ES-01/093

May 11, 2001

Ms. Amy Fox
U.S. Department of Transportation
Federal Highway Administration
New Jersey Division Office
840 Bear Tavern Road, Suite 310
West Trenton, New Jersey 08628-1019

Dear Ms. Fox:

This letter transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion regarding our review, in accordance with Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) (ESA), of construction and demolition activities related to replacement of the Ocean City - Longport Bridge, located in Egg Harbor Township, Atlantic County and Ocean City, Cape May County, New Jersey and the effects of the project on the federally listed (threatened) piping plover (*Charadrius melodus*).

The roseate tern (*Sterna dougallii dougallii*), a federally listed endangered species, was observed during the 2000 breeding season in the vicinity of the project site; however, the species is considered transient in New Jersey. No recent nesting activity of roseate terns has been documented in New Jersey; therefore, the Service concurs with the FHWA's determination that activities related to the replacement of the Ocean City - Longport Bridge are not likely to adversely affect the roseate tern.

If you have any questions or concerns regarding this consultation, please contact John C. Staples or Annette M. Scherer of my staff at (609) 646-9310, extensions 18 and 34, respectively.

Sincerely,

Clifford G. Day
Supervisor

Enclosure

cc: NJFO (5)
ARD/ES
R5, ES: Hecht
USCOE, Philadelphia District, Regulatory: Cianfrani
NJDEP: ENSP: Jenkins
NJDOT: Nick Caiazza
Steve Balzano: Amy S. Greene Environmental Consultants, Inc.
18 Commerce Street Plaza
Flemington, New Jersey 08822-1743

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BIOLOGICAL OPINION ON THE EFFECTS OF REPLACEMENT OF THE OCEAN CITY - LONGPORT BRIDGE EGG HARBOR TOWNSHIP, ATLANTIC COUNTY AND OCEAN CITY, CAPE MAY COUNTY, NEW JERSEY ON THE PIPING PLOVER (*Charadrius melodus*)

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Prepared for:

U.S. Department of Transportation
Federal Highway Administration
New Jersey Division Office
West Trenton, New Jersey 08628-1019

Prepared by:

U.S. Fish and Wildlife Service
New Jersey Field Office
Ecological Services
Pleasantville, New Jersey 08232

Preparers:

Annette M. Scherer
Douglas Adamo

Assistant Project Leader:
John C. Staples

Project Leader: Clifford G. Day

May 2001

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I. INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service) Biological Opinion, in accordance with Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.) (ESA), regarding construction and demolition activities related to replacement of the Ocean City - Longport Bridge, located in Egg Harbor Township, Atlantic County and Ocean City, Cape May County, New Jersey and the effects of the project on the federally listed (threatened) piping plover (*Charadrius melodus*).

The Ocean City - Longport Bridge replacement project is authorized and funded in part by the U.S. Department of Transportation, Federal Highways Administration (FHWA). Project implementation will be carried out by the New Jersey Department of Transportation (NJDOT) and the Cape May County Bridge Commission (CMCBC). Additional authorizations were required from the U.S. Army Corps of Engineers, Philadelphia District (Corps) and the U.S. Coast Guard (USCG).

On December 29, 1994, the U.S. Army Corps of Engineers, Philadelphia District (Corps) notified the CMCBC that the proposed bridge replacement portion of the project was authorized under 33 C.F.R. 330 (Nationwide Permit (NP) No. 15), provided the necessary U.S. Coast Guard (USCG) approval was obtained. The NP No. 15 authorization number assigned by the Corps was CENAP-OP-R-199402395-24 (NP-15). A separate authorization, for construction activities associated with modification of the existing bridge to create a fishing pier, was issued by the Corps under individual permit number CENAP-OP-R-199402481-24. For subsequent minor modifications, the Corps issued Department of the Army (DA) Permit No. CENAP-OP-R-199800061-51 to the CMCBC. The DA permit authorized the bridge demolition and fishing pier conversion portions of the project.

The USCG issued Bridge Permit No. 3-98-5 for the proposed project, under the General Bridge Act of 1946 (33 U.S.C. 525-533), as delegated to the USCG by the Secretary of Transportation under Section 502(b) of that act.

For the purposes of this consultation, it was agreed by the Service and all federal agencies involved with funding and authorization of the Ocean City - Longport Bridge replacement project that the FHWA would serve as the lead federal agency. It was further agreed that the NJDOT and its consultant, Amy S. Greene Environmental Consultants, Inc. (ASGECI), would serve as the primary contacts for the project during formal consultation with the Service. This Biological Opinion is based on information provided within the *Biological Assessment for the Piping Plover* (Charadrius melodus), *Ocean City - Longport Bridge Replacement and Upgrade of Ocean Drive* (BA) (Amy S. Greene Environmental Consultants, Inc., 2001) and other information provided by the FHWA, Corps, USCG, NJDOT, and ASGECI. A complete administrative record of this consultation is on file in the Service's Ecological Services, New Jersey Field Office.

The roseate tern (*Sterna dougallii dougallii*), a federally listed endangered species, was observed during the 2000 breeding season in the vicinity of the project site (Amy S. Greene Environmental

Consultants, Inc., 2001); however, the species is considered transient in New Jersey. No recent nesting activity of roseate terns has been documented in New Jersey; therefore, the Service concurs with the FHWA's determination that activities related to the replacement of the Ocean City - Longport Bridge are not likely to adversely affect the roseate tern.

II. CONSULTATION HISTORY

The Service engaged in informal consultation with the FHWA, Corps, USCG and the NJDOT and its consultant, ASGECI, regarding the proposed project. During informal consultation and following initiation of formal consultation the Service participated in numerous telephone calls and exchanged additional information via electronic mail or facsimile with the FHWA, Corps, NJDOT and ASGECI. In addition, beginning in early April 2001, the Service received daily monitoring reports regarding piping plover activity in the vicinity of the project area from ASGECI. A chronology of key correspondence, meetings and telephone communications is provided below.

