August 12, 2003

Mr. David Spirtes
Superintendent
Fire Island National Seashore
National Park Service
120 Laurel Street
Patchogue, NY 11776

Dear Mr. Spirtes:

This transmits the U.S. Fish and Wildlife Service's (Service) final Biological Opinion, in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.), on the effects of the National Park Service's (NPS) proposed plan entitled, "*Fire Island National Seashore Short-term Community Storm Surge Protection Plan*" (Proposed Plan) on the Federally-listed (threatened) piping plover (*Charadrius melodus*) and seabeach amaranth (*Amaranthus pumilus*). The Proposed Plan establishes criteria for beach nourishment and beach scraping projects within the Fire Island National Seashore. We note that the Federally-listed (endangered) roseate tern occurs within the Proposed Plan's action area, but this species is not likely to be adversely affected by implementation of the Proposed Plan. Therefore, the roseate tern is not included in this Biological Opinion.

The Service has conducted several teleconferences with your agency and our Department of the Interior Solicitor's Office over the last two weeks to refine the project description, clarify information in the project descriptions contained in the Environmental and Biological Assessments, and obtain information on the duration of effects of the proposed beach stabilization activities. On Monday, July 28, and Tuesday, July 29, we received verbal concurrence from your office on the project descriptions including the conservation measures as well as the reasonable and prudent measures and their implementing terms and conditions to address incidental take of the piping plover resulting from the Proposed Plan. On August 1, we were able to finalize the definition of the duration of effects of the proposed activities with assistance of Dr. Norb Psuty, technical advisor to the NPS, and Michael Bilecki of your staff.

As discussed with the NPS, because the consultation is a programmatic one and does not deal with specific projects for which NPS-FIIS authorization via Special Park Use Permit will be sought, a second step in consultation is necessary. We have attached in the Appendix a template biological assessment for use by the NPS to assist in gathering the project specific information needed to complete consultation at the project specific level. This information will be used to assure that projects proposed for authorization consistent with the plan meet the requirements detailed in the project description conservation measures, the reasonable and prudent measures and their implementing terms and conditions. In addition, the project specific information will be evaluated to ensure that assumptions about project effects on listed species were correct and that the sum total of all projects will not exceed the level of take anticipated in the incidental take statement attached to this biological opinion.

Following receipt of the second tier biological assessment for individual projects, the Service will then complete the level of consultation appropriate. This may include preparation of a tiered Biological Opinion if the project cannot avoid adverse effects on listed species, or concurrence on a NPS determination that a specific project is not likely to adversely affect listed species.

Service biologists are available to provide technical assistance regarding fulfillment of the terms of this consultation, and any conservation recommendations that the NPS elects to carry out in furtherance of your Section 7(a)(1) responsibilities. The Service appreciates your cooperation in satisfying the requirements of Section 7(a)(2) of the ESA, and your efforts to minimize adverse effects to Federally-listed species from the Proposed Plan.

If you have any questions or concerns regarding this consultation, please contact Steve Papa of the Long Island Field Office at (631) 581-2941.

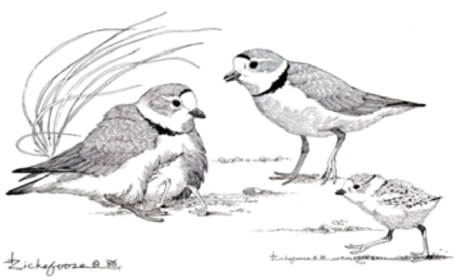
Sincerely,

David A. Stilwell
Field Supervisor

Enclosure

cc: Senator Charles Schumer, Melville, NY
Congressman Tim Bishop, Southampton, NY
Congressman Steve Israel, Hauppauge, NY
DOI, Newton, MA (R. Lepore)
FWS, Sudbury, MA (A. Hecht)
FWS, Hadley, MA (S. Morgan)
FWS, Hadley, MA (G. Smith)

BIOLOGICAL OPINION ON THE EFFECTS OF THE NATIONAL PARK SERVICE'S SHORT-TERM COMMUNITY STORM SURGE PROTECTION PLAN FOR THE FIRE ISLAND NATIONAL SEASHORE, SUFFOLK COUNTY, NEW YORK, ON THE PIPING PLOVER (*Charadrius melodus*) AND SEABEACH AMARANTH (*Amaranthus pumilus*)



Prepared for:

National Park Service
Fire Island National Seashore
Patchogue, New York 11776

August 2003

BIOLOGICAL OPINION ON THE EFFECTS OF THE NATIONAL PARK SERVICE'S SHORT-TERM COMMUNITY STORM SURGE PROTECTION PLAN FOR THE FIRE ISLAND NATIONAL SEASHORE, SUFFOLK COUNTY, NEW YORK, ON THE PIPING PLOVER (*Charadrius melodus*) AND SEABEACH AMARANTH (*Amaranthus pumilus*)

Prepared for:

National Park Service
Fire Island National Seashore
Patchogue, New York 11776

Prepared by:

U.S. Fish and Wildlife Service
Long Island Field Office
Islip, New York 11751

Preparer:
Steven T. Papa

Field Supervisor:
David A. Stilwell

August 2003

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I. CONSULTATION HISTORY

June 9, 2003 — The U.S. Fish and Wildlife Service (Service) received the Fire Island National Seashore (FIIS) Short-term Community Storm Surge Protection Plan Environmental Assessment and Biological Assessment dated June 2003 (Plan).

By copy of a transmittal note, National Park Service (NPS) requested formal consultation and that this consultation be completed by July 18, 2003.

June 12, 2003 — The Service contacted the NPS for clarification as to the current status of two Public Notices (2002-00220-L6 and 2001-01682-L-6) for two proposed beach nourishment/erosion control projects within the FIIS. These two projects appeared to be subject to the criteria for Special Park Use Permits (Criteria) evaluated in the environmental assessment.

June 24, 2003 *(rec.)* — The NPS contacted the Service via letter regarding the viability of the two public noticed beach nourishment/erosion control projects. NPS indicated that as designed, the projects did not meet the Criteria and the NPS could not issue a Special Park Use Permit for these projects.

June 27, 2003 — The Service contacted the U.S. Army Corps of Engineers (Corps) and NPS via separate letter requesting clarification of issues associated with the two beach nourishment projects within the FIIS and their relationship to the request for consultation on the Plan and Criteria. The Service requested that the NPS and Corps join the Service in a conference call to sort out these issues as soon as possible in order to facilitate the consultation process. One key issue continued to be which Federal agency would be designated lead Federal agency for the purposes of consultation.

June 30, 2003 — In a conference call, the NPS and Service discussed the issues outlined in the June 27, 2003, letter and the NPS indicated that consultation on the Plan was needed in order that NPS be able to complete the National Environmental Policy Act process, complete a Finding of No Significant Impact, and authorize projects, designed and constructed consistent with the Criteria in the Plan, via the NPS Special Park Use Permit. The NPS said that it would be the lead Federal agency. The Corps did not respond to either telephone inquiries nor the June 27, 2003, letter.

The Service requested that NPS respond in writing that it was the lead Federal agency. The NPS did not want to limit the consultation (in the form of a "batched consultation on known projects") to the pending permits and indicated that the front of the queue was occupied by several pending beach scraping permits; the beach nourishment projects, under discussion for some months, were slightly less critical. The NPS indicated that the 5-year New York State Department of Environmental Conservation permit for beach scraping was due to expire August 15, 2003. Thus, any projects would have to be completed before that date. The agencies discussed the time line for completing consultation. The Service agreed to contact NPS on July 7 with a time line for completion of consultation.

July 7, 2003 — The Service contacted the NPS with a time line for completion of consultation. The offices of Senator Schumer were also contacted. The Service also FAXed a draft letter to the NPS for any comments; this letter codified agreements between the two agencies made on June 30 and July 7, 2003.

July 9, 2003 — The Service sent the letter referenced above. The key issue was that the Service was proceeding with a programmatic consultation and that such a consultation would require an additional step each time a specific storm surge protection project (designed in conformity with the Plan and its Criteria) were under review for Special Park Use Permit authorization. The Service indicated that it was preparing a template Biological Assessment which would be completed by NPS and an applicant, and sent to the Service; the Service would then continue consultation on the specific project, tiered off the programmatic consultation.

July 22, 2003 — The Service discussed the schedule for completion of the biological opinion and means to facilitate coordination and exchange of biological information. In particular, the Service needed clarification regarding piping plover nesting within the FIIS.

July 24, 2003 — The Service sent the NPS a draft project description, including a number of conservation measures. The Service requested NPS comments on the project description and attached a draft template Biological Assessment for use by Special Park Use Permit applicants, to assist the NPS in gathering the information the Service will need to complete the second tier consultation on individual projects proposed for authorization by the NPS under the Storm Surge Protection Plan. The Service noted that significant changes to the project description conservation measures would likely impact the schedule for completion of the biological opinion.

July 25, 2003 — The NPS joined the Service on a conference call to discuss elements of the draft project description conservation measures which had been sent to them on July 24, 2003. Discrepancies between information in the biological assessment, on which the Service used to base a draft project description for the biological opinion, and the environmental assessment were discussed.

July 28-29, 2003	The NPS and Service continued discussions via teleconference regarding the conservation measures component of the project description. The Service received verbal concurrence from NPS-FIIS on the project description including the conservation measures as well as the reasonable and prudent measures and their implementing terms and conditions to address incidental take of the piping plover resulting from the Proposed Plan.
July 30, 2003	The NPS and Service continued discussions via teleconference to refine the conservation measures component of the project description, and discussed projects authorized by the NPS consistent with the Plan, and the likely duration of their effects on listed species.
July 31, 2003	NPS continued to consult, via teleconference, with the Service on the programmatic level of incidental take attributable to projects authorized for construction consistent with the Plan under consultation.
August 1, 2003	The NPS and Service, via teleconference, consulted with Dr. Norb Psuty, coastal geomorphologist, and consultant to the Department of the Interior, regarding the duration of effects attributable to projects authorized for construction consistent with the Plan under consultation.

II. DESCRIPTION OF THE PROPOSED PLAN

The NPS's proposed "Short-term Community Storm Surge Protection Plan" (hereafter referred to as the "Proposed Plan") is located within the boundaries of the Fire Island National Seashore (FIIS) and the Towns of Brookhaven and Islip, Suffolk County, New York (Figure 1). Fire Island is about 30 miles (mi.; 48.2 kilometers [km.]) in length and is bounded by the Atlantic Ocean to the south and Great South and Moriches Bays to the north. The Proposed Plan is also located within the U.S. Army Corps of Engineers' (Corps) "Reach I - Fire Island Inlet to Moriches Inlet-Fire Island Inlet to Montauk Point Beach Erosion Control and Hurricane Protection Project Reformulation Study" (FIMP) area. The Federally-authorized and maintained Moriches and Fire Island Inlets are located on the eastern and western ends of Fire Island, respectively.

The purpose of the Proposed Plan is to address short-term storm surge protection on the ocean beach fronting the FIIS communities through the application of beach scraping and beach nourishment.

The Proposed Plan establishes criteria for beach nourishment and beach scraping for 6 mi. of ocean beach fronting the seventeen communities through 2005. Beach scraping and beach nourishment activities will be considered under the conditions identified and discussed in the following sections. Overall, from three to seven nourishment projects and twelve to seventeen scraping projects are expected to be constructed during the time-frame of the Proposed Plan.

The Proposed Plan also includes conservation measures for the protection of Federally- and State-listed species within the FIIS. These are provided in Section I (C) below, and are in addition to, or supplement those conservation measures contained in the Biological Assessment found in National Park Service (2003b). Figures 2 through 4 illustrate the design cross-sections of dune and beach construction discussed in Sections A and B below.

The Service expects that the findings of this biological opinion would be superceded by the Service's biological opinion for the preferred alternative described in the Final FIMP Environmental Impact Statement (EIS). Based on the time-line for completion of the FIMP EIS and the construction schedule and anticipated duration of the effects of these projects (on average 10 years for beach nourishment [Psuty, Rutgers University, pers. comm., 2003]; and an average of four years for beach scraping [Psuty, Rutgers University, pers. comm., 2003; Keehn, Coastal Planning and Engineering, pers. comm., 2003]), the effects of the Proposed Plan would extend for an average of six years beyond the release of the FIMP EIS, or until about 2011.

A. BEACH SCRAPING

Beach scraping involves projects which would mechanically manipulate the beach or redistribute sand within the existing sand budget. Under New York State law, beach scraping is normally considered as routine beach maintenance or regrading activities (see New York State Department of Environmental Conservation [NYSDEC] - 6NYCRR Part 661; New Jersey Department of Environmental Protection [NJDEP] - NJAC 7:13, Subchapter A; and NC-15NCAC 07H Ocean Hazard Categories). However, routine beach regrading and cleaning is considered by NYSDEC as a "Presumably Incompatible Use" under NYSDEC Tidal Wetland Land Use Regulations 6 NYCRR Part 661, for which a permit is required (National Park Service 2003a).

Beach scraping is the most commonly used beach stabilization technique utilized by FIIS communities. Beach scraping has occurred since 1993; however, most NYSDEC scraping permits are due to expire, with only one or two permits valid through 2004 (National Park Service 2003a).

The Proposed Plan includes criteria which must be met by an applicant in order to receive a permit for beach scraping. These are taken from the NPS Biological Assessment (BA) and Environmental Assessment (EA), given below and summarized in Table 1. The criteria were established by NPS using existing guidelines, whenever available and appropriate, including but not limited to, base flood elevations from the Flood Insurance Rate Maps from the National Flood Insurance Program (NFIP) and Federal Emergency Management Agency (FEMA); the Corps' New York District; NY and NJDEP data and modeling results and engineering design data; NYSDEC wetland regulations; the Service and National Marine Fisheries Service (NMFS) Threatened and Endangered (T&E) Species and Essential Fish Habitat (EFH) information (National Park Service 2003a).

- The NPS would not issue a special use permit without adequate local zoning or NYSDEC regulations to ensure that upland development is not increased as a consequence of a project. This would occur if the project would enable the current primary dune to qualify as a secondary dune. Beach profile data must be consistent with NYSDEC's permits issued from 1993 to 2003, NJDEP 2000 guidelines, and modeling and monitoring data given in Psuty and Piccola (1991) and Psuty and Tsai (1997). Overall, these criteria are derived from discussions with coastal processes experts, planners, and policy-makers to provide the most effective protection for natural beaches and dunes. Seasonal restrictions are derived from, and consistent with, the Service's criteria for T&E Species Recovery Plan and Consultation guidance to avoid and minimize adverse impacts to listed species;

- Each applicant can apply for more than one beach scraping project during the scope of the Proposed Plan;

- All necessary local, State, and Federal permits and approvals must be secured;

- The beach/dune profile and design parameters must be met and the threshold for need must be established;

- No displacement of the foredune will be allowed seaward of the existing dune crestline. The full template is to be measured from the inland toe of the foredune;

- The dune template must allow a dune crest which is 30 feet (ft.) wide at 16.5 ft. (5 m.) National Geodetic Vertical Datum (NGVD). The 30 ft. (9.1 m.) must be measured 15 ft. (4.6 m.) seaward and landward of the existing dune crestline OR where no dune is present, the dune crestline must be located by following the trend of the adjacent (east and west) dune crestlines. All constructed dune crestlines must be flat or rounded upward (convex) with no downward swales along the crest. The inland slope of 1:4 will extend to the position of the natural grade;

- In those locations where houses are on, or seaward of, the dune crest, the dune crest must follow the same dimensional standards and no dune crest wider than 30 ft. (9.1 m.) will be allowed;

- The dune must be constructed over the existing dune area at the time of the application. Data to be used by the NPS for determining the existing dune position shall be one of the following: 2000 Light Detection and Ranging (LIDAR) data; 2002 LIDAR data, once available; or data supplied by an applicant that presents survey information developed on, or after, the year 2000 and is agreed upon by the NPS;

- All debris from past projects/activities shall be removed and pre-construction monitoring shall indicate that no protected beach species are present;

- Interpretive and Education component must be implemented – signs and community involvement, including symbolic fencing, to protect the recently established dunes and provide for wildlife habitat; and

- The applicant shall be required to monitor (or pay the cost of monitoring) the beach profile as well as pre- and post-project biological monitoring of beach flora and fauna with protocols developed by the NPS.

B. BEACH NOURISHMENT

The Proposed Plan (National Park Service 2003a) provides specific design criteria for beach nourishment which are listed below and summarized in Table 2:

- The slope from existing island grade, landward of the landward dune toe, shall be 1:4 to a height of 16.5 ft. (5 m.) NGVD. If the landward toe was at 9 ft. (2.7 m.) NGVD, this would allow 30 ft. (9.1 m.) horizontal;

- The dune crest must be a maximum 30 ft. (9.1 m.) wide at 16.5 ft. (5 m.) NGVD;

- The dune slope must be 1:4 seaward of the dune crest to the beach berm at 9 ft. (2.7 m.) NGVD, an additional 30 ft. (9.1 m.) horizontal;

- The beach berm must be 100 ft. (30.5 m.) wide at 9 ft. (2.7 m.) NGVD;

- Beach fill material for any proposed project shall be hydraulically dredged from the Corps' approved "Atlantic Ocean Offshore Borrow Area No. Two" (Atlantic Offshore Borrow Area), located in the Atlantic Ocean south of Cherry Grove. Hydraulic cutterhead dredges connected to pipelines which deliver the sand on the shoreline shall be used. However, a hopper dredge may be the dredge of choice since it allows the dredge to travel to the shoreline area where it will then dump the sand;

- The constructed intertidal beach slope must be 1:15 to 0 ft. NGVD, providing a total of 135 ft. (41 m.) horizontal;

- The entire dune and beach template shall allow a total horizontal distance of 30 ft. (9.1 m.) up + 30 ft. (9.1 m.) at crest + 30 ft. (9.1 m.) down + 100 ft. (30.5 m.) of beach berm + 135 ft. (41 m.) of intertidal beach slope = 325 ft. of beach dune and slopes from the landward margin of the dune toe at 9 ft. (2.7 m.) NGVD to the 0 ft. NGVD waterline;

- No tapers shall be allowed in front of non-developed lands, or in front of NPS land, and no southward placement of the dune shall be permitted;

- Beach profile data must be consistent with NYSDEC's permits issued from 1993 to 2003, New Jersey Department of Environmental Protection (2000), and modeling and monitoring data given in Psuty and Piccola (1991) and Psuty and Tsai (1997). The criteria are derived from discussions with coastal processes experts, planners, and policy-makers to provide the most effective natural beach and dune barriers. Seasonal restrictions are derived from, and are consistent with, the listed species' recovery plans and national Section 7 of the Endangered Species Act (ESA) guidance to avoid and minimize adverse impacts;

- Each applicant will only be considered for **one** beach nourishment project during the scope of the Proposed Plan;

- All necessary local, State, and Federal permits and approvals must be secured;

- The beach/dune profile and design parameters must be met and the threshold for need must be established;

- The proposed dune shall not be constructed seaward of the existing dune line. The dune crest width is always measured from the central dune crestline. The dune must be constructed over the location of the existing dune at the time of the application. All dune crests constructed must be flat or rounded upward (convex) with no swales along the crest. Data to be used by NPS for determining the existing dune position will be one of the following: 2000 LIDAR data; 2002 LIDAR data, once available; or data supplied by an applicant that presents survey information developed on, or after, the year 2000 and is agreed upon by NPS;

- Dune template to be constructed must allow a dune with a 30 ft. (9.1 m.) wide crest at 16.5 ft. (5 m.) NGVD. This 30 ft. (9.1 m.) will extend 15 ft. (4.6 m.) seaward and landward of the central dune crestline OR where no dune is present, the dune crestline will be located by following the trend of the adjacent (east and west) dune crestlines. All dune crests must be constructed flat or rounded upward (convex) with no swales along the crest. The inland slope of 1:4 will extend to the position of the natural grade (see Figure 3);

- For those locations where houses are on, or seaward of, the dune line, the dune crest will follow the same standards and no dune crest wider than 30 ft. (9.1 m.) will be allowed. For any line of houses along the dune crest line exhibiting variation, the project being designed shall pick a relative line along the existing dune crest and apply the design template at that line keeping the criteria established as the basis for that line being proposed (see Figure 2);

- The beach width must always be measured from the seaward toe of the dune. From that seaward toe of an existing dune that is already 30 ft. (9.1 m.) wide at the crest at 16.5 ft. (5 m.) NGVD and sloping seaward to the beach at 9 ft. (2.7 m.) NGVD, the allowable beach width shall be 100 ft. (30.5 m.) at 9 ft. (2.7 m.) NGVD plus a 1:15 slope down to 0 ft. NGVD which will equal 135 ft. (41 m.) for a total of 235 ft. (72 m.) from the seaward dune toe down to 0 ft. NGVD (see Figure 3);

- All debris from past projects/activities shall be removed as part of the application and pre-construction monitoring indicates that no protected beach species are present;

- Interpretive and Education component must be implemented using signs and community involvement. This includes symbolic fencing to protect the recently established dune and to provide for wildlife habitat;

- The applicant(s) shall be required to monitor (or pay the cost of monitoring) the beach profile as well as pre- and post-project biological monitoring of beach flora and fauna with protocols developed by NPS (see Section I (C), Conservation Measures, below for more details);

C. CONSERVATION MEASURES

The Proposed Plan includes a number of conservation measures found in Section C (2), below, to avoid or minimize adverse effects of either beach nourishment or beach scraping projects to the piping plover and seabeach amaranth. For the benefit of the reader, and to provide specificity for the NPS and any potential applicants, the following section provides definitions of terms used in Section C (2).

1. Definitions

Breeding Area:
The geographic boundary of the area where piping plovers exhibit territorial and courtship behavior, nest building, egg-laying, incubating, brooding, chick-rearing, and foraging. Examples of breeding areas include portions of foredunes, beach berm, intertidal areas, overwashed beaches, and blow outs.

Brood:
Chicks hatched from a single nest and tended by one or both parents (piping plover chicks in a brood are mobile and capable of foraging for themselves within hours of hatching).

