/ seabirds during the breeding season, except in the area of the terminal groin at Point Lookout:" This measure should parallel the work within New Jersey which states "1000 m of an active nest".

Service Response:

This comment references the "Contributions of Conservation Measure Implementation Toward Minimizing Adverse Effects," section of the piping plover Opinion which provides the Corps' conservation measures to avoid and reduce impacts of the project to piping plover. The Service incorporated the 1,000 meter (m) buffer distance, which would extend from the boundaries of delineated plover breeding habitat, based on coordination with the Corps and reflected in the "Consultation History" of the Opinion:

> "November 21, 2014: The Corps agrees to implement a 1,000 m buffer for construction activities in the western portion of the Action Area. The Corps also proposes to establish a 200 m buffer around terminal groin number 58 and conduct construction activities in that location during the piping plover season."

We note that the 1,000-m buffer zone around breeding areas is consistent with the Corps' proposal for the Fire Island Inlet to Moriches Inlet Stabilization Project (FIMI), which states: "The project description indicates that construction activities will not occur during the piping plover season (April 1 to September 1) in Smith Point County Park, Fire Island Lighthouse Beach and Robert Moses State Park. Within the FIIS Communities, the Corps proposes to maintain a 1,000 m buffer between piping plover breeding areas and construction activities." (U.S. Fish and Wildlife Service 2014a at page 104).

We coordinated with the Service's New Jersey Field Office (NJFO) concerning the Corps' comment that the buffer zone "...should parallel the work within New Jersey which states 1,000 m of an active nest." We were advised by the NJFO to reference page 25 of the Service's 2002 Monmouth County, New Jersey, Programmatic Biological Opinion (PBO), which establishes the protocol for establishing buffer zones relative to nesting areas. The PBO states a nesting area is defined as "1,000 meters on either side of a site [as determined by a Service-approved field monitor (monitor) and confirmed by the Service] currently occupied by courting, territorial, incubating, or brood-rearing piping plovers, nests with eggs, or unfledged chicks, or any site so occupied during any of the most recent three nesting seasons (including the current one if territories have already been established for the year)."

Corps' comment (4):

Pg 83, Piping Plover Conservation Measure No. 11: "Implement a 200 m work zone around terminal groin 58 delineated by fencing that is impenetrable to plover chicks to minimize impacts *as a result of groin reconstruction activities." The District agrees with this measure and will apply the same conservation measure for Groins A-D and the two groin rehabilitations between Groin A and the Terminal Groin at Point Lookout. The District requires this measure to be applied to these structures to ensure that there is adequate time to complete their proper construction prior to beach nourishment phase of the project.*

Service Response:

This comment refers to the section in the piping plover Opinion entitled, "Contributions of Conservation Measure Implementation Toward Minimizing Adverse Effects," which provides the Corps' conservation measures to avoid and reduce impacts of the project to piping plover as given in the BA and via further coordination with the Service.

The Corps' comment both reaffirms the commitment to implement the 200 m buffer around the terminal groin and introduces a plan to work in the plover season using a 200-m buffer to construct and rehabilitate the remaining groins in Point Lookout. The latter proposal would have to be addressed during reinitiation of consultation, as the effects of the proposed construction activities were not evaluated in the Opinion. A 200-m buffer will be inadequate and not protect plovers from disturbance. Use of this buffer zone will result in adverse effects and an increase in incidental take, which would have to be factored into the Opinion's jeopardy analysis.

We also note that the proposed change is inconsistent with the Corps' existing conservation measure found in Section 5.1 Piping Plover, No. 3, on page 31, of the BA which states, "The USACE will conduct construction activities near known plover nesting areas from September 2 through April 14 to avoid the key shorebird nesting period." In an email to the Service dated October 7, 2014, the Corps clarified the time of year restriction as April 1 to September 1. Known plover nesting areas based on New York State Department of Environmental Conservation's (NYSDEC) Long Island Colonial Waterbird and Piping Plover Survey data extend from south of the community of Point Lookout to Lido Beach Town Park West.