March 17, 1997 — The Service participated in an interagency field inspection and permit coordination meeting for the proposed project at City Hall in Ocean City. The Service discussed the status of federal and State permit applications and associated environmental issues with representatives from the USCG, Corps, FHWA, National Marine Fisheries Service (NMFS), and NJDOT.

April 17, 1997 — The Ocean City - Longport Bridge replacement proposal was discussed during a monthly interagency permit processing meeting. The Service discussed Section 7 consultation requirements regarding the protection of piping plovers nesting near the Ocean City (south) side of the bridge with meeting attendees. The Service informed the meeting attendees that restrictions on construction activities would be required during the piping plover nesting season (April 1 through August 15). In addition, the Service recommended installation of symbolic fencing, or other means of delineation, around all plover nesting areas prior to initiating any construction activities.

April 21, 1997 — Via letter to the Cape May County Department of Public Works, the Service provided information regarding the presence of federally listed threatened and endangered species, including the piping plover, in the vicinity of the proposed project area (i.e., Ocean City - Longport Bridge). Information was provided regarding the general location of nesting areas on the Ocean City side of the bridge, habitat requirements, and protection under the ESA. In addition, the Service recommended a seasonal restriction between April 1 and August 15 to avoid potential adverse impacts to nesting birds. The Service also informed the Cape May County Department of Public Works that additional coordination

would be required to allow the Service to identify and mark all potential plover nesting areas prior to project initiation.

October 28, 1997 — The USCG issued Public Notice Number 5-915, as part of its permit application process for the proposed project, including demolition of a portion of the existing double-leaf bascule bridge.

October 30, 1997 — The New Jersey Department of Environmental Protection's (NJDEP) Land Use Regulation Program (LURP) issued authorizations to the applicant, CMCBC, for the proposed project under NJDEP Permit Nos. 0000-92-0033.4 and 0000-92-0033.5. Physical Condition No. 6 of the LURP permit states that project construction must be halted in areas where NJDEP has determined that special measures are insufficient to protect piping plovers during the nesting season (i.e., April 1 through August 15).

November 28, 1997 — By letter, the Service provided comments and recommendations to the USCG in response to the above-mentioned Public Notice. The Service recommended that the project sponsor (CMCBC) contact the Service and New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP) prior to construction or in-water blasting. In addition, the Service recommended a seasonal restriction, from April 1 through August 15, for construction activities that would occur within 100 meters (330 feet) of potential piping plover nesting habitat.

December 15, 1997 — By letter to the Service, Parsons - Brinckerhoff (engineering consultants) requested excluding toll plaza reconstruction from the piping plover seasonal construction restrictions.

January 9, 1998 — By letter, the Service provided recommendations to the CMCBC concurring with the above-mentioned request by Parsons - Brinckerhoff. In addition, the Service recommended that CMCBC install an interpretive display at the public parking area near the Ocean City (south) side of the bridge to include information on the piping plover and other beach nesting birds (i.e., State-listed (endangered) least tern (*Sterna antillarum*) and black skimmer (*Rynchops niger*)).

January 20, 1998 — The Corps requested agency comments, via Pre-construction Notification (PCN), for demolition of the existing bridge, except for the northernmost 490-foot section, which will be converted to a public fishing pier. The applicant, CMCBC, requested authorization for the demolition, pier conversion, and new bridge construction, under NP No. 23 because the project was determined to

have met the requirements for a categorical exclusion in accordance with 23 CFR 771.117 (d)(3). The Corps determined that the demolition and fishing pier conversion portions of the project should continue under individual permit review.

January 22, 1998 — By letter, the Corps notified the CMCBC of the above-mentioned decisions regarding permit requirements, emphasizing that the bridge demolition and fishing pier conversion work would be subject to individual permit review.

January 23, 1998 — Via letter, the Service responded to the Corps PCN dated January 20, 1998. The Service provided information regarding piping plover nesting activity that occurred after the Service's March 10, 1995 comments. The Service informed the Corps that an assessment of potential direct, indirect, and cumulative impacts to the piping plover would be required, under Section 7(a)(2) of the ESA, for the project. Since the Ocean City portion of the proposed bridge replacement project is immediately adjacent to piping plover nesting habitat, and activities associated with the project could disturb nesting birds or destroy active nests, the Service recommended restricting activities that would occur within 100 meters (330 feet) of potential piping plover habitat during the nesting and brood-rearing season (i.e., April 1 through August 15).

January 27, 1998 — By letter, the NMFS responded to the Corps PCN dated January 20, 1998. The NMFS indicated that further consultation would be required to protect several species of federally listed sea turtles. The NMFS also recommended restricting in-water blasting from June 1 through November 30 of each project year.

April 17, 1998 — The USCG issued Bridge Permit No. 3-98-5 for the proposed project, under the General Bridge Act of 1946 (33 U.S.C. 525-533), as delegated to the USCG by the Secretary of Transportation under Section 502(b) of that act.

June 10, 1998 — The Corps issued Department of the Army (DA) Permit No. CENAP-OP-R-199800061-51 to the CMCBC. The DA permit authorized the bridge demolition and fishing pier conversion portions of the project. Special Condition No.17 of the permit incorporated the above-mentioned Service recommendations to protect piping plovers during the nesting season. Special Condition No. 19 of the permit allows for re-evaluation of the above-mentioned seasonal restriction after July 1 of any year. Special Condition No. 19 also allows that if the Service determines that piping plovers are not present, construction activities within 100 meters (330 feet) of potential piping plover

nesting habitat may proceed after written concurrence from the Corps and the Service.