Clutch:
The eggs laid in one nest.

Disturbance:
A sudden change in behavior of a piping plover (*e.g.*, from feeding to alert, from resting to running, from incubation to nest defense) that coincides with an event known to stimulate distress in piping plover; attribution of disturbance to human activities generally requires that no apparent natural disturbance stimuli (*e.g.*, avian predators flying overhead) are present and that

the new behavior is one associated with distress (*e.g.*, running or flying away, alarm calling, chick crouching, broken wing feigning, and standing alert).

Fledged:
Capable of flying; for the purpose of managing beach use, piping plover chicks are considered fledged if they are 35 days of age or observed in sustained flight for 49 ft. (15 m.), whichever occurs first.

Growing Areas:
The geographic boundary of area where individual or multiple seabeach amaranth plants are identified by a qualified monitor.

Harass:
An intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 C.F.R. § 17.3).

Harm:
An act which actually kills or injures wildlife, including significant habitat modification or degradation that results in the killing or injury of wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering (50 C.F.R. § 17.3).

Monitor:
Monitoring includes, but is not limited to, detecting and recording locations of seabeach amaranth plants, and breeding piping plovers, as well as locating nests, incubating adults, and broods, interpreting piping plover behaviors, and documenting behavioral observations. This activity is undertaken without causing disturbance to the birds or destruction of the plants under observation. Except to determine the number of eggs in a newly discovered nest, piping plover monitoring is done from a distance of greater than 164 ft. (50 m.) using binoculars or spotting scopes.

Recommended piping plover monitoring procedures are described in detail in Goldin (1994) and Cairns (1982).

Nesting:
The phase in the breeding cycle which includes the construction of nests, laying of eggs, and egg incubation. The courtship and nest building phase includes the construction of numerous unoccupied scrapes, or shallow depressions, which are formed by the male; one of which will be selected by the female for egg-laying.

Off-road Vehicle (ORV):
A motorized vehicle being operated in an area that is not paved, graveled, or otherwise graded, hardened, or permanently maintained in such condition.

Predator Exclosures:
Wire mesh fences, a minimum of 10 ft. (3 m.) in diameter, placed around piping plover nests to exclude mammalian and avian predators; deployment of exclosures requires a letter of authorization from the NYSDEC (see "Guidelines for the Use of Predator Exclosures to Protect Piping Plover Nests" found in U.S. Fish and Wildlife Service 1996a).

Qualified Biologist:
A person who has the skills, knowledge, and ability to conduct monitoring (see above) for these species. Aptitude for monitoring includes keen powers of observation, familiarity with avian and plant biology, experience observing birds or other wildlife for sustained periods, tolerance for adverse weather, patience, and the ability to maintain detailed organized notes.

Suitable Habitat:
Habitat of sufficient size and quality that is suitable for and could potentially support piping plovers and seabeach amaranth during their respective breeding and growing seasons.

Symbolic Fencing:
One or two strands of lightweight string, tied between posts to delineate areas where pedestrians (and their pets) and vehicles may not enter.

Take:
To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (ESA, 16 U.S.C. § 1532).

Territorial Adult:
A piping plover, at least nine months old, that defends a portion of the beach against other piping plovers (except its actual or prospective mate) and other perceived intruders. Territorial behaviors vary according to the stage in the breeding cycle, and include, but are not limited to, "horizontal threat," "parallel run," and aerial displays with accompanying vocalizations; distraction behaviors such as squatting, false brooding, running, feigning injury, and alarm calling.

Unfledged:
A condition of piping plover maturation when chicks are incapable of flight.

Vehicle Closures:
Areas where off-road vehicles (ORVs) have been temporarily excluded to prevent take of adults, eggs, and unfledged chicks.

Warning Signs:
Waterproof signs, not smaller than 8.5 in (21.6 cm.) by 11 in (28 cm.), which state at a minimum, that the area is a piping plover breeding area, or a seabeach amaranth growing area, is restricted, and that these birds and plants are protected under Federal and State laws.

Wrack:
Organic material including seaweed, seashells, driftwood, and other material deposited on beaches by wave and tidal action.

2. Conservation Measures

The Proposed Plan includes the following Conservation Measures to augment the Conservation Measures provided in the BA for the purpose of avoiding and minimizing potential adverse effects of the Proposed Plan, and conserve threatened and endangered species within the FIIS:

a. Time-of-Year Restrictions

Beach nourishment and scraping projects shall not occur between March 15 and September 1 to protect piping plovers and March 15 to November 1 to protect seabeach amaranth. The Proposed Plan allows that if breeding piping plovers are not observed in a proposed project area, or are not within 3,280 ft. (1,000 m.) of the project area by July 1, then project activities may commence, following consultation with both the NPS and Service;

b. Protection Efforts

Project-induced effects shall be reduced through intensive protection of breeding piping plovers on all suitable habitats in the action area from human disturbance (*e.g.*, ORVs and recreational activities) and predation for the 10 years beyond project implementation for beach nourishment, four years for beach scraping, or when baseline/reference conditions have been met. The measures identified below will also help offset impacts of habitat degradation on the plover population's vulnerability by maximizing productivity on the remaining habitat.

The Proposed Plan requires that suitable habitats within the project area(s) shall be protected through the placement of symbolic fencing and warning signs.

Prior to the piping plover breeding or seabeach amaranth growing seasons, the applicant will coordinate with NPS biologists to design a "symbolic fencing plan" to protect listed species and the habitats on which they depend. Coordination on the placement of symbolic fencing will incorporate field population and habitat data for the FIIS and visual assessment of all oceanside and bay side habitats in each year. Habitats will be deemed suitable if piping plovers and seabeach amaranth were observed at the site in previous years or the beach width, slope, cover material, (shell fragments), etc., are deemed adequate.

Consistent with current NPS management measures, breeding and growing areas shall be protected with symbolic fencing using steel or Carsonite™ fiberglass posts placed approximately 33 ft. (10 m.) apart and connected with string or twine. Fluorescent flagging material will be tied to the string every 1.6 ft. (0.5 m.) to increase visibility and piping plover or seabeach amaranth habitat warning signs shall be placed on every two or three posts (see National Park Service 2002). Posts stretch from the toe of the dune seaward to approximately 25 ft. (7.6 m.) north of the mean high water line (MHW). As sand accretes through the season, posts and fences may need to be moved seaward to maintain symbolic fencing at 25 ft. (7.6 m.) north of the MHW.

Qualified biologists shall be hired to work exclusively on the threatened and endangered species management activities (*e.g.*, coordinating with local communities and agencies, as well as organizing the pre-season planning) in community beach nourishment or scraping project areas. The primary role of these biologists will be to recommend and implement changes in the location and configuration of symbolic fencing and warning signs and to gauge the effectiveness of management actions. Biologists will be educated about biology of listed species and required to attend a piping plover management course organized by the Service, NYSDEC, and The Nature Conservancy (TNC).

All pedestrian and ORV access into, or through, the breeding or growing areas shall be prohibited. Only persons engaged in monitoring, management, or research activities shall enter the protected areas. These areas shall remain symbolically fenced for piping plovers until at least July 1, and as long thereafter as viable eggs or unfledged chicks are present. If no breeding piping plovers or their chicks are observed in the symbolically fenced areas, the fencing may be removed or reduced in scale provided that the seabeach amaranth is not present or the site is not suitable for seabeach amaranth. Symbolic fencing is intended to avoid or minimize accidental crushing of nests and repeated flushing of incubating adults, and to provide an area where chicks can rest and seek shelter when people are on the beach. Symbolic fencing erected to protect seabeach amaranth shall be in place until the plant dies, or until November 1, whichever comes first.

A corridor which is 25 ft. (7.6 m.) wide shall be permitted along the water's edge, above MHW, and will be kept free of symbolic fencing along the entire project area as an ORV and emergency response corridor.

An area within each designated community will be allowed to be kept outside of the symbolically fenced area and open to the public for swimming and visitor use. This area will be the normal area protected by lifeguards, where provided, but in no case will exceed more than two locations per community and not to exceed 300 ft. (91 m.) in width. The final locations for these designated swimming and visitor areas will be identified in the symbolic fence plan submitted by the permitee and approved by the NPS and the Service.

Beach access sites (pedestrian dune crossings) will be evaluated each spring to determine if such access sites will be closed to pedestrian use (March 15 to July 1, if no birds are present; March 15 till the birds fledge, if there are plovers present). Such closures will be identified in the symbolic fence plan. Pedestrian dune crossings will allow direct community access to designated swim beaches and shall allow access to the beach at intervals of no greater than 800 ft.; this distance may be reconsidered in response to breeding activities.

In cases where a nest is established less than 165 ft. (50 m.) from the symbolic fencing, the symbolic fencing should be extended to provide a minimum 165 ft. (50 m.) buffer.

Prior to hatching, ORVs may use designated ORV corridors established along the outside edge of piping plover breeding areas. Corridors for ORVs shall be moved, constricted, or temporarily closed if breeding piping plovers are disturbed by passing ORVs, or if disturbance is anticipated because of unusual tides or expected increases in ORV use during weekends, holidays, or special events.

Sections of intertidal beaches where unfledged piping plover chicks are present shall be temporarily closed to all ORVs. Areas where ORVs are prohibited shall include all dune, beach, and intertidal habitat within the chicks' foraging range, to be determined by <u>either</u> of the following methods:

> The vehicle-free area should extend 3,280 ft. (1,000 m.) on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. The resulting 7,560 ft. (2,000 m.) wide area of protected habitat for plover chicks should extend from the oceanside low water line to the farthest extent of dune habitat.
>
> <u>OR</u>
>
> If nests and chicks are monitored at least daily, vehicle-free areas may be reduced to not less than 656 ft. (200 m) on each side of the brood location. The size and location of the protected area should be adjusted in response to the observed mobility of the brood, and in some cases, highly mobile broods may require protected areas up to 3,280 ft. (1,000 m,), even where they are intensively monitored. Protected areas should extend from the oceanside low water line to the farthest extent of dune habitat.

Restrictions on the use of ORVs in areas where unfledged plover chicks are present should begin on or before the date that hatching begins and continue until the chicks have fledged. For purposes of ORV management, plover chicks are considered fledged at 35 days of age, or when observed in sustained flight for at least 49.2 ft. (15 m.), whichever occurs first. When piping plover nests are found before the last egg is laid, restrictions on ORVs should begin on the 26th day after the last egg is laid. This assumes an average incubation period of 27 days and provides a one day margin of error. When piping plover nests are found after the last egg has been laid, making it impossible to predict the hatch date, ORV restrictions shall begin on a date determined by <u>one</u> of the following scenarios:

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

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

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

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

c. Measures to Avoid, Minimize, and Compensate for Adverse Effects to Seabeach Amaranth

i Surveys

If any beach nourishment or beach scraping activities are scheduled to occur during the growing season of seabeach amaranth (defined by the NPS as March 15 to November 1), a NPS, or qualified, biologist hired by the applicant will survey the project area(s) for this species twice a month from June 1 to October 1, and also immediately prior to any construction or other work. Plant locations, numbers, and sizes will be recorded.

ii Fencing and Avoidance of Plants

If construction personnel or ORVs will be present in, or may pass through, seabeach amaranth growing areas, symbolic fencing will be erected encompassing a 9.8 ft. (3 m.) protective buffer around the plants if practical. All construction activities will avoid all delineated locations of seabeach amaranth where feasible. The NPS will undertake all practicable measures to avoid incidental take of plants.

iii Transplantation of Plants Likely to be Destroyed

In the event that seabeach amaranth is present in the project area, and it is likely that the plants will be destroyed, the NPS proposes to transplant the individual plants to a similar habitat near, or within, the project area to lessen the impact. Transplantation will include removal of a sufficiently large and intact volume of sand to include the full extent of the roots. Transplanted individuals will be monitored until their deaths, and the monitoring results will be provided to the NPS.

iv Seed Collection and Other Measures to Offset Adverse Effects

In consultation and cooperation with the NPS, beginning in 2004, the applicant will develop and implement a plan to compensate for plant mortality and burial of the seed bank, involving collection of a portion of the seabeach amaranth seeds produced in all areas to be nourished or renourished where the plant is present. Seeds will be sent to a qualified greenhouse. A portion of the collected seeds will be stored under controlled conditions appropriate for the species (*e.g.,* temperature, humidity, light) and later redistributed within the action area. Qualified practitioners will attempt to germinate the remainder of the seeds. If successful, germinated plants will be replanted in suitable habitats within the action area. If the number of wild plants bearing seeds is insufficient to collect an adequate amount of seeds, individual plants will be sent to a qualified greenhouse and propagated to produce additional seeds to be used for the purposes described above. Removal of a portion of the seed bank through "scraping" and stockpiling the top layer of sand prior to renourishment may also be included in the plan to compensate for adverse effects to plants and seeds. The stockpiled sand would be re-spread on the construction template upon completion of renourishment.

Based upon the best available scientific data, the NPS and the Service will cooperatively determine an acceptable course of action to compensate for seed bank burial, including the amount of seeds to be collected; thresholds for collecting and propagating plants for production of additional seeds; the proportions of collected seeds to be stored versus germinated; protocols for collection, storage, germination, and reintroduction of plants and seeds into the project area; and procedures for scraping and re-spreading sand, if deemed appropriate. The applicant will monitor reintroduced plants and seeds for the duration of the growing season and report the results to the NPS.

These actions will be undertaken to offset the anticipated adverse impacts to the seed bank and individual plants whose destruction cannot be avoided. These actions will serve to compensate for any such loss but will not be construed as a long-term commitment to species propagation between renourishments. Such activities will not continue past the second year of each renourishment cycle.

vi Evaluation of Seabeach Amaranth Conservation Measures

In consultation and cooperation with the NPS, the applicant will evaluate the success of measures to protect seabeach amaranth and will revise these protective measures as appropriate for each subsequent renourishment or beach scraping project.

d. Surveys

The Proposed Plan requires implementation of a biological monitoring program, which will be part of a binding contract with the Erosion Control Districts on Fire Island. In addition to the biologists hired to recommend and implement on-the-ground management decisions, qualified biologists shall be retained to implement a biological monitoring program. The primary role of these biologists is to collect accurate information on the status of the piping plover and seabeach amaranth in the project area(s) for the purpose of collecting abundance and productivity data for each species. This program would supplement the management program in that it would provide needed data on the location, number, habitat use, status of species, etc., which would be critical to understanding the effects of the proposed projects and making sound management decisions. The biological monitoring program would consist of the following:

Productivity and population surveys will be conducted each year up to the end of the project life (10 years following project implementation for beach nourishment; four years for beach scraping) or until the project area has reverted to baseline/reference conditions. Population survey information will include the total number of breeding pairs; the total number of piping plovers; and detailed mapping of breeding (courtship, territorial, scrapes, egg-laying, incubating, and brood-rearing) area and foraging use of habitats in the project area. Productivity information will include the total number of nests, the total number of chicks fledged per pair, and quantification of take, including eggs, chicks, and adults that occurred, including reasons for take and actions which were taken to avoid take.

Surveys will be conducted three times weekly with observations evenly distributed over a minimum time period (to be determined) during the daylight hours from 30 minutes after sunrise to 30 minutes before sunset and should include a wide range of tidal conditions and habitat types. *Note: Areas should be surveyed slowly and thoroughly.* In addition, there may be a need for more frequent monitoring to assess the impacts of ORVs passing in the vicinity of nests or their effects on suitable habitat.

Surveys will not be conducted during poor weather (*e.g.*, heavy winds greater than 25 miles per hour, heavy rains, severe cold, *etc.*), since birds may seek protected areas during these times.

Surveys will be recorded and summarized and plover locations will be recorded on maps indicating areas surveyed and habitat types. Information collected will include:

> date;
> time begin/end;
> weather conditions;
> tidal stage;
> area of coverage;
> ownership of site;
> number of adults observed;
> number of pairs observed;
> habitat type;
> nearest known plover occurrence;
> banded plovers; and
> predator trail indices.

Prior to implementation of the monitoring program, the NPS and applicants will consult with, and obtain agreement from, the Service on the methodologies and reporting frequencies to be utilized.

Information describing overall reproductive success, nest failures, and mortality in the project area with comparisons to other sites on Fire Island will also be collected. The applicants will ensure that an annual report describing methodology, results, and comparisons to historic data is submitted to the NPS at the end of the breeding season.

e. Predator Control

Subject to the authorizations from the NYSDEC, the Proposed Plan requires the use of predator exclosures to protect piping plover nests. To minimize predators, the Proposed Plan prohibits the feeding of raccoons, gulls, or other wildlife in any project area. The Proposed Plan also requires the implementation of pre-seasonal and in-season predator control measures to protect piping plover nests and chicks based upon data from the monitoring of predator trail indices and consultation with the NPS. The applicant is required to submit to the NPS, a predator plan for pre-season and in-season predator monitoring program for all project areas where the monitoring program indicates an increase in the predator population. The predator plan will include measures needed to protect piping plovers, nests, and chicks. Predator control plans will be required for ten years for beach nourishment projects, four years for beach scraping projects, or until the project returns to the baseline/reference condition. The plan must be consistent with requirements or restrictions imposed by governmental agencies with jurisdiction over management actions that may be proposed.

f. Wrack Removal

The Proposed Plan prohibits the removal of wrack in a project area during the piping plover breeding season, March 15 to September 1, if plovers are within the project area or within 3,280 ft. (1,000 m.) of the project area. Mechanical beach cleaning of any kind is prohibited, however, trash and litter may be manually removed from the wrack line.

g. Kite-flying

The Proposed Plan prohibits kite-flying within 656 ft. (200 m.) of breeding areas or unfledged juvenile piping plovers from March 15 to September 1, or in habitat symbolically fenced for piping plovers.

h. Pets

The Proposed Plan requires that pets be leashed (6 ft.; 1.8 m.) and under the control of their owners at all times, from March 15 to September 1, on beaches in the action area where piping plovers are present because dogs and cats are common predators of piping plover eggs and chicks.

i. Monitoring (*For Beach Nourishment Only)*

1) *Prey Base* - The Proposed Plan requires the implementation of a monitoring program of invertebrate prey base in the intertidal zone, berm, and backshore, based on a sampling program that has been devised in consultation with, and agreed to, by the NPS in consultation with the Service prior to its implementation. The purpose of the program is to determine the effect and length of time of the effect as a result of the project. The monitoring program will commence starting in 2004 and will continue until such time as the project sites return to the baseline/reference condition. The sampling program should be able to determine statistically test differences between nourished and reference sites and the magnitude of the differences between nourished and reference site(s) and project sites with regard to parameters such as species diversity and biomass, and will determine time from disturbance of the project site to its return to the same status as the reference site(s). The information collected during this monitoring program shall be incorporated into future actions associated with the projects to further avoid and minimize adverse impacts. Reports shall be submitted to the NPS at the end of each sampling season.

2) *Vegetation* - The Proposed Plan requires a survey of vegetation starting in 2004 in the berm and backshore, based on a sampling program that has been devised in consultation with, and agreed to, by the NPS prior to its implementation. The purpose of the program is to determine the effect of the project on vegetation as it impacts nesting, cover, and foraging habitat of piping plovers and potential vegetative competition within the habitat for seabeach amaranth. The monitoring program will commence in 2004 and will continue until such time as the project sites return to the reference site condition. The sampling program should be able to determine statistically whether there are or are not differences between the reference site(s) and project sites with regard to such parameters as species diversity, composition, and density and will determine time from disturbance of the project site to its return to the same status as the reference site(s). The information collected during this monitoring program shall be incorporated into future actions associated with the projects to further avoid and minimize adverse impacts. Reports shall be submitted to the NPS at the end of each sampling season.

j. Documentation of Commitments

The Proposed Plan requires that applicants provide written documentation of their commitment(s) to carry out protection and conservation measures for listed species in their project areas. Commitments are required for four years for beach scraping projects and five years (the duration of the Special Use Permits) for beach nourishment projects. For beach nourishment projects, since the duration of the effects is expected to be 10 years, the NPS will work with the applicant(s) to ensure that these commitments extend beyond the five-year permit duration up until 10 years or when baseline conditions return to the project areas.

k. Access

Staff of the NPS and the Service and their authorized representatives will be allowed unrestricted access to all project sites within the scope of the NPS's EA for the purposes of conducting research, monitoring, enforcement, looking for evidence of rare, threatened, or endangered wildlife or plants, preserving or protecting habitat, and erecting symbolic fencing or exclosure fencing for the purpose of protecting wildlife or plants. Access will be permitted from the landward toe of the dune to the water's edge.

l. Fireworks

Fireworks shall be prohibited on beaches within 0.75 mi. (1.2 km.) of where piping plovers nest from March 15 to September 1, or the last date of fledging.

m. Structures

No structure will be built or expanded in, or behind, the project area seaward of its present location in the Coastal Erosion Hazard Area (that includes a setback of 25 ft. from the toe of the primary dune) for five years following the completion of beach scraping and nourishment projects. This includes, but is not limited to, outbuildings, building additions, porches, swimming pools, and septic tanks. The only exception to this provision is the installation of sand fence or wooden pedestrian boardwalks crossing the dune to access the beach that are constructed in accordance with an approved permit issued by the NPS.

III. STATUS OF, AND CRITICAL HABITAT FOR, THE PIPING PLOVER AND SEABEACH AMARANTH

A. PIPING PLOVER DESCRIPTION

1. Listing

On January 10, 1986, the piping plover was listed as threatened and endangered under provisions of the ESA. Protection of the species under the ESA reflects its precarious status range-wide.

Three distinct populations were identified by the Service during the listing process: Atlantic Coast (threatened), Great Lakes (endangered), and Northern Great Plains (threatened). The Atlantic Coast population, which is the focus of this biological opinion, breeds on coastal beaches from Newfoundland to North Carolina (and occasionally in South Carolina) and winters along the Atlantic Coast from North Carolina southward, along the Gulf Coast, and in the Caribbean. No critical habitat, as defined by the ESA, has been designated for the Atlantic Coast population (U.S. Fish and Wildlife Service 1996a).