Corps' Comment (5):
Pg 92, Piping Plover RPM No. 2, paragraph 7: "The Corps shall not plant beach grass west of groin D, except in front of the residential areas noted above. Beach grass planting may lead to increases in the berm elevation and reduce the potential for ephemeral ponding and the frequency at which it occurs." The District disagrees with this measure and will plant any dune created within the project area. The proposed dune footprint is located in areas that are currently vegetated. The State has indicated to the District that their Coastal Erosion Hazard Area (CEHA) Program regulations require them to direct any applicant to replant a newly created dune that covers or augments an existing vegetated dune.

Service Response:

This comment refers to Terms and Conditions for RPM 2, No. 7, of the piping plover Opinion.

The Service notes that the Corps agreed to limiting beach grass plantings to the north side of the dunes for the West of Shinnecock Inlet Interim Project (U.S. Fish and Wildlife Service 2001), and observed that the Corps limited beach grass planting to the north side of the constructed dune at the Smith Point County Park Great Gun plover restoration area. The Service believes it is appropriate to apply the same condition to this project and retains this as a term and condition.

Corps' Comment (6):

Pg 92, Piping Plover RPM No. 2, paragraph 8: "In order to address habitat loss, degradation, and fragmentation in the Action Area, the Corps shall undertake habitat restoration (vegetation removal and topographical management), west of proposed groin D. The Corps shall devise a restoration plan in coordination with the Town, Nassau County, and the Service. The plan shall be finalized prior to initial construction of the project:" The District only concurs with RPM if it apples to the 136 acre "preservation area" and not the Service defined "Action Area" (the entire footprint of the project. This action has been identified as a maintenance feature that would be implemented by the non-Federal sponsor.

Service Response:

This comment refers to Terms and Conditions for RPM 2, No. 8, of the piping plover Opinion.

This application of this term and condition can be clarified by understanding the definition and limits of the Action Area as presented in the Opinion. "Action Area" is defined by regulation as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02)."

The section of the piping plover Opinion entitled, "Environmental Baseline, Description of the Action Area," identified the Action Area as an area that extends "... from Jones Inlet west to the Lido Beach West Town Park, a distance of about 3 mi, and encompassing 74 hectares (ha) of beach habitat. This area corresponds to Corps' plan sheets numbered 8-14 found in U.S. Army Corp of Engineers (2014b)."

As noted above, the Action Area only includes 3 miles (mi) of the project area, and does not include the "entire footprint of the project," as it excludes the area from Lido Beach West Town Park to the border of the City of Long Beach and Village of Atlantic Beach, a distance of about 3.5 mi. This term and condition specifically applies to a portion of the Action Area stretching from west of groin D to Lido Beach West Town Park. If the Corps expects to limit habitat restoration to the 136 ac shorebird area, then this will need to be addressed during reinitiation of consultation.

Corps' Comment (7):

Pg 92, Piping Plover RPM No. 2, paragraph 9: "In order to address take associated with decreases in prey resources on the oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm and backshore is conducted based on a sampling program that been devised in consultation with, and agree to by, the Service prior to its implementation. The information collected during the monitoring program shall be used to adaptively manage the operation and maintenance phases of the project to further avoid and minimize take. The plan shall be finalized prior to initial construction of the project:" The

District requests that the reference to benthic sampling of the backshore area be removed. The project will only be constructed on the oceanside of the barrier island. No work is occurring on the bayside.

Service Response:

Thank you for reaffirming that the project will not have any bayside features. We understood this to be the case, but appreciate additional clarification. We used the term "backshore" to define barrier island habitats between the berm and dune. A definition can be found in several sources including the Corps' Coastal Engineering Manual EM 1110-2-1100.[1]

Corps' Comment (8):

Pg 92, Piping Plover RPM No. 2, paragraph 12: "The Corps shall develop a biological monitoring program for the Action Area to be approved by the Service and implemented by the Service or Service approved entity:" The District concurs with this measure but will be seeking to designate a third-party representative if the program is implemented.