December 20, 1999 — The Service participated in an interagency coordination meeting with the Corps, ENSP, and NJDOT. Engineering consultants, Kiewit/Tidewater (K/T), and environmental consultants, ASGECI, participated on behalf of NJDOT and the CMCBC. Service and ENSP biologists expressed concerns about construction details that involved concrete and steel sheet pile driving via impact hammer. The pile driving operations would be located at the south bridge abutment area, which is in the immediate vicinity of potential plover nesting habitat. The NJDOT and the CMCBC representatives informed the Service and ENSP that concerns regarding such activities had not been raised previously. The Service, Corps, and ENSP representatives explained that such high noise-level activities had not previously been included in any project description and must be addressed as part of the informal consultation process. The ENSP and Service biologists raised concern that high noise levels may adversely impact plovers prior to and during nesting activities and could, therefore, constitute a "take" pursuant to Section 9 of the ESA.

January 24, 2000 — By letter, Mr. Greg Hill of K/T, expressed concerns to the NJDOT Resident Engineer, regarding piping plover issues brought forth during the above-mentioned meeting. Mr. Hill indicated that enforcement of a 100-meter buffer area would substantially delay the project by preventing construction of the south bridge abutment from April 1 through August 15. Mr. Hill proposed to request that the Corps reduce the width of the buffer zone. Mr. Hill also noted that the Corps permit does not restrict activities in paved areas adjacent to the bridge toll plaza. Mr. Hill urged the NJDOT to approve K/T's request to modify the Corps permit.

January 28, 2000 — By letter, Mr. Greg Hill of K/T requested that the Service review plans to access the south bridge abutment via an extended right-of-way (ROW). Mr. Hill stated that the east side of the bridge abutment (i.e., potential piping plover nesting habitat) is the only area where equipment can be staged. Mr. Hill included a copy of project plans that clearly depicted the area of extended ROW and associated project components.

February 11, 2000 — An interagency meeting was held to discuss project construction relative to piping plover issues (i.e., nesting habitat, beach access for construction, and the proposed equipment staging area). The Service informed the project proponents (NJDOT and K/T), that if seasonal timing restrictions during the piping plover nesting season could not be adhered to, preparation of a

Biological Assessment (BA) addressing potential impacts to nesting piping plovers and initiation of formal consultation would be required. The Service recommended that the BA address the following: (1) minimization of construction activities (i.e., crane operation, pile driving, blasting, sequencing of construction), (2) south abutment pile driving duration and noise levels, and (3) scheduling of construction and demolition activities for subsequent project years. The Service provided meeting participants with an overview of the formal consultation process and time frames. The NJDOT indicated that preparation of the BA would be a joint effort between NJDOT, K/T, and ASGECI, and would be initiated as soon as possible.

To prevent plover chicks from entering the work site, the NJDOT agreed to place a snow fence with wire mesh at a location approximately 100 meters (330 feet) west of the closest documented plover nesting and foraging area. An additional snow fence, without wire mesh, would be placed adjacent to the construction site to define the limits of the permitted work area. Monitoring of the piping plover nesting area and preparation of the BA would be performed by ASGECI. The NJDOT's environmental branch agreed to conduct an assessment of potential impacts for the all future construction seasons.

February 14, 2000 — The NJDOT circulated written minutes from the February 11, 2000 meeting summarizing the meeting results and agreements, including the need to prepare a BA and allow 135 days for formal consultation and issuance of the Service's Biological Opinion.

February 16, 2000 — By letter, the FHWA notified the NJDOT Resident Engineer that the NJDOT must adhere to the Corps permit conditions requiring a 100-meter buffer area from piping plover nesting habitat and requiring coordination with the Service and Corps prior to initiation of construction.

April 12, 2000 — During a telephone conversation with the Service, the NJDOT Resident Engineer indicated that the test pile driving on the north bridge abutment was requiring an average of 45 minutes per pile and that driving time for channel piles was averaging 25 - 35 minutes each, which was longer than anticipated. The NJDOT Resident Engineer appeared to have misunderstood the ESA requirements, as identified by the Service at the February 11, 2000 meeting. The Service informed the Resident Engineer that preparation of a BA should have been completed and that formal consultation should have been initiated. The delay on NJDOT's part in conforming to ESA requirements precluded the possibility of concluding formal consultation prior to the 2000 nesting season. The Resident Engineer was informed that even if the BA were submitted

immediately, sufficient time was not available for the Service to conclude formal consultation with the FHWA and prepare a Biological Opinion. Therefore, no incidental take of piping plovers could be authorized for the 2000 nesting season.

April 18, 2000 — By letter, the NJDOT Resident Engineer documented his understanding of findings, requirements, and recommendations set forth during the February 11, 2000 meeting and subsequent coordination. The Resident Engineer neglected to include the requirement for preparation of a BA, but included the recommendations regarding snow fence installation plans, the proposed 100-meter buffer area, the April 1 through August 15 restriction on pile driving and blasting at the south abutment, and a request from the NJDOT that the Service monitor pile driving at the north abutment to assess the potential for disturbance to nesting piping plovers.

May 3, 2000 — Via telephone, Service Biologists coordinated with the NJDOT Resident Engineer to re-evaluate proposed construction activities at the south bridge abutment during the piping plover nesting season. The Service advised the NJDOT that pile driving operations could continue only if such operations did not disturb piping plover nesting and foraging behavior. Agreement was reached between the Service and the NJDOT that pile driving could continue provided that a qualified piping plover monitor was on site and a process was in place whereby any observations of plovers reacting negatively to noise and / or activity would trigger a cease to all pile driving at the south abutment.