The "Piping Plover *(Charadrius melodus*) Atlantic Coast Population Revised Recovery Plan" (hereafter referred to as the "Piping Plover Recovery Plan") found in U.S. Fish and Wildlife

Service (1996a) delineates four recovery units, or geographic sub-populations, within the Atlantic Coast population: Atlantic Canada, New England (including Massachusetts, Maine, New Hampshire, Rhode Island, and Connecticut), New York-New Jersey (NY-NJ), and Southern (including Delaware, Maryland, Virginia, and North Carolina).

2. Life History

Piping plovers are small, sand-colored shorebirds approximately 7 in. (17 cm.) long with a wingspread of about 15 in. (38 cm.) (Palmer 1967). The species nests on sandy, coastal beaches from North Carolina (occasionally South Carolina) to Newfoundland. Piping plovers begin returning to their Atlantic Coast nesting beaches in mid-March (Coutu *et al.* 1990; Cross 1990; Goldin 1990; MacIvor 1990; Hake 1993). Males establish and defend territories and court females by early April (Cairns 1982). Egg-laying and incubation can start as early as mid-April (U.S. Fish and Wildlife Service 1996a). Piping plovers are monogamous, 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.

Piping plovers nest on coastal beaches, sand spits at the end of barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and in overwash-created bare sand areas cut into or between dunes. They may also nest on areas where suitable dredged material has been deposited. 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*. 1990; MacIvor 1990).

Nest sites 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. 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. The egg incubation period is from 27 to 28 days. Full-time incubation usually begins with the completion of the clutch and is shared equally by both sexes (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.

Piping plovers generally fledge only a single brood (one or more chicks) per season, but may re-nest several times if previous nests are lost. Chicks are precocial (mobile and 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 1996a). Chicks may increase their foraging range up to 3,280 ft. (1,000 m.) (Loegering 1992), 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).

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).

Piping plovers feed on invertebrates such as marine worms, fly larvae, beetles, crustaceans, and molluscs (Bent 1929; Cairns 1977; Nicholls 1989). Important feeding areas may include intertidal portions of ocean beaches, overwash areas, mudflats, sand flats, wrack lines, 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). 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).

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 post-hatching; chicks 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).

Migration patterns are poorly understood. Most piping plover surveys have focused on breeding or wintering sites. Northward migration occurs during late February, March, and early April; southward migration extends from late July to August and September. Both spring and fall migration routes are believed to primarily occur within a narrow zone along the Atlantic Coast.

3. Population Dynamics

Recovery criteria established in the Piping Plover Recovery Plan set population and productivity goals for each recovery unit, as well as for the entire population. The population goals for the Atlantic Canada, New England, NY-NJ, and Southern Recovery Units are 400, 625, 575, and

400 pairs, respectively. The productivity goal for each of the recovery units is to achieve a five-year average productivity of 1.5 chicks fledged per pair. Attainment of these goals for each recovery unit is an integral part of the recovery strategy that seeks to reduce the probability of extinction for the entire population by:

- contributing to the population total;
- reducing vulnerability to environmental variation, including effects of hurricanes, oil spills, or disease;
- increasing the likelihood of genetic interchange among recovery units; and
- promoting re-colonization of any sites that experience declines or local extirpations due to low productivity or temporary habitat succession.

The Piping Plover Recovery Plan identifies a recovery objective to ensure the long-term viability of the Atlantic Coast plover population in the wild, thereby allowing for the de-listing of this species, along with five criteria for meeting the objective, which are listed below:

- The population goal of 2,000 breeding pairs, distributed among four recovery units, and maintained at that level for five years;
- The adequacy of a 2,000-pair population of piping plovers has been verified to maintain heterozygosity and allelic diversity over the long-term;
- A five-year average productivity of 1.5 chicks fledged per pair has been achieved in each of the recovery units;
- Long-term agreements have been instituted to assure protection and management sufficient to maintain the population targets and average productivity in each recovery unit; and
- Long-term maintenance of wintering habitat, sufficient in quantity, quality, and distribution has been ensured to maintain survival rates for a 2,000-pair population.

The Piping Plover Recovery Plan further states, "A premise of this plan is that the overall security of the Atlantic Coast piping plover population is profoundly dependent upon attainment and maintenance of the minimum population levels for the four recovery units. Any appreciable reduction in the likelihood of survival of a recovery unit will also reduce the probability of persistence of the entire population." Under Section 7 (a)(2) of the ESA, Federal agencies shall consult with the Service or NMFS to ensure that any activities that they fund, authorize, or carry out do not jeopardize the continued existence of a Federally-listed species.

Recovery of the Atlantic Coast piping plover population is occurring in the context of an extremely intensive protection effort, since pressures on Atlantic Coast beach habitat from development and human disturbance is continually increasing. Loss and degradation of habitat due to development and shoreline stabilization have been major contributors to the species' decline. Disturbance by humans and pets often reduces the functional suitability of habitat and causes direct and indirect mortality of eggs and chicks. Predation has also been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites, and substantial evidence shows that human activities are affecting types, numbers, and activity patterns of predators, thereby exacerbating natural predation (U.S. Fish and Wildlife Service 1996a).

4. Range-wide Status and Distribution of the Atlantic Coast and NY-NJ Recovery Unit Populations

United States Atlantic Coast piping plover productivity[1] averaged 1.40 and 1.32 chicks fledged per pair in 2001 and 2002 (preliminary estimates for the 2002 breeding season), respectively. The 1992-2001 average productivity was 1.34 chicks fledged per pair (Table 3).

In 2002, productivity in the NY-NJ Recovery Unit (1.49 chicks fledged per pair) and Southern Recovery Unit (1.27 chicks fledged per pair) exceeded long-term averages (1.14 chicks fledged per pair and 1.07 chicks fledged per pair, respectively), while productivity in the New England recovery unit (1.23 chicks fledged per pair) was below the long-term average of 1.54 chicks fledged per pair. Productivity patterns in Atlantic Canada were similar to those observed in the U.S. part of the range, with the 2002 productivity (1.18 chicks fledged per pair) below the long-term average of 1.63 chicks fledged per pair (see Table 3).

After a three percent decline between 1997 and 1999, the estimate of U.S. Atlantic Coast breeding pairs posted a four percent increase between 1999 and 2000, followed by a six percent gain in 2001 and a nine percent gain in 2002 (based upon preliminary estimates; see Table 4). The total 2002 U.S. Atlantic Coast breeding pair count of 1,407 pairs is the highest since the species' 1986 listing under the ESA. Increases occurred in all three U.S. Atlantic recovery units, with the largest percentage gains occurring in the NY-NJ Recovery Unit. The New England Recovery Unit, which was generally flat between 1997 and 2000, increased seven percent in 2002 to a total of 691 pairs. Population estimates in the NY-NJ Recovery Unit grew by fifteen percent in 2000, seven percent in 2001, and fifteen percent in 2002. Increases occurred in both states and recent gains in New Jersey appear to have recouped the major population decrease that occurred in the late 1990s. The Southern Recovery Unit remained essentially unchanged between 2001 (208 pairs) and 2002 (209 pairs). The population estimate in Atlantic Canada declined in 2000, but recouped in 2001 to post a 16-year high estimate of 245 pairs and a 2002 estimate of 275 pairs. Net change in the entire Atlantic Coast population over 2001-2002 increased nine percent for a total of 1,682 pairs nesting between North Carolina and Newfoundland.

5. Piping Plover Habitat Utilization along the U.S. Atlantic Coast

Overwash habitats, bayside flats, unstabilized and recently closed inlets, ephemeral pools (areas on the beach where sea and/or rain water pool during storm overwashes and rains), and moist, sparsely vegetated barrier flats are especially important to piping plover productivity and carrying capacity in the New England, NY-NJ, and Southern Recovery Units (*e.g.*, Wilcox 1959;

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[1]Productivity is measured as the number of chicks fledged per pair.

Strauss 1990; Massachusetts Division of Fisheries and Wildlife 1996; Jones 1997; Houghton *et al*. 2000; Cohen *et al.* 2003). These characteristics are indicative of optimal or highly suitable habitats.

Piping plovers using New England beaches are attracted to, and highly productive on, a wider variety of habitats (Massachusetts Division of Fisheries and Wildlife 1996 and Jones 1997) than in the other U.S. recovery units. Studies in the New England Recovery Unit reveal the optimal value of overwash habitats with open connections to bayside foraging habitats. Strauss (1990) observed no nests seaward of steep foredunes in Sandy Neck, Massachusetts, where this habitat constituted 83 percent of the beach front. Many areas in his study site had been artificially closed with discarded Christmas trees and/or snow fences (or sand fences) which prevented natural processes important in maintaining piping plover habitat. Goldin and Regosin (1998) found significantly higher chick survival and overall productivity among chicks with access to salt-pond tidal flats than those limited to oceanside beaches at Goosewing Beach, Rhode Island.

In New York, Wilcox (1959) described the effects on piping plovers from storms in 1931 and 1938 that breached the Long Island barrier islands, forming Moriches and Shinnecock Inlets and leveling dunes across the south shore. Only three to four pairs of piping plovers nested on 17 mi. (27.4 km.) of barrier beach along Moriches and Shinnecock Bays in 1929. Following the natural opening of Moriches Inlet in 1931, plover abundance increased to 20 pairs in 2 mi. (3.2 km.) of beach habitat by 1938. In 1938, a hurricane opened Shinnecock Inlet and also eroded dunes along both Shinnecock and Moriches Bays. In 1941, plover abundance along the same 17 mi. (27.4 km.) of beach peaked at 64 pairs. Abundance then gradually decreased, a decline that Wilcox (1959) attributed to loss of habitat due to beach nourishment to rebuild dunes, the planting of beach grass, and the construction of roads and summer homes.

Elias *et al.* (2000), in a study of nest site selection on 55.8 mi. (90 km.) of beach, stretching from Jones Beach Island to Westhampton Barrier Island, New York, found that piping plover use of ephemeral pools and bay tidal flats was greater than expected based on habitat availability. Arthropod abundances (a prey base for piping plovers), plover foraging rates, and brood survival were highest in these habitats. Ephemeral pools and tidal flats produced 51 of 81 surviving broods (63 percent), although they accounted for only 12 percent of the habitat surveyed. The authors observed that these "superior habitats" were rare in their study area and that this may be due, in part, to beach development and management practices, including attempts to stabilize beaches by means of jetty construction, breach filling, and beach renourishment. They concluded that the retention of adequate high quality habitats is important to raising piping plover productivity rates to levels that will allow the species' recovery.

Fire Island has a history of sporadic overwashes and formation and closures of inlets (Leatherman and Allen 1985) which have renewed habitats important to piping plovers (Elias-Gerken 1994). Compared to the baseline for the last several hundred years, the frequency of overwashes and breaches on Fire Island has decreased since the 1938 hurricane, apparently due to anthropogenic barrier island stabilization (Elias-Gerken 1994). However, overwash habitat formed in Old Inlet in the early to mid 1990s and early 2000s. Fire Island would probably be covered with more overwashes, more open vegetation, and perhaps more inlets if humans had not begun to counter natural geologic processes and storm-related changes to barrier island morphology following the 1938 hurricane (Leatherman and Allen 1985). On Fire Island, where ephemeral pools, bayside overwash fans, and sandspits were absent and where broods had access only to oceanic foraging habitats, Elias-Gerken (1994) found that the majority of piping plovers tended to cluster near the barrier island tips at Moriches Inlet (Smith Point County Park and Cupsogue County Park) and Democrat Point (Robert Moses State Park).

6. Predators of Piping Plovers with a Focus on the NY-NJ Recovery Unit

Predators of piping plover eggs and chicks in the NY-NJ Recovery Unit include, but are not limited to, red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), herring gull (*Larus argentatus*), great black-backed gull (*Larus marinus*), and crow (*Corvus brachyrhyncos*), as well as feral and domestic cats. Beach stabilization may be exacerbating natural predation on piping plover adults, eggs, and chicks by promoting human use which introduces pets and other natural predators of the piping plover (U.S. Fish and Wildlife Service 1996a). For example, unleashed domestic dogs destroyed at least two nests within the Corps' Westhampton Interim Project area, a nourished beach, in 2003 (Cohen, Virginia Tech, pers. comm., 2003); Raithel (1984) reported that the availability of trash at beach homes led to an increase in local populations of raccoons.

Wilcox (1959) observed 92 percent hatching success of nests between 1939 and 1958 in Long Island, New York (a period of less beach development and stabilization), with loss of only two percent of nests to crows. Elias-Gerken (1994) observed crows perching and nesting in Japanese black pines (*Pinus thunbergii*) that were planted to stabilize the beaches and provide wind breaks on Jones Island, New York, and hypothesized that this vegetation and other perches, such as electric light poles, exacerbated depredation by crows on piping plovers, as the author reported the loss of 21 percent of nests in her study area to crows in 1992 and 1993. Gulls and crows are also major predators at other vital Long Island nesting areas (Kiesel, pers. comm., 2000; Davis, *unpublished report*, 2002). Avian predators such as crows and blackbirds (Icteridae sp.) were a significant source of predation during the 2003 breeding season at the Corps' Westhampton Interim Project area, Westhampton, New York (Cohen, Virginia Tech, pers. comm., 2003)

A variety of techniques are employed to reduce nest predation. Predator exclosures have reduced predation on piping plover eggs and increased hatching success at many nesting sites on the Atlantic Coast (Rimmer and Deblinger 1990; Melvin *et al.* 1992; Canale, New Jersey Department of Environmental Protection, *in litt*., 1997).

While the Service recognizes the value of this management tool, the use of predator exclosures has been associated with increased mortality due to entanglements of adult birds in the exclosure netting, attraction of predators, and vandalism. Vandalism of exclosures (and symbolic fencing) may influence a land managers' decision to deploy exclosures (Davis, *unpublished report*, 2002). Exclosures may also be an attractant to predators. In 1995, foxes keyed in on exclosures causing high rates of piping plover nest abandonment and low productivity in 1995 (Houghton *et* *al.* 1997). In Sandy Hook, New Jersey, where exclosures contributed to productivity between 1990 and 1996, predation on exclosed and un-exclosed nests was the major cause of poor productivity (0.36 chicks fledged per pair) in 1997 (National Park Service 1997).

7. The Effect of Oil Spills on Piping Plover with a Focus on the NY-NJ Recovery Unit

Oil and tar balls from the June 1990 discharge of 267,000 gallons (gal.) of fuel oil from the *B.T. Nautilus* oil tanker into the Kill Van Kull, Staten Island, New York, were found on southern Long Island beaches from Breezy Point, Queens County, to Fire Island, Suffolk County and in New Jersey from Sandy Hook south to Brigantine. Twenty-seven oiled piping plovers, ten in New York and seventeen in New Jersey, were observed.

In May 1996, 42,000 gal. of oil from the tanker, *Anitra,* were discharged into Delaware Bay, affecting more than 70 mi. (113 km.) of the southern New Jersey coastline (U.S. Fish and Wildlife Service 1996a). Oil was detected on 51 adult plovers, nine of which were captured and cleaned (Sacco, New Jersey Department of Environmental Protection, *in litt.*, 1998).

In 2001, 12,000 gal. of No. 6 oil were released into Long Island Sound resulting in the oiling of beaches between Long Beach Peninsula, Town of Smithtown, and Fresh Pond Landing, Town of Riverhead, New York. Seven of the nine beaches are known to be used by piping plovers.

Three adult piping plovers were observed to be oiled. There is a probability that oiled, killed, or otherwise injured piping plovers also went undetected (U.S. Fish and Wildlife Service, *internal report*, 2001). Table 5 provides a listing of the sites affected by this spill.

8. Disturbance to Piping Plovers from Recreational Activities and ORVs

Piping plovers experience harm and harassment from various beach recreational activities such as fireworks events, as well as pedestrians, and ORVs. Fireworks events, which generally occur around the July Fourth holiday, coincide with the peak occurrence of unfledged plover chicks. Many of these events require permits from the U.S. Coast Guard due to their impacts on navigation and, therefore, require Section 7 of the ESA consultation. In many cases, effective informal consultation has allowed the applicant and the Service to develop a plan which avoids direct and indirect effects of the fireworks events and large crowds to piping plovers. This is illustrated by our consultation statistics showing that, from 1996 to 2002, only 5 out of 176 consultations required formal consultation on fireworks events in proximity to piping plovers on Long Island, New York.

Pedestrian activities may influence local nesting distributions, adult and chick behaviors, and habitat use in an area, and represent a source of take. Elias-Gerken (1994) noted piping plovers nested in areas characterized by less pedestrian disturbance. Piping plover broods foraged in pond areas with less human activity and spent significantly less time responding to human disturbance than in foraging areas on the ocean beach where there was a higher level of human activity (Burger 1991; Goldin and Regosin 1998). Pedestrians may flush incubating adults from nests (Flemming *et al*. 1988; Cross 1990; Cross and Terwilliger 1993), resulting in exposure of eggs to extreme temperatures or increased predation. In 2002, a nest was destroyed by a pedestrian who entered a symbolically fenced area on the beaches fronting the Village of West Hampton Dunes within the Corps' Westhampton Interim Project area. Numerous instances of pedestrians entering into these protected areas were also reported in 2002 and 2003 (Virginia Tech 2002 and 2003, *unpublished reports*).

Off-road vehicles represent a potentially significant source of disturbance and mortality to adult piping plovers and their chicks, as well as contributing to habitat degradation or unsuitability. Piping plover chicks are mobile after hatching, usually leaving the nest site within a day after hatching. Chicks will forage in various habitats spanning the entire width of the beach from intertidal areas to wrack deposited on the berm, to sparse vegetation at the base of dunes. Chicks may stand motionless or crouch low and remain motionless in the presence of perceived threats, such as ORVs. Off-road vehicles create ruts that can trap or impede movements of chicks and may prevent plovers from using habitat that is otherwise suitable (MacIvor 1990; Strauss 1990; Hoopes *et al.* 1992; Goldin 1993; Hoopes 1994).

In 1991, a piping plover chick was killed on FIIS by an ORV during daylight hours, despite the presence of a pedestrian escort system (Melvin *et al.* 1994). In New York, chick mortalities also occurred due to ORVs in 1997, 2000, and 2003. Overall, this a significant issue across the NY-NJ Recovery Unit as local and State governments sustain ORV recreational use through issuance of driving permits on beaches that support piping plovers.

Beaches used by recreational ORVs during nesting and brood-rearing periods generally have fewer breeding plovers than available nesting and feeding habitat can support. In contrast, plover abundance and productivity have increased on beaches where recreational ORV restrictions during chick-rearing periods have been combined with protection of nests from predators (Goldin 1993). Beginning in 1999 at the North Brigantine Natural Area, Atlantic County, New Jersey, a seasonal closure to all motorized vehicles was imposed during the period when unfledged chicks were present. The number of nesting pairs of piping plovers at this site rose from eight pairs in 1998 to 11 pairs in 2000; productivity rose from 1.50 chicks per pair in 1998 to a New Jersey record of 3.17 chicks fledged per pair in 1999, with 2.45 chicks fledged per pair in 2000 (Jenkins *et al.* 1998 and 1999; Jenkins 2000). On Fire Island, the number of breeding pairs in the Fire Island Wilderness Area has increased from one pair in 1998 to 20 in 2003, since the NPS implemented its Endangered Species Habitat Protection Plan (National Park Service 1998), which restricted ORV access during the piping plover breeding season in the Wilderness Area and other areas.

B. SEABEACH AMARANTH DESCRIPTION

1. Listing

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

2. Life History

Seabeach amaranth (family *Amaranthaceae*) 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 approximately 994 mi. (1,600 km.). The range of seabeach amaranth is characterized by islands developed by 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 overwash flats at accreting ends of barrier islands, and lower foredunes and upper strands of non-eroding beaches. Seabeach amaranth is never found on beaches where the foredune is scarped by undermining water at high storm tides (Weakley and Bucher 1992). Occasionally, small, temporary, and casual populations are established in secondary habitats such as blowouts in foredunes, and sand or shell dredge spoil or beach nourishment material (Weakley and Bucher 1992).

Upon germination, the plant initially forms a small, unbranched 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 1.3 to 2.5 cm. in diameter and clustered towards the tip of the stem (Weakley and Bucher 1992). Plants often grow to 30 cm. in diameter, consisting of 5 to 20 branches, but occasionally reach 90 cm. in diameter, with 100 or more branches. Flowers and fruits are inconspicuous, borne in clusters along the stems. Seeds are 2.5 mm. in diameter, dark reddish-brown, and glossy, borne in low-density, fleshy, iridescent utricles (bladder-like seed capsules or fruits), 4 to 6 mm. long (Weakley and Bucher 1992). The seed does not completely fill the utricle, leaving an air-filled space (U.S. Fish and Wildlife Service 1996b).

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 rocket (*Cakile edentula*) and may be an adaptation to dynamic beach conditions. If conditions remain favorable at the site of the parent plant, then 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).

Individual plants live only one season with only a single opportunity to produce seed. 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 1996b). 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).

Seabeach amaranth does not occur on well-vegetated beaches, particularly where perennials have become strongly established (Weakley and Bucher 1992). Pauley *et al*. (1999) documented a negative correlation between seabeach amaranth and several dominant foredune species. A particularly strong negative association has been reported between seabeach amaranth and beach grasses (*Ammophila* sp.) (U.S. Fish and Wildlife Service 1996b). A positive correlation has been observed between seabeach amaranth and sea rocket, an annual plant (Hancock 1995).

Historic records of seabeach amaranth are known from nine states. Largely due to human activities such as trampling during recreation and beach stabilization, the species was eliminated from seven of these states in the 1980s, remaining only in the North and South Carolinas. Seabeach amaranth is still considered extirpated from Massachusetts and Rhode Island. Since 1990, the species has reoccupied five states from which it had previously been extirpated.

The current known range of naturally occurring seabeach amaranth is Water Mill Beach on Long Island, New York, to Debidue Beach, South Carolina (Young 2003; Hamilton 2000a). In 1999, seed and cultivated plants were transplanted to several sites south of Debidue Beach by the South Carolina Department of Natural Resources as part of a restoration program. The southern-most site in the restoration program was at Pritchards Island, approximately 124 mi. (200 km.) southwest of Debidue Beach (Hamilton 2000a and 2000b), but to date plants are known to persist from the transplanted seed/cultivars only as far south as Otter Island, roughly 181 mi. (30 km.) southwest of Debidue Beach.