Service Response:

This comment refers to Terms and Conditions for RPM 2, No. 12, of the piping plover Opinion.

The term and condition requires that the biological monitoring plan be implemented by the Service or a Service-approved entity. If the agencies agree to move forward with a "third-party representative," the "representative" shall be Service-approved. The Corps shall seek this approval prior to entering into any contracts or agreement. We look forward to further coordination with the Corps on implementing this term and condition.

Corps' Comment (9):

Piping Plover RPM No. 2 paragraph 13. "The Corps shall ensure that the subaerial extent of the proposed groins A-D during are covered during the construction and maintenance phases of the project to minimize habitat fragmentation and ensure plover chicks are able to traverse nesting and foraging areas:" The District concurs with this measure, but would like to define the area of the groins to be covered. Our recommendation is the following: "On April 1 of any calendar year, the newly constructed groins east of the 136 acre preservation area will be covered to the design template. The District defines this area as the 110-foot berm from the toes of the dune seaward."

Service Response:

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1 The Corps' Coastal Engineering Manual EM 1110-2-1100 defines the backshore as "The zone of the shore or beach that lies between the foreshore and the coastline comprising the berm and acted upon by the waves only during severe storms, especially when combined with high water."

Acknowledged. We anticipate that the Corps will fill the subaerial portion of the groins and conform to any NYSDEC Water Quality Certificate conditions governing the covering of the groins during the plover season at lower elevations on the foreshore. Please provide plan layout and cross-section profiles depicting this recommendation when consultation is reinitiated.

Corps' Comment (10):

Pg 124, 2nd Bullet (Red Knot): "The proposed time of year restrictions that prohibit construction during the piping plover and seabeach amaranth (April to November, inclusive) along with the 1000-m buffer zone would minimize direct impacts to the species:" The time of year restriction should be limited to April 1 - September 1 along with a 1,000-m buffer when there an active nest is present or until the last piping plover chick has fledged.

Service Response:

This reference concerns the "Conclusion" section of the red knot conference opinion. The Service does not concur with the Corps' time-of-year restriction for red knots. Red knots typically use mid-Atlantic stopovers enroute to northern breeding areas from late April through late May or early June (Cohen *et al.* 2009; Niles *et al.* 2008). Southbound red knots start arriving in July. Numbers of adults peak in mid-August and most depart by late September, although geolocators are showing some birds stay through November. Migrant juveniles begin to appear along the U.S. Atlantic coast in mid-August, occurring in much lower numbers and scattered over a much wider area than adults (Harrington 2001; Morrison and Harrington 1992).

We believe that the application of a 1,000-m buffer for red knots outside of the time of year restriction would be protective. However, we note that establishing 1,000-m buffer zone around plover breeding areas is consistent with the Corps' proposal for the Fire Island Inlet to Moriches Inlet Stabilization Project, which states: "The project description indicates that construction activities will not occur during the piping plover season (April 1 to September 1) in Smith Point County Park, Fire Island Lighthouse Beach and Robert Moses State Park. Within the FIIS Communities, the Corps proposes to maintain a 1,000-m buffer between piping plover breeding areas and construction activities." (U.S. Fish and Wildlife Service 2014, pg. 104).

We coordinated with the Service's NJFO concerning the Corps' comment that the buffer should parallel the work within New Jersey which states '1,000 m of an active nest.' We were advised to reference page 25 of the Service's 2002 Monmouth County, New Jersey, Programmatic Biological Opinion, which discusses establishing the buffer zones around nesting areas. The PBO states a nesting area is defined as "1,000 meters on either side of a site [as determined by a Service-approved field monitor (monitor) and confirmed by the Service] currently occupied by courting, territorial, incubating, or brood-rearing piping plovers, nests with eggs, or unfledged chicks, or any site so occupied during any of the most recent three nesting seasons (including the current one if territories have already been established for the year)."