May 4, 2000 — By letter, the Service provided the NJDOT with measures necessary to avoid a take under Section 9 of the ESA. The Service developed these measures after extensive coordination with NJDOT regarding their need to continue pile driving operations during the piping plover nesting season at the south bridge abutment. The measures require that an approved observer, located approximately 150 feet from the plover nest nearest the work site, record plover behavior and ambient noise levels, via decibel meter, at 5-minute intervals. The measures also require the observer to be in place at least 15 minutes prior to commencement of pile driving, notify the Service and ENSP at least 1 hour prior to driving each pile, and submit a daily record of observations, via facsimile, for Service review. The letter clearly stated that no additional pile driving would take place until Service concurrence of no adverse impact was received by the NJDOT Resident Engineer.

May 5, 2000 — The NJDOT commenced pile driving operations at the south abutment at approximately 5:55 p.m. Service and ENSP Biologists served as interim

observers, pursuant to the aforementioned measures, until the NJDOT could retain an environmental consultant to perform the monitoring. The Resident Engineer provided a decibel meter and was also present during observations. Pile driving equipment was located approximately 1,700 to 2,000 feet from the nearest piping plover nest, which contained 4 eggs. The nest was observed for approximately 45 minutes prior to commencement of pile driving. Decibel levels recorded during pile driving were 76 - 98. The adult plover continued incubation on the nest during the pile driving activity.

May 9, 2000 — A Service Biologist conducted piping plover monitoring at the south abutment work site accompanied by the NJDOT Resident Engineer and an ASGECI Biologist. During this monitoring period, a nesting piping plover and 6 additional adult piping plovers were observed in the vicinity. The plover nest was observed prior to and during the test pile (#12) driving, which required approximately 17 minutes. The incubating adult did not appear to be disturbed by pile driving activities. Noise levels ranged from 68 - 99 decibels during pile driving.

May 10, 2000 — ASGECI provided a brief summary of the previous day's observations, concluding that incubating plovers had shown no apparent adverse reactions to the pile driving.

May 12, 2000 — The Service received documentation of all piping plover nesting observations performed by ASGECI, from May 5 to 10, 2000, at the south abutment work site.

May 16, 2000 — During a telephone conversation with the NJDOT Resident Engineer, the Service concurred that, based on the above-mentioned documentation, no adverse impacts to piping plovers had occurred, to date, as a result of test pile driving. The Service informed the Resident Engineer that if no adverse impacts were observed during driving of the next scheduled test pile (# 6), pile driving at the south abutment could proceed with monitoring. The Service emphasized that all pile driving activities must cease if any disturbance to piping plovers is detected.

May 25, 2000 — Via telephone, the Service requested a status report of NJDOT pile driving activities. The Resident Engineer reported that due to problems with advance work, driving test pile #6 had been delayed, but could begin during the current day. An ASGECI Biologist was available to monitor the nest site should pile driving begin. The Resident Engineer sought concurrence that pile driving could begin at the south abutment. The Service reiterated that should adverse

behavioral reactions by plovers occur as a result of pile driving, all work associated with such activities must immediately cease. The Resident Engineer acknowledged the warning and indicated that NJDOT would be submitting monitoring reports for test pile #6 following completion of such work.

May 30, 2000 — In a letter to K/T, the NJDOT Resident Engineer reported further delays in driving test pile #6 and that the Service had concurred that pile driving work at the south abutment could occur provided monitoring results indicated no adverse reactions by plovers. The Resident Engineer conveyed the Service's above-mentioned warning that work must stop if nesting plovers showed adverse reactions to pile driving.

June 8, 2000 — In compliance with the Service's May 4, 2000 letter, NJDOT provided ASGECI's monitoring documentation for test pile #9, which was performed on June 1, 2000. Although observations indicated that the adult plover had vacated the nest during commencement of pile driving, no adverse behavioral reactions were reported. In the letter of conveyance, the NJDOT Resident Engineer stated that NJDOT had encountered an obstruction at pier #6 and that monitoring had been discontinued until pile driving at the south abutment resumed.

July 10, 2000 — The Service received a copy of all field notes, observations, and decibel level data recorded during monitoring of south abutment pile driving that occurred from July 6 to10, 2000. Service review of the monitoring reports revealed that a female plover had been observed exhibiting behavior indicative of an adverse reaction to a pile driving event that occurred at 9:40 a.m. on July 10, 2000. The Service received the report at 6:51 p.m.

July 11, 2000 — Via telephone the Service conferred with the ENSP regarding the status of piping plover monitoring at the south abutment. The ENSP indicated that based on ENSP on-site observations, monitoring at the project site was inadequate. The ENSP reported that, due to poor communication between the contractor and NJDOT, no piping plover monitoring was performed by NJDOT or ASGECI during pile driving that occurred over the weekend. The ENSP was concerned that subtle indications of adverse reactions to pile driving were being overlooked by the monitors and that actual adverse reactions by plovers to the pile driving noise were more prevalent than indicated on monitoring reports. In general, the ENSP was concerned that adverse conditions from loud noise generated by the pile driving was causing stress to nesting plovers.

July 11, 2000	Based on the Service's review of the monitoring reports and discussion with the ENSP, the Service informed the NJDOT Resident Engineer, via telephone, that all pile driving operations at the south abutment must cease pending further Service evaluation of site conditions and reports submitted within the last few days. During a follow-up call on the same day, the Service informed the Resident Engineer that, until all chicks had fledged from the nesting area in the vicinity of the south abutment, any further pile driving activity at the south abutment would likely result in a violation of Section 9 of the ESA. The Service recommended that all pile driving at the south abutment cease. The Service concurred that pile driving at the north abutment and sheet piling installation at the south abutment could proceed, provided adequate monitoring is performed.
July 11, 2000	Via e-mail, the Service briefed the Service's Division of Law Enforcement of the situation, including the recommendation that pile driving activities be ceased at the south abutment of the Ocean City - Longport Bridge to avoid a violation of Section 9 of the ESA.
July 11, 2000	Via letter, the NJDOT Resident Engineer informed K/T, that further pile driving south of the bridge mid-span would be prohibited, including at the south abutment work site. The Resident Engineer added that the work restriction would be in effect until all chicks had fledged from the south abutment nest.
July 12, 2000	Via facsimile, the NJDOT submitted ASGECI field notes and decibel level data from piping plover nest monitoring during sheet pile driving operations. ASGECI did not report any adverse reactions by the plovers during pile driving.
July 13, 2000	Via facsimile, the NJDOT submitted ASGECI field notes and decibel level data from piping plover nest monitoring during sheet pile driving operations. ASGECI did not report any adverse reactions by the plovers during pile driving.
July 17, 2000	Via facsimile, the NJDOT submitted ASGECI field notes and decibel level data from piping plover nest monitoring during sheet pile driving operation. ASGECI reported that all observed disturbances to plovers were due to dogs and a nest inspection performed by an ENSP Biologist and not from pile driving operations.
July 24, 2000	Via telephone, the Service informed the NJDOT that nesting and brood rearing activities in the vicinity of the south abutment had concluded and that pile driving operations could resume.