A dynamic, early successional "pioneer" species, seabeach amaranth is also termed a "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 poor competitor, seabeach amaranth is eliminated from sites where perennials have become established, probably because of root competition for scarce water and nutrient supplies (Weakley and Bucher 1992).

The same physical forces (*e.g*., storms and extreme high tides) that create the plant's very specific and ephemeral coastal habitat also destroy it. Existing habitats are eroded away but new habitats are created by island overwash and breaching. 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 1996b).

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 2000b).

3. Population Dynamics

Density of seabeach amaranth is extremely variable within and between populations. The species generally occurs in a sparse to very sparse distribution pattern, even in the most suitable habitats. A typical density is 100 plants per linear km. of beach, though occasionally on accreting beaches, dense populations of 1,000 plants per linear km. of beach can be found. Island-end sand flats generally have higher densities than oceanfront beaches (Weakley and Bucher 1992). Seabeach amaranth has been found to have a strongly clumped distribution (Hancock 1995). On Long Island, New York, however, dense assemblages and high abundances have been recorded on central barrier island locations (Young 2002).

Within its primary habitats, seabeach amaranth concentrations can be found in the wrackline (Mangels 1991; Weakley and Bucher 1992; Hancock 1995; MacAvoy 2000). In 2001, a study by 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.

4. Range-wide Status and Distribution

Because of the species vulnerability to threats and the fact that it has already been eliminated from two-thirds of its range, the species was Federally-listed as threatened by the Service in 1993.

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 one-year increase of 372 percent. 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 which reappeared on Long Island, New York (Clements and Mangels 1990). Even with the addition of the New York populations, the 1990 survey documented a range-wide reduction of 74 percent from the 1988 census.

Due to the limited number of surveys, consecutive data over the last three years (2000-2002) was only available for the states of Delaware, New Jersey, and New York. In New York State, the New York State Natural Heritage Program (NYSNHP) has collected data over the last 13 years (Table 6). Data (approximate number of plants) for Delaware and New Jersey are listed in Table 7. Data are available for several other states for the 2002 growing season, including Virginia (20 plants), North Carolina (2,001 plants), and South Carolina (199 plants); however, surveys were limited to only several historic sites and not considered complete.

The 2000 population of seabeach amaranth had an uneven geographic distribution, with almost 99 percent of the plants located on Long Island, New York. A single site on Long Beach Island, New York, comprised 75 percent of the total plants range-wide. Of the 39 extant sites documented in 2000, eleven had 100 or more plants (seven in New York, two in New Jersey, and two in North Carolina), and four had 1,000 or more plants (all in New York). Seventeen sites had fewer than ten plants (three in New York, one in Maryland, eleven in North Carolina, and two in South Carolina) (Young 2003; MacAvoy 2000; National Park Service 2001a and 2001b; Jolls and Sellers 2000; U.S. Army Corps of Engineers 2001b; Hamilton 2000a).

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 as a result of 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. 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 and the species is well adapted to its ecological niche.

5. Reasons for Listing and Continuing Threats

a. 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. A natural barrier island landscape, even a retreating one, contains localized accreting areas, especially in the vicinity of inlets (U.S. Fish and Wildlife Service 1996b).

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. When the shoreline is "hardened" by artificial structures (*e.g.*, seawalls and bulkheads), overwash and inlet formation 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, unvegetated new land (U.S. Fish and Wildlife Service 1996b). 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 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 which 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 1996b), particularly to isolated populations, as no nearby seed sources are available to re-colonize the nourished site. 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 75 percent of coastlines 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, seabeach amaranth will be unable to reestablish 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. Areas of suitable habitat were separated from one another by distances too great to allow recolonization following natural catastrophes (Weakley and Bucher 1992).

As noted in Section II (C) below, New York and New Jersey beaches have been especially affected by past and ongoing habitat modification. New Jersey has the highest degree of shoreline stabilization of any state. As measured by the amount of shoreline in the totally stabilized category (90 to 100 percent "walled"), New Jersey, America's oldest developed shoreline, is 43 percent hard-stabilized (Pilkey and Wright 1988). Much of New York is included in current or proposed long-term beach nourishment programs. Cumulatively, these nourishment projects contribute significantly to the stabilization of the NY-NJ shoreline. Furthermore, multiple, simultaneous disturbances to the habitats upon which this species depends increase the vulnerability of seabeach amaranth to declining habitat conditions and catastrophic events. These factors are particularly important given the recent seabeach amaranth population shift from south to north, discussed further below.

b. Recreational and ORV Impacts to Seabeach Amaranth

Intensive recreational use and ORV traffic on beaches can threaten seabeach amaranth populations, both through direct damage and mortality of plants and by 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). Problems generally arise only on narrow beaches or beaches which receive heavy recreational use. In such areas, seabeach amaranth populations are sometimes eliminated or reduced by repeated trampling.

Off-road vehicle use on the beach during the growing season can have detrimental effects on the species, as the fleshy stems of this plant are brittle and easily broken. 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 2002). Off-road vehicle 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. But, extremely heavy ORV use, even in winter, may have some negative impacts, including pulverization of seeds (Weakley and Bucher 1992).

Beach grooming, more common on northern beaches, may also have contributed to the previous extirpation of seabeach amaranth from that part of its range. Motorized beach rakes, which remove trash and vegetation from bathing beaches, do not allow seabeach amaranth to colonize long stretches of beach (U.S. Fish and Wildlife Service 1996b). In New Jersey, plants were found along a nearly continuous length of beach, noticeably interrupted by stretches that are routinely raked.

c. 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 1996b). Webworm herbivory of seabeach amaranth has not been documented in Delaware or Maryland. 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).

d. 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 the development of genetically-altered, domesticated varieties are potential, but currently unrealized, threats to the species (U.S. Fish and Wildlife Service 1993).

e. New Threats

New threats (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*), 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* sp.) was observed on seabeach amaranth in several South Carolina sites (Strand and Hamilton 2000). This pathogen is a white rust or water mold. 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)

C. ANALYSIS OF PIPING PLOVER AND SEABEACH AMARANTH POPULATIONS AND HABITATS LIKELY TO BE AFFECTED BY THE PROPOSED PLAN

Beach stabilization activities can result in loss and degradation of suitable plover and seabeach amaranth habitats and are major causes to the range-wide decline of the piping plover (U.S. Fish and Wildlife Service 1996a), especially in the NY-NJ Recovery Unit. 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, and dune construction and stabilization. Many of these projects accelerate the formation of mature dunes and are implemented to substantially reduce the probability of inlet creation and overwash that would otherwise form optimal piping plover and seabeach amaranth habitats.

Within the New York Bight, more than half the beaches are classified as “developed” (U.S. Fish and Wildlife Service 1997). The remaining so-called “natural, undeveloped beaches” in the New York Bight receive some protection from development through the Coastal Barrier Resources Act’s (96 Stat. 1653; 16 U.S.C. 3501 et seq.) limitations on Federal assistance and flood insurance. However, many of these areas are also subject to extensive stabilization activities.

There is a long history of beach stabilization activities by the Corps within the piping plovers’s NY-NJ Recovery Unit. From 1986 to the present, the Corps has formally consulted with the Service under the ESA for beach nourishment or navigation project activities on Long Island, New York, which adversely affected both the piping plover and seabeach amaranth and their habitats. Those consultations do not reflect those projects undertaken with the Corps pursuant to Section 10 of the Rivers and Harbors Act (RHA) and Section 404 of the Clean Water Act (CWA) for State, local, or private beach nourishment or dredging activities that require a permit from the Corps. Almost exclusively, beach stabilization projects are implemented for the purpose of protecting development and infrastructure on the barrier islands or mainland.

Corps’ beach nourishment projects in New York, which required a biological opinion addressing impacts to piping plovers and/or seabeach amaranth, include:

1. Fire Island Inlet and Shore Westerly to Jones Inlet Combined Navigation and Beach Erosion Control Project (May 1987 and on-going; affects 5 mi. [8 km.] of Long Island barrier beach coastline);
2. 15-year Shelter Island, New York, Erosion Control Project (June 1995, revised October 1997; affects 1,000 ft. [305 m.] of barrier beach habitat);
3. Shinnecock Inlet Federal Navigation Channel (1987 and on-going informal consultation);

4. Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, Beach Erosion Control and Hurricane Protection Project, Interim Breach Contingency Plan (BCP) (1995);
5. Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, Beach Erosion Control and Hurricane Protection Project, Reach II, Moriches Inlet to Shinnecock Inlet, Westhampton Interim Storm Damage Protection Project (December 1994 and on-going informal consultation to address unauthorized take within the project area.; impacts to 4 mi. [6.7 km.] of coastline);
6. Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point, Beach Erosion Control and Hurricane Protection Project, Reach II, Moriches Inlet to Shinnecock Inlet, West of Shinnecock Inlet Interim Storm Damage Protection Project (March 2001 and on-going informal consultation; affects 4,000 ft. [1.2 km.] of barrier beach habitat);
7. East Rockaway to Rockaway Inlet affecting approximately 6.2 mi. (10 km.); and
8. The Corps has engaged the Service under Section 7 of the ESA consultation procedures for the FIMP.

The Service has also conducted informal Section 7 of the ESA consultations with the Corps for the Federal navigation channels on Long Island listed below (consultation dates and miles of habitat affected when available are given in parentheses).

1. Shinnecock Inlet Federal Navigation Channel (September 1998; July 2003; affecting over 4,000 ft. [1.2 km.] of shoreline);
2. Shinnecock Inlet Western Jetty Rehabilitation Project (January 2001);
3. Long Beach Island Beach Erosion Control (May 1994; affecting approximately 8.7 mi. [14 km.] of Atlantic Ocean coastline);
4. Moriches Inlet Navigation Project (March 1996; July 1998; July 2003; affecting at least 2,500 ft. [762 m.] of shoreline);
5. Jones Inlet Jetty Rehabilitation Project (June 1995 and July 1998);
6. Fire Island Inlet and Shore Westerly to Jones Inlet Combined Navigation and each Erosion Control Project (June 1999; July 2003; affecting 3 to 5 mi. (8 km.) of shoreline);
7. Three-Mile Harbor Dredging Project (1999);
8. East Rockaway Inlet Navigation Project (2002);
4. Porpoise Channel Dredging Project (2002); and
5. Intracoastal Channel Maintenance Dredging (2002; 2003).

Of approximately 125 mi. (200 km.) of Atlantic coastline in New Jersey, stretching from Sandy Hook to Cape May, all but approximately 13 mi. (21 km) are encompassed within a Corps' beach nourishment project area. Shore protection projects within the New Jersey portion of the NY-NJ Recovery Unit for which the Service completed informal Section 7 consultation with the Corps for the initial phase of beach nourishment include the following:

1. Sea Bright to North Asbury;

2. Asbury Park to Manasquan Inlet;
3. Manasquan Inlet to Barnegat Inlet;
4. Barnegat Inlet to Little Egg Inlet;
5. Brigantine Inlet to Great Egg Harbor Inlet;
6. Great Egg Harbor and Peck Beach (Ocean City Beachfill);
7. Great Egg Harbor Inlet to Townsends Inlet;
8. Townsends Inlet to Cape May Inlet;
9. Cape May Inlet to Lower Township (Cape May Beachfill);
10. Lower Cape May Meadows to Cape May Point; and
11. Delaware Bay Coastline.

In addition to the Proposed Plan, the Service's New Jersey Field Office is currently conducting formal consultation with the Corps Philadelphia District regarding beach nourishment from Townsends Inlet to Hereford Inlet, and in Cape May City. In addition, the Service is aware of the following future Corps beach nourishment / renourishment projects in New Jersey that will require formal consultation (listed below with anticipated project start dates in parentheses):

1. Lower Cape May Meadows and Cape May Point (2003);
2. Brigantine (2003);
3. Southern Ocean City and Sea Isle City (2004);
4. Long Beach Island (2004);
5. Manasquan Inlet to Barnegat Inlet (2005); and
6. Great Egg Harbor Inlet to Townsends Inlet (2005).

Within the 13 mi. (21 km.) of New Jersey shoreline excluded from Corps nourishment programs, an approximately 900-m. section of Sandy Hook known as the Critical Zone is regularly renourished by the NPS. In May 2002, the NPS and the Service completed formal consultation for a planned September 2002 renourishment of the Critical Zone. Previous fills were conducted in 1977, 1982-83, 1989-90, 1996-97, and 1997-98 (National Park Service 2001a); the NPS has consulted with the Service regarding past fill projects in accordance with the ESA. The NPS is currently preparing Biological and Environmental Assessments for a proposed long-term beach nourishment project, known as the Sand Slurry Pipeline, which would involve transport of sand from northern Sandy Hook to the Critical Zone on a regular schedule. The NPS and the Service are conducting informal consultation for the Sand Slurry Pipeline, and will proceed with formal consultation as needed.

Authorized Corps navigation projects located within the New Jersey portion of the NY-NJ Recovery Unit include:

1. Shark River Inlet;
2. Manasquan Inlet;
3. Barnegat Inlet; and
4. Cape May and Ocean City.

IV. ENVIRONMENTAL BASELINE

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 C.F.R. § 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.

A. DESCRIPTION OF THE ACTION AREA

The action area encompasses six miles of ocean beaches fronting the FIIS communities where the projects would be proposed and constructed (direct impacts), as well as an additional six miles adjacent to these communities where indirect impacts could occur (National Park Service 2003b) (Figure 1). It extends from the Fire Island Lighthouse Visitor Center in the west to the Watch Hill Visitor Center in the east. This additional area is included because of the potential for indirect impacts from littoral drift and sand budget changes, as well as potential disturbance and habitat modification if species are present (National Park Service 2003b).

Land ownership in the action area is both public and private, both on the ocean beach and back dune areas. Land use encompasses recreational, commercial, residential activities, and Federal administrative activities. The patchwork of land use on Fire Island is further broken up by small areas of NPS properties situated between the residential communities. These areas of designated FIIS property exist between Kismet and Saltaire, Atlantique, and Corneille Estates. Larger Federal Tracts, which border some of the communities, include Fire Island Lighthouse, Sailors Haven, Carrington Tract, Talisman/Barrett Beach, Blue Point Beach, and Watch Hill.

Fire Island can be accessed from the east via the William Floyd Parkway and Smith Point Bridge, and from the west via the Robert Moses State Park Causeway Bridge. From May to October, privately-owned ferries service the FIIS communities and the Town of Islip and Town of Brookhaven beaches. The FIIS is a developed barrier island with about 4,000 buildings and residences (U.S. Army Corps of Engineers 1999), but lacks a complete set of interconnecting paved roads. An inland route, comprising concrete sidewalks, wooden walkways, or sand routes, provides ORV access to the central parts of most communities; however, the ocean beach provides the primary means of travel to and from the communities.

The recreational facilities at Smith Point County Park and Robert Moses State Park are heavily used, providing fishing, ORV access, boating, hunting, and swimming activities. Many of the Fire Island communities have life-guarded beaches during the summer.

B. STATUS OF PIPING PLOVER AND SEABEACH AMARANTH IN THE ACTION AREA

1. Piping Plover

The number of pairs has ranged from one pair to 10 pairs between 1993 and 2002 (see Table 8); productivity has ranged from 0.0 to 3.0 chicks fledged per pair over this same time period (National Park Service 2003b). Most of the nesting has occurred in the Wilderness Area. In 2002, a total of nine piping plovers were observed in the Wilderness Area and one pair on the beach in front of Cherry Grove.

Piping plovers arrive on Fire Island in March; egg-laying and incubation occur from April through June, with chicks typically hatching from May through August. The birds begin leaving Fire Island in August and are almost completely gone by September (National Park Service 2002). Nesting in recent years has occurred primarily on the ocean beaches in front of the Otis Pike Wilderness Area. Plovers generally forage on the beach but also in dune swales or on the bay shore if there is access through the primary dunes for flightless chicks (National Park Service 2003b).

Most of the birds and nest occurrences have been recorded in the Wilderness Area and in Sunken Forest/Sailors Haven; however, a single pair nested in front of, or in the vicinity of Cherry Grove (approximately 4,200 ft. [1,280 m.] west of the community of Fire Island Pines) in 2002 and 2003, and Water Island in 1997 and 1999 (approximately 7,300 ft. [2,225 m.] east of Fire Island Pines). There are no records of piping plovers breeding on the ocean beaches directly fronting Fire Island Pines (Gormezano, National Park Service, pers. comm., 2002). Water Island has historically been the site of plover courtship (Fire Island National Seashore Habitat Management Plan 1994 Summary, *unpublished report*, 1994) and is still considered suitable habitat for piping plovers (National Park Service 2002). Elias-Gerken (1994) reported 14 nest scrapes in the upper beach berm, but no nests with eggs at that site in 1993. NPS lands between Robins Rest and Atlantique provide suitable habitat but are not symbolically fenced by the NPS (National Park Service 2002). In 2003, three adults were observed on the ocean beach in front of the community of Point O'Woods and the site supported one pair (U.S. Fish and Wildlife Service, *field notes*, 2003; Lawrence, National Park Service, pers. comm., 2003).

The NPS expects an application for beach nourishment in front of the community of Fire Island Pines and the western Fire Island communities (from Saltaire to Lonelyville) under the provisions of the Proposed Plan. Therefore, information on the status of the species in this area is provided here. In the central and western half of this community, the ocean beaches are highly eroded and do not currently represent suitable plover breeding habitat. However, the eastern portion of Fire Island Pines does represent suitable habitat, as do the undeveloped NPS lands located east and west of that community (Gormezano, National Park Service, pers. comm., 2002).

The majority of the bayside of the FIIS communities are bulkheaded with no significant intertidal flats. There are no access points for adults to lead chicks to the bayside from the ocean beach. While the Federally-owned Talisman and Carrington Tracts are not bulkheaded, erosion of the bay shoreline has resulted in scarped bay shoreline conditions with no access to bayside foraging areas. Plovers have been observed foraging on the ocean beaches in front of Fire Island Pines and Talisman (Gormezano, National Park Service, pers. comm., 2002). At least several factors, such as excessive ORV traffic, lack of habitat management, etc., have likely affected the suitability of the site to piping plover and seabeach amaranth.

In the western Fire Island communities, there are no recent records of piping plover breeding. Most of this stretch of beach directly in front of the communities is not considered suitable nesting habitat at the present time due to severely eroded beach conditions, high density residential development, and intensive ORV use permitted by NPS and the Town of Islip. However, in 2002, NPS field biologists documented aerial mating displays by piping plover on the beach in front of NPS-owned land between Atlantique and Robin's Rest. Although no birds have historically used this site to nest, with wide beaches and relatively less visitor use compared to adjoining beaches, it has potential to continue to attract birds to the area if protection measures (pre-season symbolic fencing) are implemented in the future (National Park Service 2002). The nearest historical breeding site is the Fire Island Lighthouse Tract which is about 1,500 ft. (457 m.) to the west of Saltaire. One pair of plovers bred in the Lighthouse Tract in 2003, the first recorded nesting pair since 1994; however, NPS biologists have observed plover breeding activities in the eastern half of this tract in 2001 and 2002 (Gormezano, National Park Service, pers. comm., 2002).

2. Seabeach Amaranth

Table 9 provides a listing of seabeach amaranth occurrences in the FIIS between 1990 and 2002. Surveys for seabeach amaranth in FIIS are conducted annually by NYSNHP, with assistance from the NPS and Service. Within the last several years, plants have been observed on the ocean beaches in front of Talisman/Barrett Beach, Lighthouse Tract, and Atlantique (New York State Natural Heritage Program 2003). A single plant was observed already this year (Schwanoff, EEA, pers. comm., 2003) at Talisman and at least a couple of dozen in the Lighthouse Tract (Schwanoff, EEA, pers. comm., 2003). Since the plant was first rediscovered within FIIS in 1990, the occurrence of seabeach amaranth has been reported to be patchy, but increasing in abundance. Seabeach amaranth is restricted to the oceanside beaches within FIIS.

C. FACTORS AFFECTING PIPING PLOVER AND SEABEACH AMARANTH AND THEIR HABITATS WITHIN THE ACTION AREA

Beach stabilization, lack of optimal foraging and nesting habitat, beach scraping, barrier island and vegetative stabilization, predation, and ORV use (commercial, recreational, residential, and NPS-administrative activities) are all factors which have contributed to the lack of suitable piping plover and seabeach amaranth habitats in the action area. Suitable habitats are mostly found where human activities such as ORV use, dune stabilization, and intense recreational activities are generally prohibited.

1. Beach Stabilization

Efforts within the action area to stabilize barrier islands include beach nourishment, snow fencing, and dune construction, as well as vegetative and structural shoreline stabilization. These activities inhibit the natural processes which affect barrier island morphology, allowing for the creation of transitory, storm-created habitats which are important to the piping plover and seabeach amaranth. The protection of natural landforms, processes, and wildlife resources on the barrier island is often in conflict with long-term, large-scale beach stabilization projects and their indirect effects, *i.e.*, increases in residential development, infrastructure, and public recreational uses, as well as preclusion of overwash and breach created habitats.

Vegetative reinforcement of dunes can prevent the formation of optimal nesting and foraging habitats for plovers (Massachusetts Barrier Beach Task Force 1994; MacIvor 1990; Elias-Gerken 1994), foraging, and predator avoidance (Elias-Gerken 1994). Dune building activities may prevent plovers from accessing preferred foraging and brood rearing habitats including interdunal swales, wet meadows, and ephemeral pools (MacIvor 1990; Elias-Gerken 1994), which, in addition, may serve as important feeding areas for a variety of other bird species (Massachusetts Barrier Beach Task Force 1994). The planting of beach grass and the erection of sand fencing was conducted throughout the 1990s in association with individual community nourishment projects. The use of snow fences and Christmas trees to capture drifting sand and/or to build dunes may produce steepened dune faces, or by themselves, created physical barriers to plover movement (Strauss 1990).