Corps' Comment (11):

Pg 126, RPM No. 2: "Dredging submerged and emergent shoals shall be avoided to preserve beach dynamics and shorebird habitat:" The project as proposed does not describe dredging of any submerged and/or emergent shoals and request that this measure be removed from the BO.

Service Response:

The Service believed it was reasonable to include this measure, as we assumed that Jones Inlet will continue to be dredged in the future and as part of this project as referenced in U.S. Army Corps of Engineers (2014). The easternmost beach fill segment of the proposed project overlaps with the Point Lookout beach area that receives dredge spoil placement from Jones Inlet under a Corps' Section 933 project (Coastal Planning and Engineering, Inc. 2009). Shoals that are outside of the authorized Jones Inlet navigation channel shall not be mined for sand to provide sand for this project.

Corps' comment (12):

Pg 127, Red Knot RPM No. 1, paragraph 11: "In order to address take associated with decreases in prey resources on the Oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm and backshore is conducted based on a sampling program that has been devised in consultation with, and agreed to by, the Service prior to its implementation:" There are no backshore areas within the project description. Request that any discussion relative to this be removed from your recommendations.

Service Response:

See Comment No. 5, above.

Thank you for the opportunity to assist your agency in addressing and clarifying aspects of the Opinion and BA. If you have any questions or require further assistance, please contact Steve Papa of the Long Island Field Office at (631) 286-0485. We look forward to receiving your reinitiation package.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

cc: USACE, New York District, New York, NY (P. Weppler)
NYSDEC, Region I, Stony Brook, NY (R. Marsh)

References:

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____________________ 2014a. Biological Opinion and Conference Opinion Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project Suffolk County, New York. 217 pp.

____________________ 2014b. Biological Opinion and Conference Opinion on the Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Damage Risk Management Project. 165 pp.

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
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NEW YORK NY 10278-0090

Environmental Branch

February 20, 2015

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Coastal Storm Risk Management Project

Dear Mr. Stilwell:

The U.S. Army Corps of Engineer, New York District (District) is in receipt of the U.S. Fish and Wildlife Service's (Service) Biological Opinion and Conference Opinion (BO) dated November 24, 2014. The BO addressed the effects on the threatened piping plover (*Charadrius melodus;* Atlantic Coast population), the threatened seabeach amaranth (*Amaranthus pumilus*; threatened), and the rufa red knot (*Calidris canutus rufa*; red knot). The District has reviewed the Service's BO and respectfully does not concur with some of the measures as written as they relate to the proposed action.

As you are aware, it is important to recognize that all our work is dependent on the availability of funding which is appropriated by Congress annually. The Service should recognize the distinction between initial construction (and scheduled renourishments) of the recommended coastal storm risk management alternative with its related construction monitoring (committed budget funds) versus annual maintenance and monitoring. The District and the Project's local sponsors will implement the Reasonable and Prudent Measures (RPM) to the best extent practible. It should be noted that given the highest degree of collaboration and agreement between the Federal, State and local agencies in this important effort, the District does not control how the State and local agencies conduct local land management practices. Following construction or re-nourishment, beach management activities will be the responsibility of the local municipality or other appropriate landowner. The Town of Hempstead for example already has a management plan in place that provides protective measures for piping plover including: establishment of protective zones; restrictions on beach maintenance and other municipal activities; and actions to reduce impacts to the local plover population from predators and humans.

After our analysis of the BO and with substantial coordination with the non-Federal and local sponsors, the District concurs, in part with some of Service's recommendations, but not all of them. To better execute the RPMs, the District requests that the Service provide a table and figures/maps that better reflects how and where the RPMs should be implemented for the listed species.

The following paragraphs specifically discuss each RPM and recommendation that the District has concerns with:

1. Pg 5, under the section *"Description of the proposed project"*, there is no mention of the 136 acres ("preservation area") the District has set aside for habitat preservation. Was this area accounted for within the BO's analysis? The District believes that the Service misinterpreted the conservation measures contained within the Biological Assessment (BA). Most of the measures were to be applied within the designated 136 acre preservation area of which the majority of the Long Beach Island piping plover population is located.