July 28, 2000	Via letter, the NJDOT Resident Engineer notified K/T that pile driving operations could continue south of the Ocean City - Longport bridge mid-span.
December 20, 2000	Service Biologists met with ASGECI regarding issues to be addressed in the BA. The Service requested that ASGECI specifically address concerns regarding: (1) construction sequencing and avoidance of impacts to anticipated nesting plovers in the 2001 season; and (2) mitigative measures, including standards and methodology for behavioral monitoring.
January 12, 2001	Via letter, the FHWA requested initiation of formal consultation for the Ocean City - Longport Bridge project and informed the Service that a BA for the project would be forwarded to the Service from ASGECI.
January 17, 2001	The Service received the BA for the Ocean City - Longport Bridge project. The BA, dated January 15, 2001, was prepared by ASGECI on behalf of NJDOT.
February 5, 2001	Via letter to FHWA, the Service acknowledged receipt of the above-mentioned BA and FHWA's request for initiation of formal consultation. The Service provides the FHWA with a timeline for conclusion of formal consultation and issuance of the Service's Biological Opinion.
March 20, 2001	Via telephone, the NJDOT Resident Engineer discussed construction activities that were to take place during the 2001 piping plover nesting and brood rearing season with the Service. The Resident Engineer raised concerns that seasonal restrictions on construction would further impact the work schedule. The Service informed the Resident Engineer that formal consultation had not concluded and that the Service's Biological Opinion, would not be finalized by April 1 (i.e., beginning of the construction restriction).
March 21, 2001	Via telephone, ASGECI provided a description of the construction activities that would occur during March through May 2001 and requested on behalf of the NJDOT that construction activities proceed provided that monitoring was conducted to ensure that no disturbance to piping plovers occurred. The Service concurred that construction could continue, but must cease if disturbance to plovers was observed.
March 23, 2001	Via letter, ASGECI, provided a description of construction activities that would take place during the 2001 piping plover nesting season and prior to conclusion of formal consultation. It was agreed that plover nest monitoring would be performed before, during, and after pile driving operations. The monitoring will include observations during the use of the vibratory hammer (for sheet pile

installation), as well as during the use of the impact hammer used to drive piles. In addition, field data sheets would be transmitted directly from ASGECI to the Service at the conclusion of each workday when pile driving is performed.

May 1, 2001 — Via telephone, ASGECI notified the Service that alarm behavior had been displayed by a nesting plover during sheet pile installation. The operation was ceased and the bird returned to its nest. Sheet pile installation was resumed and the bird showed no reaction. The Service concurred with ASGECI's determination that since sheet pile operations had not been ongoing during the past few days when the bird initiated nesting activity, the start-up of the operation had caused an initial reaction, but that the bird became acclimated to the construction activity. The Service recommended that monitoring continue, and that construction activities cease if any further disturbance was observed.

III. BIOLOGICAL OPINION

A. DESCRIPTION OF THE PROPOSED ACTION

1. Project Overview and Schedule

The Ocean City - Longport Bridge Replacement Project (Project) involves construction of a new bridge along Ocean Drive connecting the City of Ocean City, Cape May County with the Township of Egg Harbor, Atlantic County (Amy S. Greene Environmental Consultants, Inc., 2001). The new bridge will replace an existing drawbridge (bascule-type bridge) crossing at Egg Harbor Inlet along a new alignment located slightly east of the existing bridge. The new bridge will have a 65-foot clearance, eliminating the need for a bascule-type bridge. Except for a 490-foot section at the northern end of the existing bridge, which will be rehabilitated as a public fishing pier, the existing structure will be demolished upon completion of the new bridge. The project is currently under construction with completion anticipated during August 2002 (Amy S. Greene Environmental Consultants, Inc., 2001).

In addition to the bridge replacement, the Project also includes an upgrade of Ocean Drive (County Route 656) to raise the road elevation from the northern end of the new bridge to the intersection with New Jersey State Route 152, reconstruction of the existing bridge toll plaza in Ocean City, and construction of a parking area adjacent to the proposed fishing pier in Egg Harbor Township (Amy S. Greene Environmental Consultants, Inc., 2001).

Figures depicting the general location of construction activities and the relationship of the Project area to nesting habitat occupied by piping plovers during the 1999 and 2000 nesting seasons were provided within the BA. While no work areas associated with the Project are directly located within areas used by piping plovers for nesting and brood rearing, the species has traditionally nested within Ocean City approximately 700 feet southeast of the southern bridge abutment. Piping plover nesting and foraging behavior may be adversely affected by noise from pile driving and demolition activities occurring during the nesting season (April 1 through August 15).