Accessible bayside foraging habitat is extremely limited in the action area due to the hardening of the bay shoreline with bulkheading, which is an attempt to mitigate the effects of shoreline erosion and natural barrier island migration. Those activities may also inhibit natural processes which renew early successional beach habitats favorable to many beach strand species (least tern, [*Sterna antillarum*]; seabeach knotweed, [*Polygonum glaucum*], and American oystercatcher, [*Haemotopus palliatus*]). Although they are temporary habitats, the observation that piping plovers seem to prefer overwash areas to ocean beach limited habitats (MacIvor 1990) underlies their importance to the recovery of the species.

Public and private beach stabilization efforts have occurred on the ocean beaches in the action area between 1938 and 1992 (U.S. Army Corps of Engineers 1999). Between 1955 and 1994, approximately 6.4 million cubic yards (cy.) of fill were placed on Fire Island by the Federal government, local municipalities, and local interests. Approximately 54 percent of this fill activity occurred during the 1960s in response to the severe shoreline change caused by Hurricane Donna (1960) and the Ash Wednesday Storm of 1962. Some 1.66 million cy. of fill were placed on Fire Island's beaches more recently, between 1993 and 1997. Most of this latter fill was placed by local communities at Fire Island Pines, Ocean Bay Park, Fair Harbor, and

Saltaire in response to the severe storms that occurred during the early 1990s (National Park Service 2003b).

The U.S. Army Corps of Engineers (1999) speculated that most of the existing dune line on Fire Island has been affected by storm damage protection projects, illustrating the large degree of artificial stabilization that has affected piping plover habitat. On the north side of the barrier island, individual permits issued by the Corps under the Section 10 of the RHA as well as Section 404 of the CWA have resulted in dramatic changes to the bay shoreline on Fire Island including the nearly complete stabilization of the bay shoreline north of the 17 communities (U.S. Army Corps of Engineers 1999). The Corps' Regulatory Program is also responsible for the authorization of individual permits for piers, docks, and bulkheads that have affected natural barrier island processes and habitat formation, particularly on the bayside of the barrier island.

Beach stabilization through the process of beach scraping, which involves the use of heavy machinery to remove the approximate top 6 in. (15 cm.) layer of sand over a wide section of the dry beach and depositing it to augment or reconstruct artificial dunes, is currently permitted in 15 of the 17 communities in FIIS (Land Use Ecological Services, Inc., and Coastal Planning and Engineering 2002). This activity has occurred in the FIIS communities since 1993.

2. Predation

Populations of feral dogs and cats are reported to be widespread within FIIS and represent a significant threat to wildlife, including ground nesting birds such as the piping plover (U.S. Army Corps of Engineers 1999 *at EIS3-85*). Red foxes are also plentiful within the FIIS and often make their dens at the base of primary dune (National Park Service 2002 - http://www.nps.gov/fiis/sftour/hs%7Ecritters.htm).

The National Park Service (2002) documented predator sightings and numerous predator tracks within symbolically fenced areas and in the vicinity of piping plover nests within the FIIS. Black-backed gulls (*Larus marinus*), herring gulls (*Larus argentatus*), crows (*Corvus* spp.) and other migratory avian predators, red fox, raccoons, domestic dogs, and humans, have all been identified and observed in these areas. Ghost crabs (*Ocypode quadrata*) also pose a risk to plover chicks. Individual crabs have been observed stalking chicks from nest #02-9A in front of Cherry Grove and may have caused the disappearance of two chicks from that brood in 2002. Unleashed dogs have also been documented on many occasions and vehicle tracks have been found in the Wilderness Area and in Sailor's Haven/Sunken Forest, where driving is prohibited during the nesting season (National Park Service 2002). Herbivores of seabeach amaranth such as white-tailed deer and rabbits are also plentiful in FIIS, however, there are no data or studies to support their effect on seabeach amaranth populations.

3. Disturbance from Recreational Impacts

There are numerous potential sources of disturbance to plovers that may utilize FIIS including, but not limited to, ORVs, aircraft, recreational fishing, kite-flying, bird-watching, surfing, dog-walking, and fireworks events. Threats to seabeach amaranth in the action area include pedestrians and ORVs.

The NPS permits hundreds to thousands of ORV trips within the FIIS each year. Off-road vehicle use can reduce the quality of available foraging habitat and compact and reduce any existing foraging base. These activities may also result in the mortality of adults, nests, and chicks. In most areas of FIIS, ORV use is seasonally heavy. As mentioned in Section B(4) above, there is a history of plover mortality on FIIS due to ORV use. Two piping plover chicks were found crushed in tire tracks at Watch Hill and Sailors Haven in 1991 and 1992 (Melvin *et al.* 1994). In some areas of Fire Island, ORVs appear to be truncating the open vegetation field widths, making the beaches less attractive for plover nesting and brood-rearing. In 2002, local law enforcement made hundreds of patrols through piping plover chick rearing habitat in FIIS.

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 realized through protection and restriction of ORV use during the piping plover and seabeach amaranth season. In some areas, this protection only extends to the end of the piping plover season, which is September 1, or possibly earlier, if plover breeding is successful. 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 ORVs on seabeach amaranth in the action area is unknown; however, ORVs do pose a threat for which management efforts are required.

V. 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.

Information used in this section was compiled from information contained in the "Revised Atlantic Coast Piping Plover (*Charadrius melodus*) Recovery Plan" (U.S. Fish and Wildlife Service 1996), "Recovery Plan for Seabeach Amaranth (*Amaranthus pumilus*) Rafinesque" (U.S. Fish and Wildlife Service 1996b), other biological opinions, and the action agency's biological and environmental assessments (National Park Service 2003 a and b).

Factors which were considered in this effects analysis were proximity of the Proposed Plan 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.

A. DIRECT AND INDIRECT ADVERSE EFFECTS ON PIPING PLOVERS AND SEABEACH AMARANTH

The NPS's Biological Assessment (National Park Service 2003b, page 54) identified the following potential adverse effects to listed species resulting from beach scraping:

* Disturbance to prey base and temporarily reduced prey availability (destruction of beach invertebrates and wrack line);

* Reduction of potential for formation and maintenance of optimal overwash or bayside piping plover breeding and foraging habitat;

* Disturbance to piping plovers through enhancing beaches to attract increased recreational activities on oceanside beaches;

* Habitat destruction and disturbance, including the potential for additional development and stabilization efforts resulting in additional or expanded structures/use;

* Increased potential predator populations/activity that could utilize habitat created by the project;

* Creation of suboptimal habitat and a potential population sink within community areas; and

* Potential for direct impacts from construction if conducted outside of the safety window - mortality, loss of productivity, or disturbance to plovers and amaranth including burial of seed bank and increased predation.

In addition to the above, the NPS's BA (National Park Service 2003b, pages 62 and 63) identified the following potential adverse effects to listed species resulting from beach nourishment:

* Disturbance to prey base and temporarily reduced prey availability (beach invertebrates and wrack line);

* Reduction of potential for formation and maintenance of optimal overwash or bayside piping plover breeding and foraging habitat;

* Disturbance to plovers through enhancing beaches to attract increased recreational activities;

* Habitat destruction and disturbance due to the potential for additional development and stabilization efforts resulting in additional or expanded structures/use;
* Increased predator populations/activity that could utilize habitat created by the project;

* Creation of suboptimal habitat and a potential population sink;

* Direct mortality to plovers or amaranth if present during project activities (not anticipated); and

* Changes in existing plover and amaranth habitats on FINS (could be positive or negative).

B. DURATION OF EFFECTS

For the purposes of this programmatic consultation, the Service expects, based on information obtained from technical experts, that effects of beach nourishment on Fire Island will last an average of ten years and effects of beach scraping will last an average of four years (Keehn, Coastal Planning and Engineering, pers. comm., 2003; Psuty, Rutgers University, pers. comm., 2003). In the case of beach nourishment, it is expected that the berm would provide storm damage protection for five years and then erode over the next five years to a point where it would not provide protection to the artificially created dune.

C. DIRECT EFFECTS

1. Direct Effects on Piping Plovers

The Service anticipates that there will be no significant and measurable direct adverse effects of the Proposed Plan's provision for beach scraping and beach nourishment on piping plovers. This determination reflects the provision in the Proposed Plan to restrict beach scraping and beach nourishment activities to be in accordance with protection dates provided in the NPS's Endangered Species Habitat Management Plan dated 1998, or March 15 to September 1. The Proposed Plan provides a provision to allow beach scraping to occur after July 1 if breeding piping plovers are not observed in, or within 3,280 ft. (1,000 m.) of a proposed project area, provided that the NPS consults with the Service prior to undertaking such action.

2. Direct Effects to Seabeach Amaranth

The Service (1995) surmised that a long-term program of beach scraping on Fire Island would be likely to degrade additional potential seabeach amaranth habitats. The Service anticipates that the Proposed Plan would result in direct adverse effects to seabeach amaranth as it allows beach scraping and beach nourishment during the growing season, in a project area, *as well as* transplantation of seabeach amaranth plants if the plants cannot be adequately protected or avoided. Plants would be transplanted to similar nearby project sites and protected through fencing and educational signs and monitored (National Park Service 2003b).

When beach scraping is conducted during the growing season, plants that germinated will be torn from their substrate. Whether conducted during the growing season or after it, existing seedbanks will be redistributed and redeposited along the shore. The placement of fill on areas where seabeach amaranth occurs during, or prior to the end of, the growing season will likely result in the mortality of those plants buried (Weakley and Bucher 1992) and the loss of seed production that would have occurred until the end of the growing season. Beach nourishment which is conducted in the winter would likely have minimal impacts to the adult plants as they will already have set seed. Deeply burying seeds with several feet of sand taken from the offshore borrow areas as provided for in the Proposed Plan may also affect their ability to germinate in the next growing season, having potential deleterious effects on local populations. The severity of the impacts depends on the depth of burial, erosional climate, the nature of seabeach amaranth's seedbank, and the importance of long distance seed dispersal to outlying population maintenance. In addition, any seeds dispersed to the project area from nearby populations prior to beach nourishment would likely be buried after beach nourishment commenced. Therefore, the Service expects up to 100 percent burial of the amaranth seedbank within the template of the beach nourishment design profiles contained in the Proposed Plan. Transplantation itself is not without adverse effects – it poses direct adverse effects to the plant as it requires digging up the plant(s) and physically moving it to another environment.

Beach nourishment will entail the supportive actions of erecting sand fencing, and the planting of perennial dune grasses, both of which can impact seabeach amaranth and its habitat through burial, trampling, or accelerated interspecific competition (Murdock 1993).

The number of plants which could potentially be impacted in a specific site cannot be accurately forecast. Since other forces affecting the spread of amaranth are anticipated to remain the same, the impact to the species from the Proposed Plan would be in the form of a temporary delay in colonizing project area beaches.

D. INDIRECT EFFECTS

The Service has identified the following indirect adverse effects on piping plover and seabeach amaranth resulting from the Proposed Plan. Indirect effects can occur at a later time, and a distance from the individual projects which may be implemented under the Proposed Plan.

1. Potential Long-term Reduction in Habitat Formation Due to Continuation of Stabilized Beaches

Beach nourishment and beach scraping will adversely affect piping plovers and seabeach amaranth over both the long- and short-terms (short-term effects are discussed in Section IV (B) below). The Service anticipates the Proposed Plan will directly affect 6 mi. (9.6 km.) of ocean beach habitat fronting the FIIS communities with indirect effects on these same habitats later in time; and may indirectly affect an additional 6 mi. (9.6 km.) of publically or privately owned undeveloped lands which lie between Watch Hill and the Fire Island Lighthouse Tract (see also National Park Service 2003b). In total, adverse effects are anticipated for approximately 50 percent of the ocean shoreline habitat within the FIIS. Over the long-term, the Proposed Plan is detrimental to piping plovers and seabeach amaranth as it indirectly affects these species later in time through perpetuating shoreline stabilization projects that impede natural processes of shoreline movement and habitat formation, preventing the natural formation of highly suitable habitats essential for the recovery of these species. The Service expects that the barrier island, as a whole, if permitted to function and respond to natural forces, would eventually provide suitable piping plover and seabeach amaranth habitat, *i.e.*, only if structures destroyed by natural forces were not rebuilt.

The Service believes that naturally functioning habitats, which are properly managed, are essential to the recovery of the species. In the case of Democrat Point, physical processes which have maintained sparse vegetation and expansive intertidal flats and restrictions on ORV access and recreational activities have contributed to an increase in piping plover abundance at this site from the late 1990s to the present. Within the FIIS, naturally functioning habitat and proper management in the Wilderness Area, particularly at Old Inlet, may be contributing factors to the increase in piping plover abundance at that site.

Overwashing and the formation and closure of inlets have historically occurred on portions of Fire Island throughout its history (Leatherman and Allen 1985). The frequency of overwashes and breaches on Fire Island has decreased since the 1938 hurricane, apparently due to anthropogenic barrier island stabilization (Elias-Gerken 1994). Leatherman and Allen (1985) reported that Fire Island would probably be covered with more overwashes, more open vegetation, and perhaps more inlets if civil works activities had not been implemented to counter natural geologic processes and storm-related changes to barrier island morphology following the 1938 hurricane. These geomorphological changes have potentially influenced the distribution, abundance, and productivity of listed species on Fire Island. For example, where ephemeral pools, bayside overwash fans, and sandspits were absent on Fire Island, and where piping plover broods had access <u>only</u> to oceanic foraging habitats, Elias-Gerken (1994) reported that the majority of piping plovers tended to cluster near inlet habitats at Moriches Inlet (Smith Point County Park) and Democrat Point (Robert Moses State Park).

Over the long-term, the Proposed Plan will delay restoration of natural barrier island processes that form and maintain overwash-created habitats most preferred by piping plovers (Cohen *et al*. 2002, Elias *et al*. 2000, Loegering and Fraser 1995). While it is not known precisely when and where within a project area this habitat will form[2], the Service believes that formation of highly

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[2] In 1995, the Corps developed a classification system to identify areas on FIIS which were prone to breaching. As a result of that effort, sites were classified on FIIS as having low to moderate probabilities of breaching or overwashing (U.S. Army Corps of Engineers 1999) based on several criteria which they developed including dune and berm heights, barrier island widths,

suitable habitats within the action area will be delayed by the life of the beach nourishment and/or beach scraping projects. An estimate of this impact is based on a 10-year delay in habitat formation processes, on a spatial scale that could, very conservatively, form habitat capable of supporting 24 highly productive pairs of plovers[3]. The Service believes that this is a very conservative estimate of the average carrying capacity of high quality habitats (equivalent to only 1 mi. (1.6 km.) of "A+" ranked habitat (Massachusetts Division of Fisheries and Wildlife 2000) or 3 mi. (4.8 km.) of "B" ranked habitat). Such habitats are most likely to support robust average productivity rates $ 1.5 chicks per pair that are required for a secure population. Thus, a 10-year delay in natural habitat formation processes under the Proposed Plan might conservatively delay for 10 years the production of 360 fledged chicks (1.5 chicks fledged per pair per year by 240 pair-years of habitat). This loss of productivity is partially offset by the creation of suboptimal habitats which may result from the Proposed Plan (see Section IV (B) below), projected to provide as much as 74 pair-years of habitat. Assuming productivity in over 6 mi. (9.6 km.) of suboptimal habitats ranges between 0.9 and 1.3 chicks fledged per pair, near-term production of between 67 and 96 chicks would be realized. The Services stresses that the date when overwash-created habitat would form, "but for" the Proposed Plan, is unknown, but that a nourishment project with a 10-year life is logically expected to forestall formation of overwash habitats over that same time period.

2. Creation of Suboptimal Beach and Dune Habitats

The Proposed Plan would perpetuate the artificial creation and maintenance of suboptimal beach and dune habitats within the piping plover NY-NJ Recovery Unit and in the New York range of

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and proximity to deepwater back bay areas. However, almost eight years later, no current scientific information on overwash potential for the dynamic beach environment on FIIS is available; statements about the need for storm surge protection frequently include the premise that erosive shorelines which exist in front of some communities are frequently considered prone to overwash of at least part of a barrier island's width.

[3]The Service evaluated the existing population within the action area, other areas within the FIIS, the adjacent Wilderness Area, and other comparable sites on Long Island and along the Atlantic Coast to arrive at an estimate of the number of pairs and the loss of productivity they would experience due to the delayed formation of suitable habitat resulting from the Proposed Plan. This estimate is near the number of pairs which currently utilize the Federally-owned areas within the FIIS (20 pairs) where natural forces are allowed to shape and maintain the environment. The Service believes that the above estimate is very conservative in light of the amount of habitat that may form "but for" the project and the recent rapid growth of the FIIS population (suggesting that the population is still below carrying capacity). The Service expects that future revisions to this estimate will likely occur as further information on the habitat formation within barrier island complexes is collected, analyzed, and modeled by the Corps over the course of the FIMP Reformulation Study. Analysis of the pattern of recent piping plover expansion within FIIS may also help refine this estimate.

seabeach amaranth. The creation of suboptimal habitat may lead to limits in available suitable habitat for breeding and growing, accelerated plant competition, a population “sink” for piping plovers, reduction in the quality of foraging habitat for piping plovers, and the creation of physical conditions such as scarps and steepened berm and dune profiles which adversely affect the ability of piping plover chicks to forage. Additional effects include the reduction in prey resources which lowers piping plover productivity, increased recreational activities, the creation of habitat for predators of piping plovers, and allowance for ORV access through breeding and growing areas. These latter effects are discussed in Sections IV (C) and (D) below.

The Proposed Plan, by permitting beach stabilization over 6 mi. (9.6 km.) of FIIS beaches, will directly affect or create 88 acres (ac.; 35.6 hectares [ha.]) of suboptimal beach berm and suboptimal dune habitat, and 119 ac. (48 ha.) of ocean intertidal habitat. As represented by the National Park Service, the effects of these features would extend for 10 years in the case of beach nourishment and four years in the case of beach scraping (Psuty, Rutgers University, pers. comm., 2003). The Proposed Plan affords protection to, and perpetuates upland development by buffering structures from ocean storm and wave attack. The Service recognizes that no new hard stabilization structures are permitted in the Proposed Plan. Economic consideration of the extensive upland infrastructure and development receiving storm protection from the existing stabilization structures further suggests that, absent a large storm, their abandonment is unlikely in the short-term, irrespective of the Proposed Plan.

Artificial constructed and stabilized dunes provide less suitable habitat for piping plovers and seabeach amaranth (Strauss 1990; Weakley and Bucher 1992). The installation and maintenance of a continuous dune line, as opposed to a dune swale, blowout, or overwash-configured project design, will indirectly affect these species by interrupting natural processes that maintain suitable habitat. However, the existing development within the FIIS reduces the opportunity for habitat formation in the short-term and over small-scales. High-quality piping plover and seabeach amaranth habitat is generally characterized by sparse vegetation, a well-developed wrack line, and, for piping plovers, abundant shell material (U.S. Fish and Wildlife Service 1996a and b; National Park Service 2003a). Unstabilized dunes provide more potential piping plover and seabeach amaranth habitat as they tend to have a more gently sloping foredune face than stabilized dunes. Blowouts (breaks, often formed during storms) which may form in the primary line of unstabilized dunes, provide marginal habitat for seabeach amaranth (Weakley and Bucher 1992) and high quality habitat for piping plovers (Strauss 1990; Jones 1997). However, interdune swales and gently-sloping foredune habitats become important when the berm has been narrowed by erosion, as happens following severe coastal storms or towards the end of a recurring sand renourishment cycle; this project will impede the formation of such features for ten years.

Dune vegetation planting and snow fence placement, in association with beach nourishment and beach scraping, as has previously occurred within developed portions of the action area, will artificially accelerate growth of dense vegetation that precludes use of habitat by piping plovers and seabeach amaranth, limiting the amount of available suitable habitat for these species and creating suboptimal habitat conditions. While the Proposed Plan requires that vegetation be planted at 18 in. on-center on the seaward side of the dune, it does not require the applicants to maintain this density. While sparse vegetation can be beneficial to piping plovers and pose limited adverse effects to seabeach amaranth, artificially planted areas that rapidly grow into dense areas of perennial vegetation precludes use by both species. The planting of perennial grasses will substantially limit the area of seabeach amaranth habitat that is currently available and will introduce added pressures to the species via interspecific competition. 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 which have been snow-fenced (Weakley and Bucher 1992), but the relationship between snow fencing and seabeach amaranth populations has not been fully investigated on Long Island.

The creation of new oceanside habitat may be detrimental to piping plovers if indirect adverse effects are sufficient to result in reproductive rates below those needed for stable or recovering populations. Habitat that is initially physically suitable may create a "population sink" by recruiting individuals to the area each season, only to yield reproduction below replacement levels. By implementing the design profile, the Proposed Plan may attract piping plover to an artificially widened beach, which over time, through the forces of nature, will begin to erode to its current configuration. Because piping plovers demonstrate a fidelity to their breeding sites, they are likely to persist in breeding, even if the habitat degrades and plover productivity declines in future years. In this way, the Proposed Plan may continue to expose piping plovers to indirect adverse effects even beyond the life of the project. Piping plovers which may be attracted to the site may also have reduced productivity due to low prey resources, increased disturbance, and predation.

The construction template calls for a completely flat berm (0 upper beach slope) and an intertidal beach at a slope of 1:15. This configuration bears similarities to the gently sloping areas preferentially chosen as plover nest sites on Cape Cod, Massachusetts. However, there are important differences between a natural beach profile and a constructed, stabilized beach as provided in the Proposed Plan. Natural forces which work to redistribute the sand that is placed on the beaches during nourishment projects may create a sharp discontinuity of slopes between the upper beach and the intertidal zone, inhibiting the movement of piping plovers, especially chicks, into intertidal foraging areas. In addition, nourished beaches have a tendency to scarp as beach elevations and widths reach equilibrium with the local wave and current climates. By steepening the intertidal slope, scarping may reduce the size of the intertidal foraging area, further inhibiting adult and chick movement into the intertidal zone, and possibly delay the formation of an upper beach wrack line, an important habitat component for piping plovers. Further, sand-fencing can promote the formation of steep, uniform dunes. Vertical sand accretion and burial caused by sand fences are detrimental to seabeach amaranth and their use is contradictory to seabeach amaranth recovery. This dune stabilization practice, which will be permitted by the NPS under the Proposed Plan in front of the FIIS communities, will further perpetuating the practice of degrading barrier island habitats upon which these species and others depend.