2. Pg 30, Par 4, under section *Conservation: No major construction between June 1 – November 1 to protect seabeach amaranth.* The District agrees to a no work window from March 31 to August 31 within in the 136 acre preservation area as presented in the BA. To date, the District is unaware of a total "no work window" for seabeach amaranth within the States of New York and New Jersey and has been successful in utilizing monitors and collecting seed. The District cannot concur with this conservation measure as written.

3. Pg 83, Piping Plover Conservation Measure #10. *Beach fill would not be placed within 1,000 m of known populations of piping plover or other state or federally-listed shorebirds/seabirds during the breeding season, except in the area of the terminal groin at Point Lookout:* This measure should parallel the work within New Jersey which states *"1000 m of an active nest"*.

4. Pg 83, Piping Plover Conservation Measure #11 *Implement a 200 m work zone around terminal groin 58, delineated by fencing that is impenetrable to plover chicks to minimize impacts plovers as a result of groin reconstruction activities:* The District agrees with this measure and will apply the same conservation measure for Groins A-D and the two groin rehabilitations between Groin A and the Terminal Groin at Point Lookout. The District requires this measure to be applied to these structures to ensure that there is adequate time to complete their proper construction prior to beach nourishment phase of the project.

5. Pg 92, Piping Plover RPM #2 para 7. *The Corps shall not plant beach grass west of groin D, except in the front of the residential areas noted above. Beach grass planting may lead to increases in the berm elevation and reduce the potential for ephemeral ponding and the frequency at which it occurs:* The District disagrees with this measure and will plant any dunes created within the project area. The proposed dune footprint is located in areas that are currently vegetated. The State has indicated to the District that their Coastal Erosion Hazard Area (CEHA) Program regulations require them to direct any applicant to replant a newly created dune that covers or augments an existing vegetated dune.

6. Pg 92, Piping Plover RPM #2 para 8. *In order to address habitat loss, degradation, and fragmentation in the Action Area, the Corps shall undertake habitat restoration (vegetation removal and topographical management), west of proposed groin D. The Corps shall devise a restoration plan in coordination with the Town, Nassau County, and the Service. The plan shall be finalized prior to initial construction of the project:* The District only concurs with RPM if it applies to the 136 acre "preservation area" and not the Service defined "action area" (the entire footprint of the project). This action has been identified as a maintenance feature that would be implemented by the non-Federal sponsor.

7. Pg 92, Piping Plover RPM #2 para 9. *In order to address take associated with decreases in prey resources on the oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm, and backshore is conducted based on a sampling program that has been devised in consultation with, and agreed to by, the Service prior to its implementation. The information collected during this monitoring program shall be used to adaptively manage the operation and maintenance phases of the project to further avoid and minimize take. The plan shall be finalized prior to initial construction of the project:* The District requests that the reference to benthic sampling of the backshore area be removed. The project will only be constructed on the oceanside of the barrier island. No work is occurring on the bayside.

8. Pg 92, Piping Plover RPM # 2 para 12. *The Corps shall develop a biological monitoring program for the Action Area, to be approved by the Service and implemented by the Service or Service-approved entity:* The District concurs with this measure but will be seeking to designate a third-party representative if the program is implemented.

9. Pg 93, Piping Plover RPM #2 para 13. *The Corps shall ensure that the subaerial extent of the proposed groins A-D during are covered during the construction and maintenance phases of the project to minimize habitat fragmentation and ensure plover chicks are able to traverse nesting and foraging areas:* The District concurs with this measure, but would like to define the area of the groins to be covered. Our recommendation is the following: "On April 1 of any calendar year, the newly constructed groins east of the 136 acre preservation area will be covered to the design template. The District defines this area as the 110-foot berm from the toe of the dune seaward."