The Project is federally authorized and funded in part by the FHWA; the NJDOT is the Project sponsor. As described above, additional federal authorizations were required from the Corps and USCG. Permits issued by the Corps and the USCG require restrictions on construction activities within 100 meters (330 feet) of habitats used for nesting and foraging activity during the piping plover nesting season. The indirect adverse impacts to nesting piping plovers associated with noise from pile driving activities occurring at a distance greater than 100 meters (330 feet) had not been identified by the applicant (CMCBC), nor anticipated by the Corps and USCG. Since pile installation is a major component of the Project, the project cannot be scheduled to completely avoid pile driving during the piping plover nesting season. Pile driving and demolition activities will be ongoing during the 2001 and 2002 nesting season (Amy S. Greene Environmental Consultants, Inc., 2001).

The NJDOT anticipates that no more than one pile will be driven per work day. Each pile will require no more than 30 to 40 minutes of drive time each day using a single action air hammer. The balance of each work day will be spent on positioning of equipment, mobilization, and maintenance. In addition to pile driving activities, NJDOT anticipates using a vibratory hammer to facilitate probing for underwater obstructions and to install casings at piers 6 and 7.

An anticipated construction schedule was included within the BA prepared for the Project (Amy S. Greene Environmental Consultants, Inc., 2001). The construction schedule anticipates that pile installation for pier construction will proceed during 2001 nesting season. Pile driving is proceeding from north to south, and is scheduled to be completed by mid-August (Amy S. Greene Environmental Consultants, Inc., 2001). Construction of the bridge superstructure (girders and decking) will be also proceed from north to south and, according to the construction schedule, will proceed in segments following completion of piers. Girder construction spanning piers 16 to 14 and piers 13 to 11 is scheduled to occur during the piping plover nesting season. Decking construction may occur as far south as pier 14 during the plover nesting season. No adverse impacts to piping plovers are anticipated from girder and decking construction as scheduled. Construction schedules are updated quarterly (February, May, August, and November) (Amy S. Greene Environmental Consultants, Inc., 2001).

Once traffic is redirected onto the new bridge, demolition of the existing bridge will begin. Demolition may include the use of blasting to remove the existing piers. Demolition is anticipated to begin in mid-December 2001 and will continue through mid-July 2002, extending into the 2002 piping plover nesting season. While it is anticipated that demolition activities in close proximity to the Ocean City piping plover nesting area (i.e., south of the existing navigation channel) will be completed prior to the onset of the 2002 nesting season, timing of construction activities are subject to change due to constraints such as weather and equipment malfunction (Amy S. Greene Environmental Consultants, Inc., 2001). Major activities scheduled to occur during the piping plover nesting season (April 1 through August 15) are summarized in Table 1 (Amy S. Green Environmental Consultants, Inc., 2001).

Table 1. Major Construction Activities to be Conducted During the 2001/2002 Piping Plover Nesting Seasons

Nesting Season	Start Date	Completion Date	Description
2001	February 7, 2001	August 13, 2001	Install water-based piles at Piers 6 to13
2001	June 26, 2001	January 11, 2002	Install land-based piles at Piers 1 to 5
2002	December 21, 2001	July 12, 2002	Demolition of existing bridge

2. Measures Proposed to Minimize Impacts to the Piping Plover

To minimize potential adverse impacts to the piping plover, the applicant has incorporated the following measures into the project design and implementation schedule as described within the BA (Amy S. Greene Environmental Consultants, Inc., 2001).

- Work areas on the southern (Ocean City) side of the project area will be confined to an area not to exceed 30 feet east of the proposed new bridge, in compliance with Corps permit conditions.

- A six-foot high construction fence has been erected immediately adjacent to the south abutment to contain all construction personnel and equipment. No disturbance to beach or dunes will be permitted beyond the limits of the construction fence. The construction fence will be maintained for the duration of the project.

- A three-foot high snow-fence, which includes a small mesh piping plover exclusion fence, has been erected in proximity to the south abutment work area to prevent piping plover chicks from accidentally wandering into the work area and to redirect pedestrian traffic toward the shoreline away from the nesting beach. The exclusion fence will be maintained in serviceable condition for the duration of the Project to ensure that a minimum of six inches of small mesh fencing protrudes above the top of the sand.

- No staging or material stockpiling will be conducted in proximity to the south bridge abutment during the nesting season (April 1 through August 15). With the exception of demolition of the south abutment, no material stockpiling, processing or staging is anticipated at the south abutment during the remainder of the demolition work.

- NJDOT will notify the Service of any anticipated changes to the pile driving or demolition schedule that will take place during the nesting season. Any change in the construction schedule which results in a substantial change in the duration or proximity of pile driving or demolition activities during the nesting season (April 1 through August 15) will be subject to the approval of the Service. To the maximum extent practicable, the duration of pile driving activities and proximity of pile driving to the piping plover nesting area in Ocean City will be minimized during the nesting season.

Although the piping plovers have traditionally nested in excess of 700 feet from the work area, in subsequent years nests may be located in closer proximity to the work area. In order to minimize the potential for adverse impacts to nesting birds, the NJDOT proposed the following limitations on construction within the BA (Amy S. Greene Environmental Consultants, Inc., 2001):

- o No pile driving or demolition activities will be conducted within 330 feet (100 meters) of an active nest.

- o Pile driving and/or demolition activities will not be conducted that disrupt the establishment of more than 2 nests during the early portion of any nesting season to allow time for re-establishment of a nesting territory at an alternate location.

- o No abandonment of nests or broods attributed to construction activities will be permitted after June 1 or when chicks are detected, whichever is earlier.

- o No abandonment of flightless chicks attributed to construction activities will be permitted at any time.