The Service expects that the effects described above will potentially impact up to 12 pairs of piping plovers. In the case of beach nourishment with 10 years of effects, 74 pair years of habitat above baseline will occur, with reductions in productivity ranging between 0.2. and 0.6 chicks per pair, and a loss of between 14.8 and 44.4 chicks is expected. In the case of beach scraping, with 4 years of effects, 26 pair years of habitat above baseline will occur. Applying the range of reduced productivity given above, the Service anticipates a loss of between 5.2 and 15.6 chicks due to beach scraping over the 4 years of effects.

3. Potential Reduction of Plover Productivity as a Result of Severe Reductions of Intertidal and Terrestrial Invertebrate Prey Resources Due to Burial by Dredged Material

Piping plovers feed on invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks (Bent 1929; Cairns 1977; Nicholls 1989). Prey can generally be divided into two categories: terrestrial invertebrates (chiefly dipterans and other insects, including diurnally burrowing Talitrid amphipods [*Amphipoda* spp.]) (Gibbs 1986) and intertidal infaunal invertebrates. On oceanfront habitats, terrestrial invertebrates tend to be concentrated in the wrack line (Loegering and Fraser 1995; Hoopes *et al.* 1992), a habitat used by foraging plover adults and chicks (Goldin 1993; Hoopes 1993; Hoopes *et al.* 1992). Availability of wrack is especially important at sites where ephemeral pool and bayside foraging areas are not available (Elias *et al.* 2000).

The exact composition of potential invertebrate prey resources is not known, but a number of studies have investigated plover use of these prey resources on other Atlantic coastal beaches. On three southern New Jersey beaches, Staine and Burger (1994) found that polychaete (*Scoieiepis* spp.) abundance is highest in piping plover foraging areas and concluded that polychaetes (especially *Scoieiepis squamata*) are the plovers' main source of food where they were present. Hoopes *et al.* (1992), Gibbs (1986), and Cairns (1977) also documented that piping plovers feed on polychaetes. Loegering (1992) found amphipods and mole crabs (*Emerita taipoida*) abundant in the saturated intertidal zone of the ocean beach on Assateague Island National Seashore in Maryland, with amphipods comprising approximately 95 percent of samples from these areas. Loegering (1992) and Loegering and Fraser (1995) observed that older chicks and adults often feed in this saturated zone, suggesting that amphipods constitute a prey resource. In an evaluation of invertebrate prey resources conducted by the Corps in Ocean City, Cape May County, New Jersey, dominant taxa included amphipods, coquina clams (*Donax* spp.), and polychaetes (Scott 2002).

Beach nourishment activities would affect documented and potential foraging areas for breeding piping plovers. Beach scraping could also bury or temporarily remove the wrack line, an important source of prey for plovers. Up to 207 ac. of beach berm and intertidal habitats would be affected by these activities which would be permitted under the Proposed Plan. Burial and suffocation of terrestrial and intertidal invertebrate species will occur as a result of beach nourishment, resulting in temporary yet severe impacts to these resources (Land Use Ecological Services, Inc., and Coastal Planning and Engineering 2002). Beach scraping will likely result in the removal and destruction of prey resources. Nourishment projects will completely remove or bury the wrack line within the construction footprint. While the completed projects will increase the quantity of available nesting and foraging habitat above current conditions, artificially created habitats may be inferior to naturally accreted beach and overwash habitats, tidal pools, bayside flats, and sand spits. Therefore, the positive benefits of the project may not be realized until recolonization of benthic organisms occurs and natural coastal processes begin to "reshape" the constructed features (Land Use Ecological Services, Inc., and Coastal Planning and Engineering 2002).

Except where curtailed by mechanical beach raking or delayed by scarping, partial to complete physical recovery of the organic material that comprises the wrack line can be expected within one year following sand nourishment, depending on the timing of the construction activity. However, the recovery rates of the terrestrial insect prey resource associated with the wrack line are unknown, but they might be expected to be low during the winter period of low invertebrate activity and more rapid during warmer weather. Due to ORV use occurring within the FIIS, the pre-construction wrack line and associated prey resources are most likely already diminished, suggesting that prey resource recovery rates in newly forming wrack would be further depressed. Apart from this factor, recovery of prey resources in the wrack line will depend on the timing of the fill activity relative to the periods of highest biological activity in these zones of the beach. Qualitatively, areas receiving sand in autumn will likely have a longer prey resource recovery period than areas receiving fill in the winter and early spring.

Time frames for intertidal invertebrate recruitment and re-establishment following beach nourishment are generally reported as taking between 12 and 18 months (National Resource Council 1995). The U.S. Army Corps of Engineers (1999) reported that beach nourishment has short-term effects on the species' richness, abundance, and biomass at the sand placement area following nourishment. Recovery times are dependent on compatibility of sediments between the existing beach and the fill material, as well as the time of year in which nourishment takes place. For oceanside beach nourishment, the intertidal zone fauna is most affected by nourishment activities (Lynch 1994). Studies conducted in Florida, North Carolina, and South Carolina show that recolonization rates by benthic invertebrates are variable and somewhat dependent on the time of year in which the nourishment occurs, beginning within days and taking up to one year for full recovery of some species (Reilly and Bellis 1983; Bacca and Lankford 1988; Lynch 1994). The macrofaunal community after recolonization may differ considerably from the original community. Once established, it may be difficult for species of the original community to displace the new colonizers (Hurme and Pullen 1988).

In a study of the effects of beach nourishment on oceanside intertidal benthos conducted by the Corps in Monmouth County, New Jersey, recovery time of the intertidal infaunal community was as short as two months following renourishment carried out between early August and early October. Therefore, construction during this period will likely have little or no adverse effect on piping plovers attributable to a reduced prey availability. Recovery time following renourishment in mid- to late-October is expected to fall within the range of 2.0 to 6.5 months. Due to the requirements of the Proposed Plan, all construction activities would only be permitted after November 1. Construction between November and January would coincide with the period of sharp seasonal decline in abundance, and the infaunal community would not be expected to recover for at least 6.5 months. Construction between mid-October and January, therefore, may result in reduced productivity, or possibly abandonment of piping plover nesting areas because of reduced prey resource availability (U.S. Army Corps of Engineers 2001).

Using a conservative estimate, full recovery of benthic prey resources may be expected to occur within one year of beach nourishment or beach scraping. The Proposed Plan requires pre- and post-construction monitoring of select project areas to establish this rate for FIIS beaches. Therefore, the Proposed Plan may be expected to impact piping plover prey resources for at least one breeding season. It is anticipated that the six pairs which currently use the ocean beaches within the action area adjacent to or in the FIIS communities would be impacted more than those outside of the action area. It is expected that this effect would contribute to the estimated reductions in productivity of pairs which would colonize the suboptimal habitats formed as a result of the Proposed Plan.

4. Effects of Increasing Recreational Activities, Preserving ORV Access to Oceanside Habitats and Creating Habitat for Predators

We recognize that the NPS has put a lot of work into developing the conservation measures described in the Project Description. However, the Service anticipates that the proposed measures will not completely avoid indirect adverse effects and increased predator-related effects attributable to implementation of the proposed plan. For the NPS assessment of the limitations of their monitoring and management efforts, see the FIIS listed species monitoring report from the 2002 breeding season (National Park Service 2002).

Projects which may be permitted under the Proposed Plan would most likely increase recreational activities on the ocean beaches (National Park Service 2003a; Land Use Ecological Services, Inc., and Coastal Planning and Engineering 2002). Recreational activities that may potentially adversely affect piping plovers include unleashed pets, fireworks, kite-flying, increase in garbage and refuse concomitant with increased recreational activities, potential removal of wrack resources (from mechanized removal of wrack near plover nesting and feeding areas), or loss of wrack from ORV traffic. Unleashed pets, such as dogs and cats, can prey on piping plovers. For example, at least two nests were lost to predation by unleashed dogs in the Corps' Westhampton Interim Project Area, Suffolk County, New York (Cohen, Virginia Tech, pers. comm., 2003). Fireworks have the potential to result in both direct and indirect effects, including disturbance to foraging adults and chicks, as well as trampling and disturbance from spectators (U.S. Fish and Wildlife Service 1997). Kite-flying may disturb piping plovers as it is believed that the piping plovers perceive kites as avian predators. Maintenance activities, such as beach raking, which will be allowed on portions of the project area, may result in loss of foraging resources found in the wrack line. Beach raking also has the potential to kill or injure piping plover chicks when conducted in the vicinity of breeding areas (*e.g.*, Davis, unpubl. rpt., 2002).

Indirect effects of disturbance to piping plovers also occur by limiting breeding habitat to oceanside habitats that are simultaneously made more attractive for recreational activities. This would place additional demands on NPS and the Towns of Islip and Brookhaven in managing the potential conflicts between endangered species and recreational uses of these sites (National Park Service 2003a). In New Jersey, Burger (1994) studied plover foraging behavior and habitat use at ocean, dune, and back-bay habitats. The primary focus of that study was the effect of human disturbance on habitat selection, showing that habitat selection and foraging behavior correlated inversely with the number of people present.

The level of recreational impacts within potential piping plover nesting areas is expected to increase in the near term. Wide beaches with little human disturbance at the time piping plovers initiate nesting (March to April) often experience heavy recreational pressure later in the nesting season (May through August), adversely affecting reproductive success by disturbing nesting birds. Moderate levels of human use, however, can create sufficient disturbance to cause abandonment of nests, interfere with foraging, cause broods to be separated from adults, or attract predators. Studies have found a negative correlation between the number of people present within 50 m. of piping plovers and time spent foraging (Burger, 1991). 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 his study area, including restrictions on dogs and ORVs and use of symbolic fences to protect nests and provide refuge areas for chicks.

Within Sea Bright and Monmouth Beach, New Jersey, evidence of adverse impacts to seabeach amaranth was obvious in areas of intensive recreational use, such as at beach access paths or a site near a volleyball net. 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 fenced for the protection of piping plovers and other beach nesting birds (U.S. Fish and Wildlife Service 2002).

The Proposed Plan would create habitat for predators of the piping plover. On the Long Island south shore barrier beaches, the red fox uses the dunes as denning sites. Efficiency of fox and other predators may also be increased by confining piping plover breeding areas to narrow, predictable bands of linear oceanside habitat. Wider, irregular barrier island features may allow piping plovers to be more efficient in eluding predators. Red fox forage on the ocean beach, in the interdunal area, and in the bayside habitat. These are a significant concern in terms of plover productivity within the action area, even with the protective measures which will be in place.

The degree to which increases in recreational activity and predator habitat result in mortality or disturbances to plovers and their chicks depends on the degree to which the protection measures are implemented. We would expect 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 lowered productivity levels attendant with creating suboptimal habitats within the action area, resulting in some mortality of eggs and chicks over ten years and five years for beach nourishment and beach scraping, respectively.

<u>Contributions of Conservation Measure Implementation Toward Minimizing Adverse Effects of Recreational Activities and Predators</u>

The Proposed Plan requires that symbolic fencing be erected and maintained between March 15 and November 1 of each season for the protection of portions of the suitable habitats created or manipulated by a proposed project to reduce recreational impacts from humans, the effects of preserving ORV access to the ocean beach, and creating habitat for predators. However, the exact locations of areas to be protected have not been fully identified by the NPS at this time.

The Proposed Plan would require that symbolic fencing be erected by March 15 of each season for the protection of habitat created or manipulated by any proposed project. During the early part of the piping plover breeding season, the fencing would be erected to protect beach habitat necessary to support piping plover breeding activities such as territorial displays, courtship, egg-laying, and chick rearing. In the event that this buffer zone could not be attained, the NPS would require monitors to gauge the effectiveness of a reduced buffer. When chicks are present, the Proposed Plan requires that the areas to the low water line would be closed to ORVs until the chicks have fledged (35 days).

To minimize the effects of recreational use on nourished and scraped beaches, the Proposed Plan requires the applicants to undertake annual surveys for listed species in proposed project areas, to monitor and manage piping plovers in accordance with the Conservation Measures in the Project Description for 10 years in the case of beach nourishment, and four years for a scraping project, or until baseline conditions are reached. Annual monitoring and management activities will include endangered species surveys, on-site education and outreach to beach users, and construction of symbolic fencing and predator exclosures and trapping/removal of predators, as appropriate, in coordination with the NPS, Service, NYSDEC. Additionally, if seabeach amaranth is found within a project area, the NPS's Proposed Plan requires expansion of these protection and monitoring activities to include this species as well. The Service anticipates that indirect effects to piping plovers and seabeach amaranth will continue to be minimized through intensive monitoring, fencing, and public outreach. This expectation assumes that endangered species management efforts will be adjusted in future years to respond to changes in recreational patterns and/or species conditions.

VI. SUMMARY OF EFFECTS

The Proposed Plan will result in multiple adverse effects to the piping plover and seabeach amaranth including, but not limited to, preclusion of the creation of highly suitable habitat, creation and maintenance of suboptimal habitats, impacts to prey resources for piping plovers, increases in recreational impacts, creation of habitat for predators of piping plovers, and effects of ORV use of the ocean beach. These effects will occur over the entire duration of effects of ten years for beach nourishment and four years for beach scraping. The Proposed Plan will likely result in an increase in recreational activities on the project beaches affecting both piping plovers and seabeach amaranth. This would increase the potential conflicts with, and adverse effects on, adult and chick plovers, as well as seabeach amaranth plants. Initial construction and renourishment of the design profile will cause the destruction of invertebrate food resources for piping plovers in the project area(s). Recolonization of these organisms will take on the order of 12 to 18 months, thereby potentially affecting adults and chicks in one full plover season and adults in the first three months of the second breeding season if recovery takes 18 months. The Proposed Plan would potentially increase predators of the piping plover. The Proposed Plan contains conservation measures which will avoid or minimize direct and indirect effects to these species over the duration of the effects resulting from beach nourishment (10 years) and beach scraping projects (4 years).

The extent to which the Proposed Plan contributes to the perpetuation of shoreline stabilization over existing baseline conditions is of concern to the Service when considered along with past and ongoing Federal, State, and local activities which have or continue to affect the species and its habitat (see Section II (C) for a listing of Federal activities in the NY-NJ area).

VII. CUMULATIVE EFFECTS

The NPS has stated that any activities that occur within the boundaries of the NPS would require the issuance of a special use permit, a Federal action which would require Section 7 consultation with the Service (Lawrence, National Park Service, pers. comm., 2003). Therefore, cumulative effects, which include the effects of future State, local, or private actions that are reasonably certain to occur in the action area, would not be likely due to Federal jurisdiction of all activities within the boundaries of the FIIS.

VIII. 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.

A. PIPING PLOVER

While there have been some encouraging gains in the status of the species since its 1986 listing, its status remains highly precarious due to the recent population decline in New Jersey from 1995 to 1998, the occurrence of four oil spills in the recovery unit since 1990, and apparent habitat succession at Corps' inlet and beach stabilization project areas. The purpose of the Proposed Plan is to provide protection to coastal structures and development in areas where the probability of breaching and overwashing has not been determined. Therefore, unlike other biological opinions where a breach was anticipated as "imminent," this consultation is based on the assumption that formation of natural features such as dune blowouts, overwash habitat, etc., following storm events, would affect only part of the island. Absent the Proposed Plan, partial island overwashing is likely to occur in some locations. Overwash is a natural mechanism which may, in turn, create and maintain highly suitable or optimal habitat in front of the communities or across island over the long-term. The presence of protected habitats where natural processes are maintained on Federally-owned lands on FIIS provides important habitat for piping plovers. However, such habitats are extremely rare in the NY-NJ Recovery Unit and the majority of piping plovers nest on habitats that are subject to threats similar to those in the Proposed Plan. As discussed earlier in this biological opinion, similar projects conducted or authorized by the Corps have served to reduce naturally functioning overwash habitats in the NY-NJ Recovery Unit to a few remnants. While the impacts on habitat formation and maintenance are primary sources of concern for the recovery and survival of the species, additive impacts include exacerbation of conflicts between breeding plovers and recreational activities.

The Service notes that the reliability of artificially stabilized oceanside habitats to support robust piping plover populations on Long Island remains highly uncertain and that underlying factors are poorly understood. Attaining acceptable productivity on oceanside beaches may also be contingent on intensive management to minimize and mitigate impacts of recreational disturbance, predation, and diminished foraging options on much longer stretches of beach with lower carrying capacity than overwash habitats.

After reviewing the current status of the Atlantic Coast population, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the NY-NJ Recovery Unit and, therefore, the Atlantic Coast population. No critical habitat has been designated for the Atlantic Coast piping plover, therefore, none will be affected. The Service cautions that it remains highly concerned about the extent and duration of projects that preclude formation of optimal habitats on Long Island.

B. SEABEACH AMARANTH

The Proposed Plan 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, and the net affect of the NPS's Proposed Plan on populations within the FIIS. It is not clear whether the perpetuation of shoreline protection in the action area would cause serious long-term consequences for New York State-wide populations.

After reviewing the current status of seabeach amaranth, the environmental baseline for the action area, the direct and indirect effects of the Proposed Plan, and the cumulative effects of future non-Federal actions that are reasonably foreseeable to occur in the action area, it is the Service's biological opinion that while authorization of the Proposed Plan may result in the destruction of plants and seeds and preclusion of some new habitat from partial overwashes and dune blow outs, it is not likely to jeopardize the continued existence of seabeach amaranth range-wide.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and the Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of threatened and endangered species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in the death or injury to listed species by significantly impairing essential behavioral patterns such as 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 carrying out 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 a prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

A. SEABEACH AMARANTH

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, will be provided in this opinion.

B. PIPING PLOVERS

The Service notes that the quantification of anticipated take of piping plovers is extremely complicated. In part, this is due to the confounding factors that affect piping plover productivity, such as habitat formation, weather, predation, and recreational impacts. However, it is clear that this Proposed Plan, by permitting the perpetuation of beach and dune stabilization on Fire Island, is preventing or delaying the formation of highly suitable piping plover habitats that would otherwise be created over time by unimpeded natural barrier beach processes. By permitting the stabilization which precludes formation of highly suitable habitats within the NY-NJ Recovery Unit, the Proposed Plan is contributing to the primary factor affecting prospects for long-term survival, and, therefore, contributing to the vulnerability of the Atlantic Coast piping plover population to extinction.

The Proposed Plan may, in the short-term, provide an increase in the amount of existing suboptimal habitat for piping plovers. The habitat created by beach nourishment projects is considered suboptimal because of productivity of pairs nesting in these habitats is lower than the productivity in naturally created habitats due to absence of overwash-created microhabitats; impacts to prey resources due to manipulation and burial of the beach substrate; disturbance induced by facilitating recreational and ORV activities, while simultaneously limiting plover breeding activity to the same space; and elevated predation due to pets, natural predators attracted by human-supplied food, and increased predator efficiency on linear beaches. Effects that kill or injure birds include:

> Delayed nest establishment, prolonged incubation, and reduced nest attendance by adults which, in turn, increase exposure to weather and disturbance, thereby increasing nest abandonment, crushing of eggs, egg predation, and other sources of embryo deaths.
>
> Increased mortality of pre-fledged chicks due to inadequate foraging resources, disturbances that interrupt chick foraging and interfere with adult attendance, direct crushing of chicks, and increased exposure to predators and weather (both heat, cold, and rain) during prolonged pre-fledge periods.

The suboptimal conditions created by the factors addressed above will be offset proportionally to the quality and quantity of the protection measures (*e.g.*, symbolic fencing and ORV restrictions) provided as part of the project description (see Conservation Measures in Section I [C]). Therefore, we expect some level of piping plover population productivity in the project area during the 10-year duration of project effects. Of the chicks produced in the project area, and in spite of protective measures, a portion is expected to be lost due to recreational activities, predation, and diminished prey resources similar to levels found at projects of a similar nature on Long Island.

<u>Incidental Take Statement</u>:

Taking that is incidental to, and not intended as part of, the agency action is not considered a prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

This incidental take statement is based on the full range of potential beach nourishment and beach scraping projects that could be permitted under the Proposed Plan. If fewer projects are actually implemented, the level of take will be correspondingly lower.

1. The Proposed Plan will result in incidental take of piping plovers through habitat alteration by curtailing natural processes that revitalize or create highly suitable habitats, such as overwash, tidal pools, natural dunes, and newly formed inlets. By precluding formation of these habitats, the Proposed Plan reduces the amount and quality of available breeding and foraging habitats <u>over the long-term</u>. Based on information contained in the NPS's Draft EA and BA, the Service anticipates that the

Proposed Plan would affect nesting and foraging habitat suitability mainly along 6 mi. of shoreline with the potential to affect an additional 6 mi. (9.6 km.) of beach within the action area. The duration of effects related to beach nourishment will persist for an average of 10 years. The duration of effects resulting from beach scraping is an average of four years. Therefore, over the long-term, any potential for natural processes to create suitable habitat is delayed by the period of effect. A quantified estimate of these effects is provided in the Effects of the Action section of this biological opinion.