10. Pg 124, 2nd Bullet (Red Knot). *The proposed time-of-year restrictions that prohibit construction during the piping plover and seabeach amaranth (April to November, inclusive), along with the 1,000-m buffer zone would minimize direct impacts to the species:* The time of year restriction should be limited to April 1 – September 1 along with a 1000m buffer when there an active nest is present or until the last piping plover chick has fledged.

11. Pg 126, RPM # 2. *Dredging submerged and emergent shoals shall be avoided to preserve beach dynamics and shorebird habitat:* The project as proposed does not describe dredging of any submerged and/or emergent shoals and request that this measure be removed from the BO.

12. Pg 127, Red Knot RPM #1 para 11. *In order to address take associated with decreases in prey resources on the oceanside, the Corps shall ensure that intensive monitoring of invertebrates in the intertidal zone, berm, and backshore is conducted based on a sampling program that has been devised in consultation with, and agreed to by, the Service prior to its implementation:* There are no backshore areas within the project description. Request that any discussion related to this be removed from your recommendations.

Acknowledging that the RPMs and the accompanying terms and conditions provided within the BO nondiscretionary and are designed to minimize incidental take of threatened and endangered species, the District requests that the Service review and concur with the above statements that clarify the District's commitment to implement the revised RPMs on our ongoing commitment to protection of federally listed species. I look forward to working with you and your staff on finalizing these RPMs and the BO. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Paul E. Owen
Colonel, U.S. Army
District Engineer New York District

cc. USFWS-LIFO

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Branch

October 15, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: The Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York Storm Damage Reduction Project

Dear Mr. Stilwell:

The U.S. Army Corps of Engineer, New York District (District) is in receipt of your draft Fish and Wildlife Coordination Act Report (FWCAR) dated July 2014. The District has reviewed your report and respectively does not concur with some of the assumptions the Service has made on the proposed action. Long Beach Island, New York, has an extensive history of property damage and economic loss as a result of coastal flooding and erosion associated with frequent storms. Significant beach erosion and sand loss has reduced the width of the protective beach front and has exposed properties to a high risk of damage from ocean flooding and wave attack. Existing groins and jetties along the island have deteriorated and are becoming less effective at reducing sand loss along the shoreline and providing wave protection. As you are aware, the authorizedcoastal storm risk management project (previously referred to as a shore protection or storm damage reduction project) was designed to provide risk reduction against wave attack, erosion and inundation for homes and businesses along approximately 6.4 miles of oceanfront, including the Town of Hempstead (Point Lookout and Lido Beach), Nassau County (Nickerson Beach), and the City of Long Beach. At the outset, it is important to recognize the high degree of collaboration and full agreement between the Federal, State and local agencies in this important effort. After analysis, the District concurs, in part with some of your eight recommendations, but not all of them. The following paragraphs specifically discuss each recommendation:

1. Recommendation 1 asks the District to explore additional alternatives for this project.
   1R. Based on the analyses performed between the original 1998 FEIS and the 2014 EA, the District concluded that the preferred alternative is the best alternative which will provide coastal storm damage management measures while enhancing the surrounding habitat. The District is confident that the proposed project represents a sound engineering solution to property damage concerns

within the project area and will perform as stated in the Environmental Assessment.

2. Recommendation 2 suggests that the District allow natural processes to occur allowing for partial overwash and dune blow outs within the residential developments and public park areas.
   2R. The District has a concern with a recommendation that will allow wave attack, erosion and inundation to occur anywhere in an area that is heavily populated. Since Hurricane Sandy, considerable amount of information has been exchanged between our respective agencies on the proposed project with the acknowledgements of our agencies respective missions. Consequently, the District will incorporate some recommendations, as applicable, with the understanding that some recommendations will not allow the project to be implemented within its intended purpose. The District requests this recommendation be taken out of the FWCAR.

3. Recommendation 3 recommends that the District ensure full protection of these shorebird species and their habitats prior to project implementation, through the development of long-term agreements with the Town of Hempstead, Nassau County, New York State, and Service. (Ref attached 8-26-14 TOH letter)
   3R. The District agrees with and plans to have the Town and County continue its protection of the designated habitats.