The NJDOT proposes to cease pile driving and demolition activities immediately if piping plover behaviors are observed indicating that any of the above construction limitations cannot be met. To ensure that project-related impacts to piping plovers are minimized, the NJDOT proposes to conduct monitoring of piping plover within the project area as follows:

- o Piping plover nesting activities will be monitored by a qualified ornithologist during all pile driving and demolition activities occurring south of the existing navigation channel, during the piping plover nesting season. Monitoring will be conducted for 1 hour before and after each pile driving operation to obtain baseline piping plover behavioral data. Observations will be entered onto standardized field forms at fifteen-minute intervals. Observations will record all nesting, foraging, and flight behaviors detected during each observation period.

- o During March 1 through April 1, the project area will be surveyed once per week to detect the arrival of piping plovers. The Service and ENSP will be notified immediately of the date of arrival of any piping plovers and the approximate location of a nest, if detected.

- o Prior to April 1, all piping plovers will be monitored on a weekly basis to confirm the location and timing of nest establishment. The Service and ENSP will be notified immediately if any nest is located within 100 meters (330 feet) of the project work area.

- o Once a nest is established and incubation commences, nest monitoring will be performed during all days on which pile driving activities or demolition activities to the south of the existing navigation channel are anticipated.

- o The nest monitor will record the behavior of those nesting birds and/or flightless young which are located in closest proximity to the project work area.

- All behaviors will be monitored for the entire duration of pile driving activities including a minimum of one-hour pre and post construction monitoring.

- All monitoring reports will be transmitted concurrently to the Service and ENSP during the next business day if any construction activities have an affect on nesting birds or flightless young, or by the end of the calendar week if no visible impacts are observed.

- The Ocean City Police Department will be notified immediately to report any unleashed dogs or cats on the beach.

Within its BA, the NJDOT proposes the following to ensure that piping plover behaviors are monitored during pile driving activity (Amy S. Greene Environmental Consultants Inc., 2001):

- The NJDOT Resident Engineer will contact the monitor to assure that pre-construction monitoring has been completed prior to allowing the contractor to commence pile-driving activities.

- Pile driving activities will not commence prior to the completion of an hour of pre-construction nest monitoring.

- Pile driving activities will cease no later than one hour prior to dusk to allow for a minimum of one-hour, post-construction nest monitoring. If the NJDOT Resident Engineer determines that pile driving must proceed until dusk due to safety concerns, then two hours of pre-construction monitoring during the next monitoring period will be performed in lieu of one-hour post construction monitoring.

B. STATUS OF THE SPECIES

Relevant biological and ecological information considered by the Service in formulating this Biological Opinion is presented below. Appropriate information on the piping plover's life history, habitat, distribution, and other factors affecting the species' survival is included to provide background for analyses in later sections. This section also documents the effects of all past human and natural activities or events that have led to the current status of the species.

1. Species/Critical Habitat Description

On January 10, 1986, the piping plover was listed as endangered and threatened pursuant to the ESA. Protection of the species under the ESA reflects its precarious status range-wide. Three distinct populations were identified: Atlantic Coast, Great Lakes and Northern Great Plains. The Atlantic Coast population, which breeds on coastal beaches from Newfoundland to North Carolina and winters along the Atlantic Coast from North Carolina south, along the Gulf Coast, and in the Caribbean, is listed as threatened under the ESA. No critical habitat has been designated or proposed for breeding habitat of the Atlantic Coast piping plover population (U.S. Fish and Wildlife Service, 1985).

The recovery plan for the Atlantic Coast population of the piping plover (U.S. Fish and Wildlife Service, 1996) delineates four recovery units or geographic subpopulations within the population: Atlantic Canada, New England, New York-New Jersey, and Southern (Delaware, Maryland, Virginia, and North Carolina). Recovery criteria established within the recovery plan defined population and productivity goals for each recovery unit, as well as for the population as a whole (see Table 2 for goals and current status[1]). Attainment of these goals for each recovery unit is an integral part of a piping plover recovery strategy that seeks to reduce the probability of extinction for the entire population by: (1) contributing to the population total, (2) reducing vulnerability to environmental variation (including catastrophes, such as hurricanes, oil spills, or disease), (3) increasing likelihood of genetic interchange among recovery units, and (4) promoting recolonization of any sites that experience declines or local extirpations due to low productivity or temporary habitat succession. The 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." In accordance with the Endangered Species Consultation Handbook (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998), since recovery units have been established in an approved recovery plan, this Biological Opinion considers the effects of the proposed project on piping plovers in the New York - New Jersey Recovery Unit, as well as the Atlantic Coast population as a whole.

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[1] Final 2000 Atlantic Coast nesting season results were unavailable as of the date of this Biological Opinion

Table 2. Comparison of Population Estimates and Ten-Year Average Productivity with Recovery Criteria by Recovery Unit[1]

Recovery Unit	1999 Population Estimate (Number of Breeding Pairs)	Minimum Subpopulation Needed for Recovery (Number of Breeding Pairs)	1999 Population Estimate as Percent of Recovery Goal (%)	Average Productivity 1990-1999 (Number of Chicks Fledged per Pair)	Percent of Breeding Population 1990-1999 on Which Productivity Estimate is Based (%)	Average Productivity Needed for Recovery (Number of Chicks Fledged per Pair)
Atlantic Canada	230	400	57.5	1.56	51.7	1.5
New England	624	625	99.8	1.59	96.7	1.5
New York-New Jersey	350	575	60.9	1.09	82.5	1.5
Southern	182	400	45.5	1.00	75.0	1.5
U.S. Total	1156	1600	72.3	1.33	87.6	1.5
Atlantic Coast	1386	2000	69.3	--	--	1.5

1 Final 2000 Atlantic Coast nesting season results were unavailable as of the date of this Biological Opinion

2. Life History

Piping plovers are small, sand colored shorebirds, approximately 17 centimeters (7 inches) long with a wingspread of about 38 centimeters (15 inches) (Palmer, 1967) that nest on sandy, coastal beaches from 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 (Cairns, 1982). 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 begin breeding as early as at one year of age (MacIvor, 1990; Haig, 1992); however, the percentage of birds that breed in their first adult year is unknown.