2. For the purposes of this programmatic biological opinion, incidental take due to plovers breeding on suboptimal habitat within the project area is projected for the maximum possible nourishment of 6 mi. (9.6 km.) within the action area (Bilecki, National Park Service, pers. comm., 2003); for specific projects, this take will be pro-rated based on the linear extent of nourished beach. The duration of projected impacts is 10 years for the nourished berm to return to baseline conditions (Psuty, Rutgers University, pers. comm., 2003); the nesting population is projected to increase in years one through four, as plovers colonize the nourished beach. The projected population then levels out, but begins to decline in year seven, a one year lag (due to nesting fidelity of piping plovers) behind initiation of declining beach conditions in year six (Psuty, Rutgers University, pers. comm., 2003). In the case of beach scraping, the incidental take is projected for only the first four years. The Service estimates that over a ten year life of effects, beach nourishment of 6 mi. (9.6 km.) of beach is likely to furnish 74 pair-years[4] (and productivity from 67 to 96 chicks) of habitat above the current baseline condition. This number is greater than the number of birds predicted to nest on the community beaches in the baseline condition which is impacted by human disturbance, but is less than the carrying capacity and productivity predicted for a naturally occurring beach. Indeed it reflects a very restrained estimate of carrying capacity (two pairs per mi.), equivalent to provisional density objectives for "C" ranked habitat in Massachusetts (Massachusetts Division of Fisheries and Wildlife 2000). Even with the established protection measures in place, take is expected to occur in the project area following implementation of beach nourishment and beach scraping projects due to the recreational disturbances and diminished prey resources described above. For the purposes of this incidental take statement, take is estimated as a range of reduced productivity between 0.2 and 0.6 chicks per breeding pair, and is intended to reflect losses of both eggs and unfledged chicks from all causes, including residual human disturbance, elevated predation, prey burial, etc. This level of take is consistent with that observed with other similar projects on Long Island. Take due to suboptimal breeding conditions in the event that 6 mi. (9.6 km.) of nourishment were authorized under the Proposed Plan is, therefore, estimated to be between approximately 15 and 44 chicks that will fail to fledge.

[4] A pair-year of habitat is habitat used by one pair for one breeding season.

Years post-construction	Estimated nesting pairs/6 miles of nourished beach	Take due to reduced productivity due to all effects of suboptimal habitat on nourished beaches (chicks/pair)	
		Estimated take based on average 0.2 chicks per pair reduction	Estimated take based on average 0.6 chicks per pair reduction
1	2	0.4	1.2
2	4	0.8	2.4
3	8	1.6	4.8
4	12	2.4	7.2
5	12	2.4	7.2
6	12	2.4	7.2
7	10	2.0	6.0
8	8	1.6	4.8
9	4	0.8	2.4
10	2	0.4	1.2
Total pair years and chicks for 6 miles of nourishment	74	14.8	44.4
Total pair years and chicks for 6 miles of scraping	26	5.2	15.6

X. REASONABLE AND PRUDENT MEASURES

The purpose of the Proposed Plan is to address erosion of FIIS beaches in front of the 17 communities, as these areas become increasingly vulnerable to overwash and breaching. Habitats formed by these processes are important to the survival and recovery of piping plovers and seabeach amaranth. Regulations (50 CFR 402.14) implementing Section 7 of the ESA specify that the biological opinion shall include reasonable and prudent measures, if any. Reasonable and prudent measures (RPMs) 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 NPS so that they become binding conditions of any grants or permits issued to the applicant, as appropriate, in order for the exemption in Section 7(o)(2) to apply. The NPS 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 NPS must ensure implementation of the RPMs and their implementing terms and conditions in this biological opinion. Relative to this, the NPS must ensure that their permitees 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. If the NPS fails to assume and implement the terms and conditions or fails to require the applicant or contractor 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.

The Service believes that the following RPMs are necessary and appropriate to minimize the anticipated take of piping plovers due to the Proposed Plan.

The RPMs identified below are intended to minimize the anticipated level of incidental take of piping plovers associated with the Proposed Plan. Sections 4 and 9 of the ESA prohibit taking (harm, harass, pursue, hunt, shoot, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in the injury or death to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as 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 any take of listed animal species that results from, but is not the intended purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. 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 a prohibited taking provided that such taking is in compliance with the terms and conditions of an incidental take statement.

A. Ensure that all project engineers, contractors, and construction staff are fully informed of and compliant with all conservation measures contained in the project description, reasonable and prudent measures, and terms and conditions.

B. 50 CFR 402.14(i)(3) requires the Federal agency or applicant to report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. This requirement will be implemented through Conservation Measures (d) and (i).

XI. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the NPS must comply (or ensure compliance) with the following terms and conditions, which implement the RPMs described above and outline the reporting/monitoring requirements. As indicated above, these terms and conditions are non-discretionary and must be implemented by the NPS within the action areas so that they become binding conditions, as appropriate, in order for the exemption in Section 7(o)(2) to apply.

A. Schedule a pre-construction meeting between the Service, NPS, project engineers, contractors, and construction staff to discuss implementation of the Conservation Measures and Terms and Conditions. Provide all project engineers, contractors, and construction staff with a written summary of this Biological Opinion (including all conservation measures and terms and conditions), a written statement that all conservation measures, reasonable and prudent measures, and terms and conditions contained herein are non-discretionary, including project timing.

B. Prior to implementation of the post-monitoring program, the NPS shall consult with, and obtain confirmation and agreement from the Service on the methodologies and reporting frequencies to be utilized.

C. 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:

   Senior Resident Agent
   U.S. Fish and Wildlife Service
   Division of Law Enforcement
   70 East Sunrise Highway
   Valley Stream, New York 11581
   (516) 825-3950

   Upon locating an abandoned nest or non-viable egg specimen, initial notification must be made to the following Service office:

   U.S. Fish and Wildlife Service
   Long Island Field Office
   500 St. Marks Lane
   Islip, New York 11751
   (631) 581-2941

XII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the 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.

A. PIPING PLOVER

1. Specific areas should be identified where barrier beach processes can operate unimpeded;

2. Monitoring should be conducted to determine where pre-nesting and non-incubating piping plover adults forage and stage on FIIS throughout the breeding season, starting in mid-March. Such an effort would involve using two observers with phones or radios to locate birds and observe their movements. Protect habitats identified through this monitoring from disturbance and degradation; and

3. Outreach and educational efforts should be increased in the FIIS regarding piping plovers to increase compliance with measures to reduce take due to recreational and ORV use.

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.

B. SEABEACH AMARANTH

1. The Service recommends that the NPS and the applicant raise the public's awareness of the status, life history, and threats to seabeach amaranth and facilitate its protection;

2. Seabeach amaranth monitoring data should be supplied annually to agencies engaged in protecting and restoring the species to enhance interagency data sharing;

3. The Service recommends that, when implementation of the proposed transplanting strategy is anticipated, activities to be conducted under the transplanting strategy should be coordinated with the Service, NYSDEC, NYSNHP, and TNC prior to their implementation;

4. Surveys should be conducted involving the collection of data on plant size and reproductive stage, geographical positioning system (GPS) coordinates or location relative to permanent landmarks, the plants' location on the beach profile (position relative to the dune toe or apparent high water line), plant associates, a description of occurrence (dispersed or concentrated), evidence and extent of predation, and documentation of any other threats, should be conducted. This information should be

used to direct future nourishment activities so that seabeach amaranth will not be threatened by long-term periodic events;

5. Seabeach amaranth populations should be monitored for evidence of herbivory, both insect and mammalian. Identify herbivores when possible. Report the results to the Service; and

6. A program of long-term storage of seabeach amaranth seeds collected from various parts of FIIS should be implemented as insurance against catastrophic population declines.

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.

XIII. INDIVIDUAL PROJECT CONSULTATION

As discussed with the NPS, because the consultation is a programmatic one and does not deal with specific projects for which NPS-FIIS authorization via Special Park Use Permit will be sought, a second step in consultation is necessary. We have attached in the Appendix a template biological assessment for use by the NPS to assist in gathering the project specific information needed to complete consultation at the project specific level. This information will be used to assure that projects proposed for authorization consistent with the plan meet the requirements detailed in the project description conservation measures, the reasonable and prudent measures and their implementing terms and conditions. In addition, the project specific information will be evaluated to ensure that assumptions about project effects on listed species were correct and that the sum total of all projects will not exceed the level of take anticipated in the incidental take statement attached to this biological opinion.

Following receipt of the second tier biological assessment for individual projects, the Service will then complete the level of consultation appropriate. This may include preparation of a tiered Biological Opinion if the project cannot avoid adverse effects on listed species, or concurrence on a NPS determination that a specific project is not likely to adversely affect listed species.

XIV. REINITIATION OF FORMAL CONSULTATION

This concludes formal consultation on the effects of the National Park Service's Short-Term Community Storm Surge Protection Plan for the Fire Island National Seashore, Suffolk County, New York, on the piping plover and seabeach amaranth. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action (formulation of this plan) has been maintained (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 that was 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 extent of incidental take is exceeded, all activities that are causing such take must cease until such time as any necessary consultation is completed in order to avoid violation of Section 9 of the ESA.

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TABLES

Table 1. Potential Criteria for Beach Scraping (National Park Service 2003a).

Process and responsible party	NPS land/ impact	Seasonal restrictions	Monitoring	Scope/ level	Project design criteria
Communities must apply for all appropriate permits and funding must be private, with no public expenditures (NPS 1977) Applicant/permitee is responsible for implementing and enforcing all criteria and conservation measures as part of project design and permit conditions	Not on NPS upland, except for small lots within community boundaries Equipment transport will occur by water or interior road transport to avoid and minimize impacts to additional areas of the shoreline whenever possible	March 1- November 1 Combined safety window Derived from: 3/1-9/1 FIIS beach Threatened and Endangered (T&E) species protection 4/1- 9/1 USFWS Plover window 4/1-11/1 USFWS Amaranth window Allowed after July 15-through Sept. 30 if surveys and monitoring (conservation measures per USFWS protocol) determine no plover nests w/in 1000m each direction and no SB Amaranth w/in 100m each direction	Shoreline and ecological resources including T&E species presence, pre-project, during, and post project-project life USFWS and NYSDEC protocol will be used and are included as part of the project requirements	Potential for max of 12-17 projects within 2.5 years Each project minimum length 500' (C/B ratio)	1) Minimum Beach width 100' @ 9.0' NGVD to be considered 2) only 1' of beach is permitted to be scraped - dozer blade restriction 3) dune face slope = 1/4 4) maximum beach construction will allow a maximum of 1:4 slope dune up to a 30' dune crest @ 16.5' NGVD, 1:4 dune slope down to 9.0' NGVD, 100' of beach @ 9.0' NGVD 5) Constructed dune template must be built over existing dune. 6) vegetation preserved or planted with local genetic stock at varying densities (per USFWS protocol) 7) all debris removed or reused (fencing) 8) No southward dune placement accept where widening dune crest per NPS developed template 9) Project will meet all USFWS, NMFS and NJDEP T & E species conservation design measures.

Table 2. Potential Criteria for Beach Renourishment (National Park Service 2003a).

Process	NPS land/ impact	Seasonal restrictions	Monitoring	Scope/ Level	Project design criteria
Communities must apply for all appropriate permits and fund each project without federal expenditures (NPS 1977) Applicant/permitee is responsible for implementing and enforcing all criteria and conservation measures as part of project design and permit conditions	Not on NPS upland, except for small lots within community boundaries and for those small tracts between Kismet and Saltaire and potentially the 2 small tracts between Atlantique and Ocean Beach No tapers outside of community boundaries Equipment transport will occur by water or interior road to avoid and minimize impacts to additional areas of the shoreline whenever possible	February 1- November 1 = Combined safety window Derived from: 3/ 1-9/1 Fire Island (FIIS) Threatened & Endangered species (T&E) protection policy 4/1- 9/1 USFWS Plover window 4/1-11/1 USFWS Amaranth window 5/ 1-11/ 15 Sea Turtle and Marine Mammal NMFS window 10/1-1/31 EFH NMFS window Surveys and monitoring (conservation measures per USFWS, and NMFS protocol) will determine species presence and along with dredge selection will determine allowable project dates	Shoreline and ecological resource monitoring including T & E, pre-project, during, and post project throughout project life USFWS, NMFS and NYSDEC protocol will be used and are included as part of the project requirements Grain size and sediment characteristics of the material to be deposited will be consistent with the existing beach substrate.	Max 6 miles 3-7 projects in 3 years	1) Beach and dune criteria generally insufficient to meet scraping criteria (width less than 100' and 9'NGVD, maximum dune crest width = 30' @ 16.5' NGVD) 2) Design must establish a 9.0' NGVD beach and no tapers on federal property or in front of undeveloped community property 3) dune face slope = 1/4 4) maximum beach construction will allow a maximum of 1:4 slope dune up to a 30' dune crest (15'to seaward and landward of the central dune crest line) @ 16.5' NGVD, 1:4 dune slope down to 9.0' NGVD, 100' of beach @ 9.0 NGVD, 1:15 slope down to 0 NGVD Total beach/dune profile would have the following horizontal dimensions from the inland toe of the fore dune to the water: fore dune= 90ft (base) + beach berm (100ft) + seaward beach slope (135') = 325 ' from inland toe of fore dune. Dune profiles are 16.5' in height, with a 30' crest width and 9.0'NGVD base elevation 5) Constructed dune cannot be displaced seaward of existing dune. Houses on the dune crest, the seaward margin of the dune crest may extend 15' from the central dune crest line. The dune may be widened to extend beneath existing structures. Fill material will not be considered a new primary dune. If fill cannot be tied to the dune crest, beach fill may still be utilized but no elevation beneath existing structures will be permitted. If no dune exists, or it is very irregular, a dune crest line and accompanying dimensions will be developed by the applicant for NPS approval. 6) Must include Interpretation and Education with signs, community involvement and symbolic fencing 7) vegetation preserved or planted with local genetic stock at varying densities from 12" on center to 36" on center 8) all debris removed or reused (fencing) 9) Project will meet all USFWS, NMFS and NYDEC T & E species conservation design measures. 10) No nourishment will be permitted which would result in a dune width greater than 30 feet at the crest

Table 3. Summary of Piping Plover Productivity Estimates for the U.S. Atlantic Coast, 1992-2001.[t]

STATE/REGION	1992	1993	1994	1995	1996	1997	1998	1999	2000[p]	2001[p]	1992-2001 AVG[q]
Maine	2.00	2.38	2.0	2.38	1.63	1.98	1.47	1.63	1.60 (50)	1.98 (55)	1.85 (459/459)
New Hampshire	-	-	-	-	-	0.60	2.40	2.67	2.33 (6)	2.14 (7)	2.07 (29/29)
Massachusetts	2.03	1.92	1.80	1.62	1.36	1.32	1.50	1.60	1.09 (487)	1.49 (494)	1.52 (4088/4226)
Rhode Island	1.55	1.80	2.0	1.68	1.56	1.34	1.13	1.79	1.20 (49)	1.50 (52)	1.52 (406/410)
Connecticut	1.45	0.38	1.47	1.35	1.31	1.69	1.05	1.45	1.86 (22)	1.22 (32)	1.33 (274/274)
NEW ENGLAND	1.91	1.85	1.81	1.67	1.40	1.38	1.46	1.62	1.18 (614)	1.53 (640)	1.54 (5256/5398)
New York	0.98	1.24	1.34	0.97	1.14	1.36	1.09	1.35	1.09 (327[u])	1.27 (294)	1.19 (2034/2436)
New Jersey	1.07	0.93	1.16	0.98	1.00	0.39	1.09	1.34	1.40 (112)	1.29 (122)	1.06 (1178/1193)
NY-NJ REGION	1.03	1.08	1.25	0.97	1.07	1.02	1.09	1.35	1.17 (439)	1.28 (416)	1.14 (3212/3629)
Delaware	1.00	0.50	2.5	2.0	0.50	1.00	0.83	1.50	1.67 (3)	1.50 (6)	1.31 (42/42)
Maryland	1.00	1.79	2.41	1.73	1.49[r]	1.02[s]	1.30	1.09	0.80 (60)	0.92 (60)	1.27 (474/474)
Virginia	0.59	1.45	1.65	1.00	1.54	0.71	1.01	1.21	1.42 (85)	1.52 (110)	1.24 (716/991)
North Carolina	0.42	0.74	0.36	0.45	0.86	0.23	0.61	0.48	0.54 (24)	0.50 (22)	0.51 (406/417)
SOUTHERN REGION	0.62	1.18	1.37	1.06	1.34[r]	0.68	0.99	1.04	1.09 (172)	1.22 (198)	1.07 (1638/1924)
U.S. AVERAGE	1.35	1.47	1.56	1.35	1.30[r]	1.16	1.27	1.45	1.16 (1225[u])	1.40 (1254)	1.34 (10106/10951)
ATLANTIC	1.55	0.69	1.25	1.69	1.72	2.10	1.84	1.74	1.47 (200)	1.77 (219)	1.63 (1281/2168)

Table 3, continued:

[p] Parentheses indicate the number of pairs on which productivity is based. Number of pairs reflected in 1992-1995 data, by year, may be found in Table 6 (page 25) of the Revised Recovery Plan (USFWS 1996), while the number of pairs reflected in 1996 -1999 productivity is provided in the respective Status Updates for those years (USFWS 1997, 1998, 1999, 2000).

[q] Parentheses denote number of pairs on which productivity is based/estimated number of pairs in the state or region between 1992 and 2001.

[r] Reflects correction in 1996 Maryland productivity from 1996 Status Update.

[s] Chicks surviving to 25 days projected from data collected through day 15 based on linear regression analysis. For further information see NPS and Maryland DNR (1997).

[t] Productivity data for 1987 - 1991 may be found in Table 6 (page 25) of the Revised Recovery Plan (USFWS 1996).

[u] Number of pairs on which New York 1999 and 2000 productivity is based exceeded the population estimate, Tables 1 and 2. Reasons for the relatively large discrepancy between the 1999-2000 window estimates and the number of pairs on which the 1999-2000 New York productivity estimates are based are unclear, but appear to reflect undercounts in the window estimates and double counting of some renesting pairs at some sites in the productivity estimates. If this is the case, it would, in turn, result in an underestimate of State-wide productivity.

Table 4. Summary of Atlantic Coast Piping Plover Population Estimates, 1986 to 2001.

STATE/REGION	PAIRS																
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Goal
Maine	15	12	20	16	17	18	24	32	35	40	60	47	60	56	50	55	
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	5	5	6	6	7	
Massachusetts	139	126	134	137	139	160	213	289	352	441	454	490	495	501	496[i]	495[i]	
Rhode Island	10	17	19	19	28	26	20	31	32	40	50	51	46	39	49	52	
Connecticut	20	24	27	34	43	36	40	24	30	31	26	26	21	22	22	32	
NEW ENGLAND	184	179	200	206	227	240	297	376	449	552	590	619	627	624	623	641	625
New York[g]	106[a]	135[a]		191	197	191	187	193	209	249	256	256	245	243	289	309	
New Jersey	102[b]	93[b]		128	126	126	134	127	124	132	127	115	93	107	112	122	
NY-NJ REGION	208	228	277	319	323	317	321	320	333	381	383	371	338	350	401	431	575
Delaware	8	7	3	3	6	5	2	2	4	5	6	4	6	4	3	6	
Maryland	17	23	25	20	14	17	24	19	32	44	61[e]	60	56	58	60	60	
Virginia	100	100	103	121	125	131	97	106	96	118	87	88	95	89	96	119	
North Carolina	30[c]	30[c]		55	55	40	49	53	54	50	35	52	46	31	24	23	
South Carolina	3	-	-	-	1	1	-	1	-	-	0	-	-	-	-	0	
SOUTHERN REGION	158	160	171	199	201	194	172	181	186	217	189[e]	204	203	182	183	208	400
U.S. TOTAL	550	567	648	724	751	751	790	877	968	1150	1162	1194	1168	1156	1207	1280	1600
ATLANTIC CANADA[h]	240	223	238	233	229	234	234[d]	234[d]	181	208	186	197[f]	212	240	231	245	400
ATLANTIC COAST[h]	790	790	886	957	980	985	1024	1111	1149	1358	1348	1391	1380	1396	1438	1525	2000

Table 4, continued:

[a] The recovery team believes that this estimate reflects incomplete survey effort. See discussion on page 22 of the Revised Atlantic Coast Piping Plover Recovery Plan (USFWS 1996).

[b] The New Jersey plover coordinator conjectures that one quarter to one third of the apparent population increase between 1986 and 1989 is due to increased survey effort.

[c] The recovery team believes that the apparent 1986-1989 increase in the North Carolina population is due to intensified survey effort. See discussion on page 22 of the recovery plan (USFWS 1996). No actual surveys were made in 1987; estimate is that from 1986.

[d] 1991 estimate. Actual counts of 174 pairs in 1992 and 186 pairs in 1993 reflect partial surveys.

[e] Reflects correction in 1996 Maryland population from 60 pairs reported in 1996 Status Update to 61 pairs.

[f] Assumes that the number of pairs in Newfoundland in 1997 was 11 pairs, the same as 1996; Newfoundland reported 35 adults in 1997, up from 27 in 1996, but provided no 1997 estimate for breeding pairs.

[g] As noted in the discussion of population estimates and note “j”accompanying Table 2, the only statewide count tallied in New York in 1994-2000 is the window census.

[h] Changes from Atlantic Canada and Atlantic Coast totals reported in 1999 Status Update reflect corrections received from Canadian Wildlife Service.

[i] Beginning in 2000, Massachusetts estimates reflect a slight change in methodology from prior years. See description of Adjusted Total Count in Methods section, Mostello and Melvin (2001).

Table 5. Piping Plover Nesting Habitat Oiled During TB-Rhode Island Spill March–April 2001.

Shoreline Location	Township
Long Beach Peninsula	Town of Smithtown
West Meadow Beach	Town of Brookhaven
Flax Pond	Town of Brookhaven
Old Field Beach	Town of Brookhaven
Mount Misery Point Beach	Town of Brookhaven
Cedar Beach	Town of Brookhaven
Shoreham Beach	Town of Brookhaven
Wading River Landing	Town of Brookhaven
Fresh Ponds Landing	Town of Riverhead

In New York State, there has been a dramatic increase in the number of plants from 1990 to 2002. The approximate total number of plants observed during NYNHP surveys are listed as follows:

Table 6. Number of Surveyed Seabeach Amaranth Plants in Long Island, New York, Between 1990 and 2002.

Year	Number of Plants
1990	331
1991	2,100
1992	422
1993	195
1994	182
1995	599
1996	2,263
1997	7,990
1998	8,599
1999	19,155
2000	138,600
2001	179,300
2002	190,500

Table 7. Number of Seabeach Amaranth Plants in Delaware, New Jersey, and New York from 2000 to 2002.