4. Recommendation 4 recommends that the District undertake a regional assessment of cumulative impacts of beach nourishment on fish and wildlife resources and develop a long-term comprehensive management plan for sensitive species within the project areas.
   4R. The District is currently engaged in creating (coordinating with the New York Department of Environmental Conservation-Region 1) a regional assessment protocol for the borrow areas. The District is also seeking to re-establish the concept of developing a Long-term Regional Comprehensive Management Plant (LTRCMP) for Threatened and Endangered Species as part of the Fire Island Inlet to Montauk Point Reformulation Study. As you are aware, the LTRCMP was initiated to fully understand the effects that the Reformulation alternatives might have on these species and their habitats. This concept would include all of the south shore of Long Island. The goals of the LTRCMP was to ensure adequate data collection to support a Biological Assessment and the development of educational, management and monitoring strategies to support conservation measures to contribute to the recovery of the species.

5. Recommendation 5 recommends that the District undertake an updated impact assessment on fish and wildlife resources relative to this project.
   5R. After review, the District believes that conditions offshore and inshore have not experienced any major change to the existing species assemblage.

6. Recommendation 6 recommends that all offshore dredging activities should be coordinated with the NYSDEC Region 1 in regard to the protection of resources under their jurisdiction.
   6R. See **4R** above. The District has coordinated and will continue to coordinate with the NYSDEC to ensure the minimization of impacts and protection of resources in relation to the implementation of Corps' projects. Specifically, to minimization of impacts to surf clams, The District is working with NYSDEC for a borrow area SOP

7. Recommendation 7 recommends the following in order to avoid and minimize impacts to the offshore borrow area Resource Category 3 habitats and achieve "no net loss of habitat value, while minimizing loss of in-kind habitat value".
   7R. The District agrees in part with this recommendation. As stated in **4R** above, the District and the NYSDEC are creating guidance for borrow area monitoring and has used some part of the Bureau of Ocean Energy Management (BOEM), formerly Minerals Management Services, protocols.

8. Recommendation 8 recommends that the Corps should consider habitat enhancements in less developed areas at Hempstead, Nickerson, and Lido Beaches to address unavoidable impacts. Potential enhancements include vegetation and predator control, invasive species removal, and grading to promote shorebird foraging.
   8R. The District agrees with this recommendation and understands that during the Endangered Species Act formal consultation process our respective agencies can work out the details.

The District would like clarification on the Service's position on existing condition in the project area and the project footprint. The Service has included the updrift sand fillet at Jones Beach Island (page 2). On page 19, under Future Resource Conditions Without the Project, paragraph three states: "In a place (Long Beach Island) where it is heavily groined, lack of suitable shorebird habitat erosion or accretion would not likely affect shorebird population". It is the District position that the project provides risk reduction against wave attack, erosion and inundation and will also maintain and enhance the habitat for fish and wildlife in the area. The Service describes that the habitat within the project area is of lower quality and yet throughout the draft FWCAR it is states that the project will result in long-term irreplaceable impacts by creating suboptimal habitat. It is also unclear to the District how the proposed project can disturb an already suboptimal habitat area.

Thank you for continued cooperation in advancing this effort. I look forward to working with you and your staff on this effort. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729

Sincerely,

Mr. Peter Weppler
Chief, Environmental Analysis Branch

Cc. USFWS-LIFO

Emailed 07/23/2014

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

July 23, 2014

Colonel Paul E. Owen, P.E.
U.S. Army Corps of Engineers
Commander, New York District
26 Federal Plaza
New York, NY 10278

Attention: Mr. Peter Weppler

Dear Colonel Owen:

Re: Response to request for initiation of formal consultation for the Atlantic Coast of New York, Jones Inlet to East Rockaway Inlet, Long Beach Island, New York, Coastal Storm Damage Risk Management Project

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) receipt of your July 10, 2014, request for formal consultation pursuant to section 7 of the federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*; Act). The U.S. Army Corps of Engineers (Corps) has requested consultation for project impacts resulting from the above-referenced project that may affect the piping plover (*Charadrius melodus*; threatened).