State	2000	2001	2002
Delaware	41	83	423
New Jersey	1,039	5,813	10,908
New York	(discussed below)		

Table 8. Historic Success of Piping Plover Breeding Activity on Fire Island National Seashore, New York, 1993-2002.

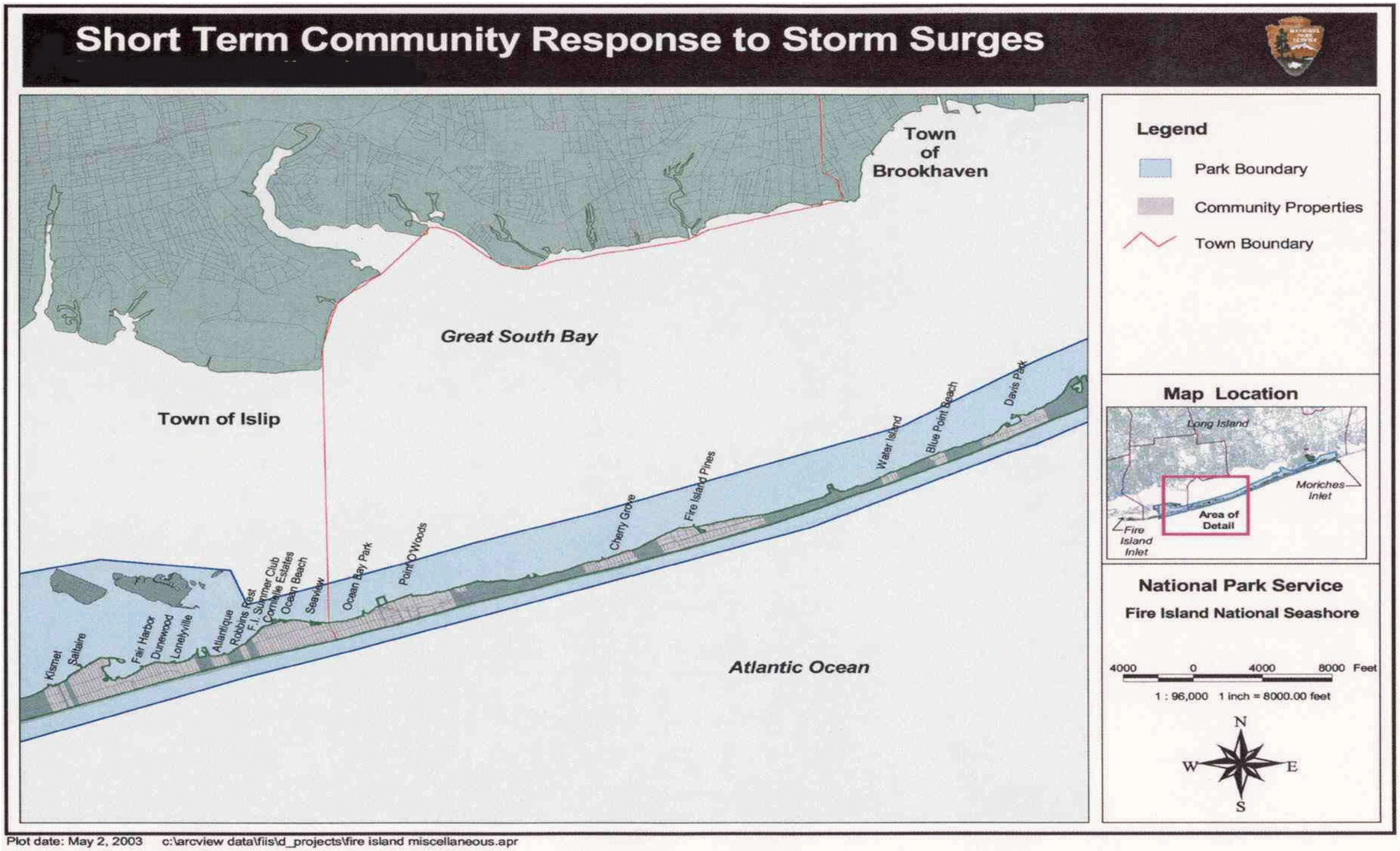
Year	Breeding Pairs	Nest Attempts	Productive Pairs	Eggs Hatched	Hatchlings per Breeding Pair	Chicks Fledged	Chicks Fledged per Nest Attempt	Chicks Fledged per Pair
1993	7	7	0	0	0	0	0	0.0
1994	3	4	0	0	0	0	0	0.0
1995	9	2	1	N/A[1]	N/A	2	1	0.2
1996	2	1	1	N/A	N/A	1	1	0.5
1997	1	1	0	0	0	0	0	0.0
1998	1	1	1	N/A	N/A	1	1	1.0
1999	3	2	2	N/A	N/A	5	2.5	1.7
2000	3	3	3	N/A	N/A	9	3	3.0
2001	4	4	4	N/A	N/A	11	2.8	2.8
2002	10	11	9	33	3.3	28	2.6	2.8
Average	**4.3**	**3.6**	**2.1**	**N/A**	**N/A**	**5.7**	**1.4**	**1.2**

[1]Data from previous nesting seasons are incomplete

Table 9. New York State Department of Environmental Conservation, Long Island Colonial Waterbird Survey for Fire Island, 1994 to 2002.

Location	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fire Island Pines	0	1	0	0	0	1	0	0	1
Fire Island Sunken Forest	2	2	0	0	0	0	0	0	0
Fire Island Wilderness	1	6	2	1	1	1	3	4	10

FIGURES



(National Park Service 2003a)

Figure 1. Site map of Fire Island National Seashore.

Figure 2. Dune construction for structures landward of existing dunes (from National Park Service 2003b).

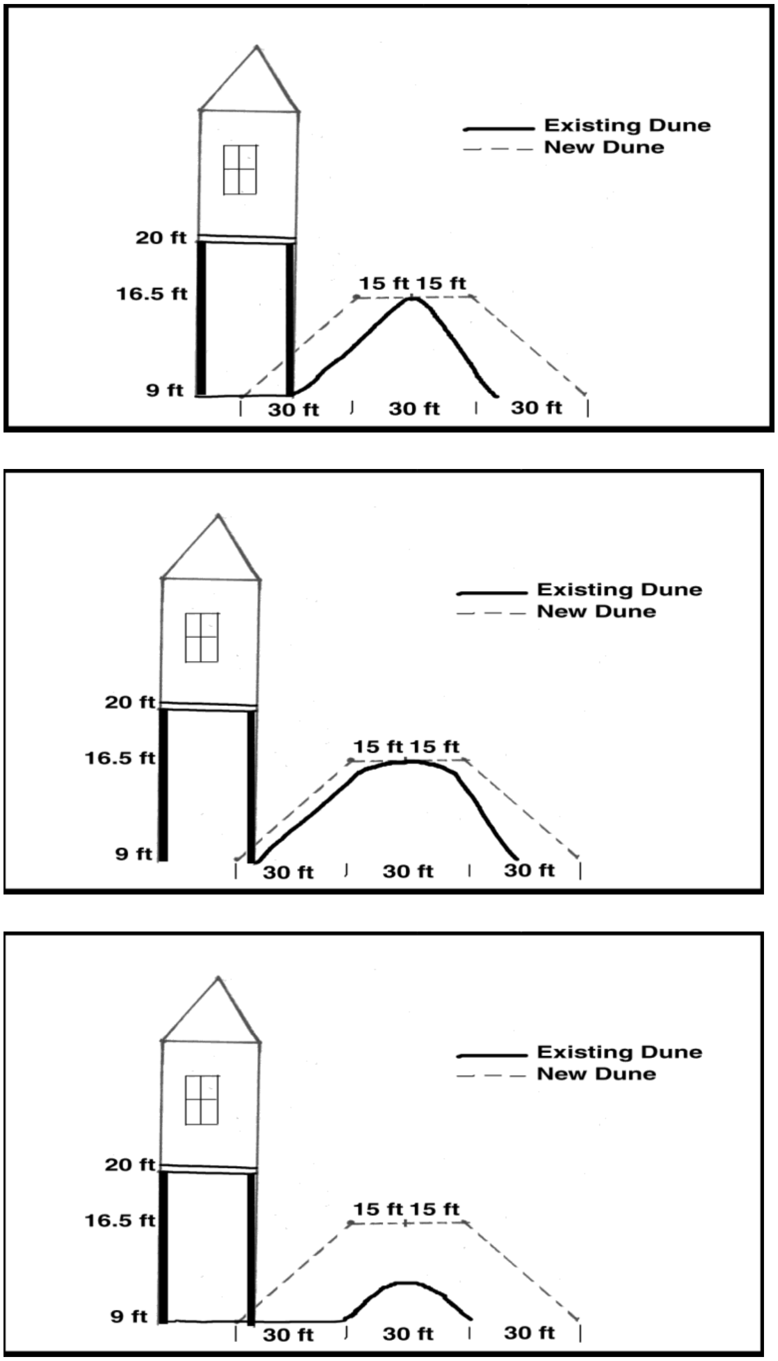


Figure 3. Beach/Dune Template (from National Park Service 2003b).

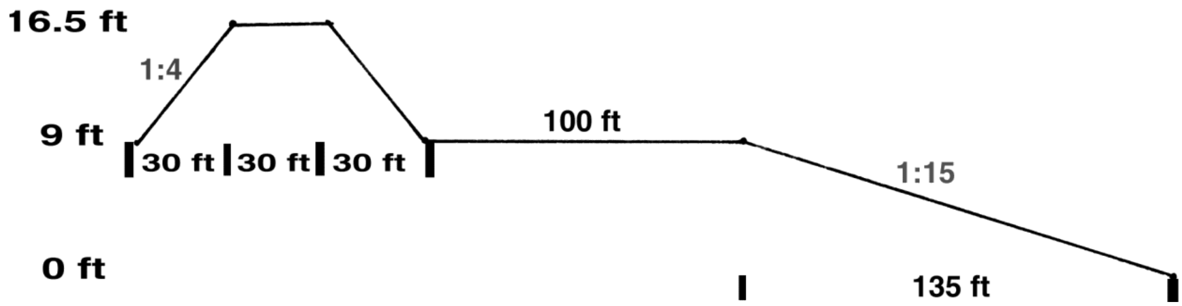
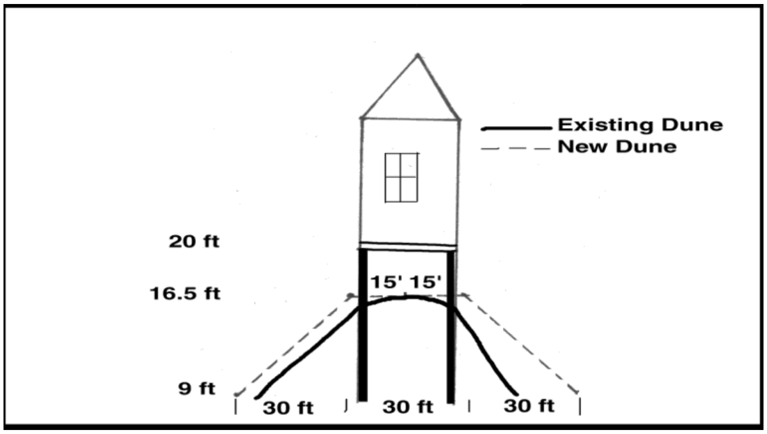
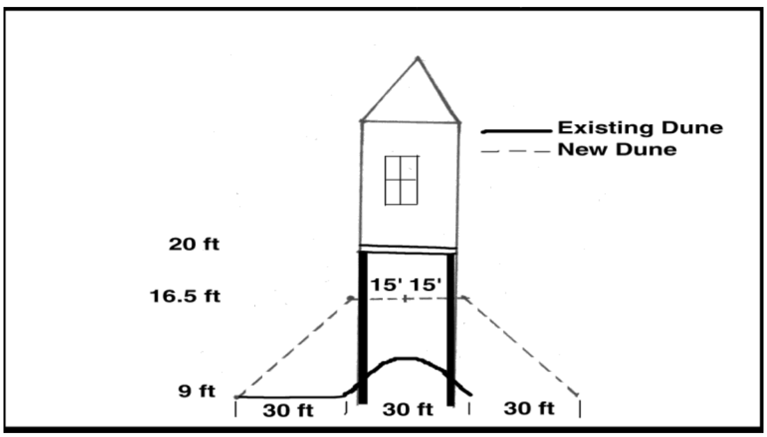
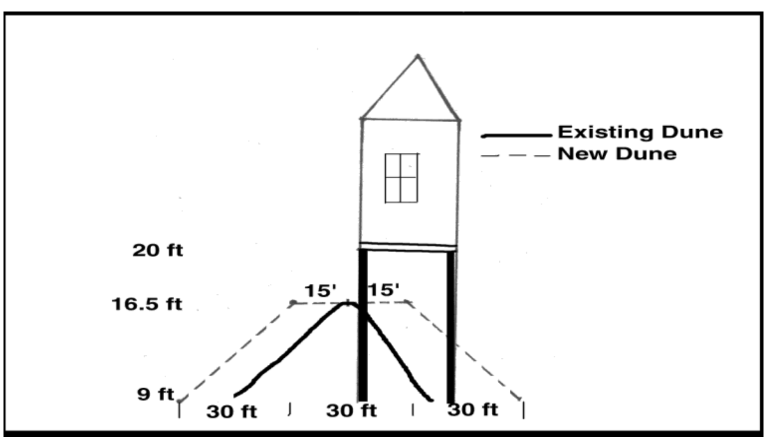


Figure 4. Dune construction for structures on or seaward of the existing dune (from National Park Service 2003b).







APPENDIX

Template Biological Assessment for Proposed Projects Under: 2003 Short-Term Community Storm Surge Protection Plan for the Fire Island National Seashore (FIIS)

LOCATION:

[*Please include a map of the FIIS indicating the project location as well as a vicinity map. The vicinity map should be at a 1:24,000 scale with the USGS quad name included.*]

[*Community Name*: ____________________], [*Beach*: _________________________]

Contact Person: [*Your name*: ______________________]   Phone Number: [___/___-____]

Introduction

This standard form is intended for use by the National Park Service to provide the U.S. Fish and Wildlife Service (Service) with the *type* and *level of detailed information* needed to complete Endangered Species Act (ESA) (16 U.S.C. 1536 (c)) Section 7 consultation for each specific project proposed for construction pursuant to the Fire Island Short Term Community Storm Surge Protection Plan (Plan). It is prepared in accordance with legal requirements set forth under Section 7 of the ESA, and follows the standards established in the Department of the Interior's National Environmental Policy Act guidance. The regulations at 50 CFR 402.12(g) allow action agencies to incorporate by reference an earlier BA, when evaluating an action that is identical or very similar to the earlier action for which the earlier biological assessment was prepared, and can incorporate by reference the earlier biological assessment, plus any supporting data from other documents that are pertinent to the consultation, into a written certification that the proposed action involves similar impacts to the same species in the same geographic area; no new species have been listed or proposed or no new critical habitat designated or proposed for the action area; and the biological assessment has been supplemented with any relevant changes in information.

The analysis of this biological assessment will be tiered off the more comprehensive analysis conducted in the Programmatic Biological Opinion for the June 2003 Fire Island National Seashore Short Term Community Storm Surge Protection Plan, dated August 4, 2003 (Programmatic Biological Opinion).

Our expectation will be that the National Park Service-FIIS (NPS) and the applicant will complete the template and the Service will evaluate the information provided against assumptions made at the programmatic level. The Service will check to be sure that any effects have been previously covered in the Programmatic Biological Opinion and that any take associated with an individual project is consistent with the assumptions made in the Biological Opinion. The Service will then complete the level of consultation appropriate. This may include preparation of a tiered Biological Opinion if the project cannot avoid adverse effects on listed species, or concurrence on the NPS determination that a specific project is not likely to adversely affect listed species.

Threatened, Endangered, Proposed Threatened, or Proposed Endangered Species

The species considered in this document are:

Piping plover (*Charadrius melodus*);
and Seabeach amaranth (*Amaranthus pumilus*).

Critical Habitat
No habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act, therefore, none will be affected.
Consultation History

Summarize and include meetings and correspondence that were important to the decision-making process for the proposed action addressed in this biological assessment. ***Additional pages may be attached if necessary.***

Description of the Proposed Action
The Programmatic Biological Opinion section "Description of the Proposed Plan" includes a description of the range and extent of activities anticipated to be conducted under the June 2003 Fire Island National Seashore Short Term Community Storm Surge Protection Plan (Proposed Plan), and includes specific criteria which must be met in order for NPS to permit the individual actions. The criteria for beach scraping and beach re-nourishment permits are listed in Tables 1 and 2 of the Programmatic Biological Opinion. The Programmatic Biological Opinion's analysis of effects to listed species is based on the Proposed Plan. Individual projects are covered under this Programmatic Biological Opinion to the extent that they conform to the Proposed Plan.

Describe (1) What the project or action is (e.g., beach scraping, beach nourishment); (2) where the project is (refer to attached maps); (3) describe when the action is going to take place, time line/implementation schedule; (4) specify who is going to do the action and under what authority, include name and address of the applicant; (5) include those measures that relate to how the action will be accomplished. For beach scraping: How many linear feet of shoreline and how many acres of dune and beach will be affected? For beach nourishment:
How many cubic yards of dredged material will be placed as beach nourishment? How many linear feet of shoreline and acres of beach will be affected? What is the source and composition of the dredged material? (6) Does the project differ in any way from the description in the Programmatic Biological Opinion? Please provide sufficient information such that the reviewer will have a clear understanding of the project.

Attach additional pages and supporting documentation.

The following conservation measures are included in the description of the proposed action, as described in the Programmatic Biological Opinion. Not including these measures may result in the proposed action not being covered under the Programmatic Biological Opinion, and further consultation may be required.

Conservation Measures Included in the Project Description:
Full details of these conservation measures are found in the Programmatic Biological Opinion in the section "Description of the Proposed Plan."

- **a. Time-of-Year Restrictions**
- **b. Protection Efforts (including symbolic fencing, warning signs, and vehicle restrictions)**
- **c. Measures to Avoid, Minimize, and Compensate for Adverse Effects to Seabeach Amaranth (including surveys, fencing and transplantation of plants, and seed collection)**
- **d. Surveys**
- **e. Predator Control**
- **f. Wrack Removal Prohibitions**
- **g. Kite-flying Prohibitions**
- **h. Pets**
- **i. Monitoring**
- **j. Documentation of Commitments**
- **k. Access**
- **l. Fireworks**
- **m. Structures**

Will the Conservation Measures listed above and as described in the Programmatic Biological Opinion be included in the Project Description?

If the proposed action does NOT include all of the Conservation Measures, indicate which measure is not included, provide an explanation of any alternative conservation measures that will be included, and identify how the potential adverse effects to listed species that would have been addressed by these measures will be addressed and whether any will remain.

Species Accounts
This section incorporates, by reference, the species accounts in the July 2003 Programmatic Biological Opinion.

Habitat Status
Historic information on use of the action area by listed species is presented in the July 2003 Programmatic Biological Opinion.

Provide any data subsequent to the date of the biological opinion on the presence of species in the action area. Describe species use of the habitat (e.g., forage, nesting) in the action area. Reference field notes, unpublished data, research in progress, view of recognized experts, local population information, and survey information.

Existing Environment
This section incorporates by reference information provided in the July 2003 Programmatic Biological Opinion.

Describe any additional impacts to the species that you know about that will be occurring in the action area but which are unrelated to effects of your action.

Effects of the Action
The effects to listed species of beach scraping and beach nourishment activities are described in detail in the July 2003 Programmatic Biological Opinion and include the following:

Direct Adverse Effects of Beach Scraping and Beach Nourishment on Piping Plovers
The Programmatic Biological Opinion determines that beach nourishment or beach scraping will not result in direct effects to piping plovers if activities are conducted outside the piping plover nesting season (March 15 to September 1).

Will all activities occur outside the piping plover nesting season (March 15 to September 1)?

Indirect Adverse Effects of Beach Scraping and Beach Nourishment on Piping Plovers

1). Potential long-term reduction in habitat formation due to continuation of stabilized beaches.

2). Creation of Sub-Optimal Beach and Dune Habitats.

3). Potential reduction of plover productivity as a result of severe reductions of intertidal and terrestrial invertebrate prey resources due to burial by dredged material.

4). Effects of Increasing Recreational Activities and Creating Habitat for Predators.

Indicate which of the effects listed above apply to the proposed action:

Adverse Effects of Beach Scraping and Beach Nourishment on Seabeach Amaranth

If, for any reason, construction activities might unavoidably encroach on the *Seabeach amaranth* growing season (March 15 to November 1) direct effects to *Seabeach amaranth* may result, including:
1). Mortality of buried individual plants.
2). Loss of seed production.

Additional effects may occur even if activities take place outside the March 15 to November 1 period, including:
3). Burial of seeds beyond germination depth.
4). Establishment of dune grass and accelerated interspecific competition.
5). Changes in erosional climate that may affect amaranth plant viability.

Indicate which of the effects identified above apply to the proposed action, and how those effects are either avoided or minimized:

Cumulative Effects
The NPS has stated that any activities that occur within the boundaries of the NPS would require the issuance of a special use permit, a Federal action which would require section 7 consultation with the Service. Therefore, cumulative effects, which include the effects of future State, local, or private actions that are reasonably certain to occur in the action area, would not be likely due to Federal jurisdiction of all activities within the boundaries of the FIIS.

Conclusion and Determination
This section must conclude with one of the following statements:
The NPS concludes the action is consistent with the action described in the Programmatic Biological Opinion and finds that the action is:
_____ Likely to benefit, and request for concurrence from the Service; or
_____ Not likely to adversely affect; and requests for concurrence from the Service; or
_____ Likely to adversely affect; and requests initiation of project-specific formal consultation.

Summarize the key facts and reasoning that led to this conclusion:

Literature Cited
Attach any references or supporting documentation.

List of Contacts/Contributors/Preparers
Attach list of contacts and preparers.