In electronic correspondence dated May 6, 2014, the Corps submitted a biological assessment (BA) to the Service in which it made a determination of "Not Likely to Adversely Affect" (NLAA) for both the seabeach amaranth (*Amaranthus pumilis*; threatened) and the piping plover. The Service responded with a letter dated, July 1, 2014, stating that we did not concur with the NLAA determination for piping plover for reasons stated in that document and recommending initiation of formal consultation pursuant to section 7 of the Act.

In this same letter, we concurred with the NLAA determination regarding seabeach amaranth due to the understanding that this species was not found within the project area and the Corps' stated intention to request reinitiation if the species was subsequently found. However, it is necessary for us to revise our concurrence, based on the documented presence of seabeach amaranth in the project area (U.S. Fish and Wildlife Service 2010 and 2011) of which we have subsequently become aware; therefore, we will include this species in the consultation.

The consultation will also include a conference on the red knot (*Calidris canutus rufa*; proposed), which has been documented in the project area and may be adversely impacted by the project.

All information required to initiate formal consultation was included with the BA and associated project documents found at http://www.nan.usace.army.mil/Missions/CivilWorks/ProjectsinNewYork/JonesInlettoEastRockawayInlet(LongBeach).aspx. Consequently, formal consultation is considered to be initiated effective the date of your July 10, 2014, request for initiation, as stipulated by the Endangered Species Consultation Handbook, §4.4 (U.S. Fish and Wildlife Service and National Marine Fisheries Service, March 1998).

Both the Act and its supporting regulations mandate that formal consultation is to be concluded within 90 days of initiation, with the Service's final biological opinion delivered to the Corps within 45 days after conclusion of the consultation period (50 CFR 402.14[e]). We acknowledge the Corps' request to expedite this consultation; however, we note that we have already committed to expedited consultations, as well as the expedited provision of reports pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq*.), for several other major projects at the Corps' request. While we will make every attempt to complete this consultation in as timely a manner as possible, the Service is unable to commit to a particular expedited timeframe. Therefore, the Service expects to deliver the final biological opinion to the Corps no later than November 24, 2014.

Please note that although we have received adequate information to initiate consultation, it may be necessary to further clarify any issues that may arise during this process. We expect to remain in close coordination with the Corps throughout the consultation period.

As a reminder, section 7(d) of the Act requires that after initiation of formal consultation, the federal action agency may not make any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying their critical habitats until formal consultation has been concluded.

If you have any questions, please contact Steve Papa of the Long Island Field Office at (631) 286-0485.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

Literature Cited

U.S. Fish and Wildlife Service. 2010. Seabeach Amaranth Survey Report 2010 for Long Beach East. Submitted by Town of Hempstead Department of Conservation and Waterways to U.S. Fish and Wildlife Service, Long Island Field Office. 3 pp.

____________. 2011. Seabeach Amaranth Survey Report 2011 for Long Beach East. Submitted by Town of Hempstead Department of Conservation and Waterways to U.S. Fish and Wildlife Service, Long Island Field Office. 4 pp.

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF
Environmental Branch

April 29, 2014

Mr. David Stilwell
Field Supervisor
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Long Beach Hurricane and Storm Damage Reduction Project

Dear Mr. Stilwell,

This is a follow-up to August 12, 2013 letter and subsequent email correspondence regarding informal Section 7 consultation for the project referenced above. The U.S. Army Corps of Engineers, New York District has determined that the proposed actions that may occur in the project area may affect, but are not likely adversely affect, listed species under the Endangered Species Act. Please see the attached Biological Assessment for our justification for our Determination of Effect statement for the project.

It is requested that your office concur with the determination. If you should have any questions, please contact Mr. Robert J. Smith of my staff at 917-790-8729.

Sincerely,

Frank Santomauro, P.E.
Chief, Planning Division

Attachments
cc. USFWS-LIFO