Piping plover nests can be found above the high tide line on coastal beaches, on sand flats at the ends of sand spits and barrier islands, on gently sloping foredunes, in blowout areas behind primary dunes, and in washover areas cut into or between dunes. The birds may also nest on areas where suitable dredge material has been deposited. Nest sites are shallow scraped depressions in substrates ranging from fine grained sand to mixtures of sand and pebbles, shells or cobble (Bent, 1929; Burger, 1987; Cairns, 1982; Patterson, 1988; Flemming *et al.*, 1990; MacIvor, 1990; Strauss, 1990). Nests are usually found in areas with little or no vegetation although, on occasion, piping plovers will nest under

stands of American beachgrass (*Ammophila breviligulata*) or other vegetation (Patterson, 1988; Flemming *et al.*, 1990; MacIvor, 1990). Plover nests may be very difficult to detect, especially during the 6 to 7 day egg-laying phase when the birds generally do not incubate (Goldin, 1994).

Eggs may be present on the beach from early April through late July. Clutch size for an initial nest attempt is usually four eggs, one laid every other day. Eggs are pyriform in shape, and variable buff to greenish brown in color, marked with black or brown spots. The incubation period usually lasts for 27-28 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.

Piping plovers generally fledge only a single brood per season, but may renest several times if previous nests are lost. Chicks are precocial (Wilcox, 1959; Cairns, 1982). They may move hundreds of meters from the nest site during their first week of life (U.S. Fish and Wildlife Service, 1994), and chicks may increase their foraging range up to 1,000 meters before they fledge (are able to fly) (Loegering, 1992). Chicks remain together with one or both parents until they fledge at 25 to 35 days of age. Depending on date of hatching, flightless chicks may be present from mid-May until late August, although most fledge by the end of July (Patterson, 1988; Goldin, 1990; MacIvor, 1990; Howard *et al.*, 1993).

Cryptic coloration is a primary defense mechanism for this species; nests, adults, and chicks all blend in with their typical beach surroundings. Chicks sometimes respond to vehicles and/or pedestrians by crouching and remaining motionless (Cairns, 1977; Tull, 1984; Goldin, 1993; Hoopes, 1993). Adult piping plovers also respond to intruders (avian and mammalian) in their territories 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).

Plovers feed on invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks (Bent, 1929; Cairns, 1977; Nicholls, 1989). Important feeding areas may include intertidal portions of ocean beaches, washover 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). Studies have shown that the relative importance of various feeding habitat types may vary by site (Gibbs, 1986; Coutu, *et al*. 1990; McConnaughey *et al.*, 1990; Loegering, 1992; Goldin, 1993; Hoopes, 1993, 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).

Feeding activities of chicks may be particularly important to their survival. Most time budget studies reveal that chicks spend a very high proportion of their time feeding. Cairns (1977) found that piping plover chicks typically tripled their weight during the first two weeks post-hatching; chicks that failed to achieve at least 60 percent of this weight gain by day 12 were unlikely to survive. During courtship,

nesting, and brood rearing, feeding territories are generally contiguous to nesting territories (Cairns, 1977), although instances where brood-rearing areas are widely separated from nesting territories are not uncommon. Feeding activities of both adults and chicks may occur during all hours of the day and night (Burger, 1993), and at all stages in the tidal cycle (Goldin, 1993; Hoopes, 1993).

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, and 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 (U.S. Fish and Wildlife Service, 1996).

3. Status on the Atlantic Coast and in the New York-New Jersey Recovery Unit

a. Historical Population Trends

Historical population trends for the Atlantic Coast piping plover have been reconstructed from scattered, largely qualitative records. Nineteenth century naturalists, such as Audubon and Wilson, described the piping plover as a common summer resident on Atlantic Coast beaches (Haig and Oring, 1987). However, by the beginning of the 20th century, uncontrolled hunting, primarily for the millinery trade, and egg collecting had greatly reduced the population, and, in some areas along the Atlantic Coast, the piping plover was close to extirpation. Following passage of the Migratory Bird Treaty Act in 1918, and changes in the fashion industry, piping plover numbers recovered to some extent (Haig and Oring, 1985).

Available data suggest that the most recent population decline began in the late 1940's or early 1950's (Haig and Oring, 1985). Starting in 1972, the National Audubon Society's "Blue List" of birds with deteriorating status included the piping plover (Tate, 1981). Johnsgard (1981) described the piping plover as "... declining throughout its range and in rather serious trouble." The Canadian Committee on the Status of Endangered Wildlife in Canada designated the piping plover as "Threatened" in 1978 and elevated the species' status to "Endangered" in 1985 (Canadian Wildlife Service, 1989).

Reports of local or statewide declines between 1950 and 1985 are numerous and many are summarized by Cairns and McLaren (1980) and Haig and Oring (1985). While Wilcox (1939) estimated more than 500 pairs of piping plovers on Long Island, New York, the 2000 preliminary population estimate was 265 pairs (U.S. Fish and Wildlife Service, 2001). There was little focus on gathering quantitative data on piping plovers in Massachusetts through the late 1960's because the species was commonly observed and presumed to be secure. However, numbers of piping plover breeding pairs declined 50 to 100 percent at seven Massachusetts sites between the early 1970's and 1984 (Griffin and Melvin, 1984). Further, recent experience of biologists surveying piping plovers has shown that counts of these cryptic birds sometimes goes up with increased census effort. This suggests that some historic counts of piping plover numbers by one or a few observers, who often recorded

occurrences of many avian species, may have underestimated the piping plover population. Thus, the magnitude of the species' decline may have been even more severe than available numbers imply.

b. Population Trends Since Listing Under the Endangered Species Act

Table 3 summarizes nesting pair counts for the Atlantic Coast piping plover population since listing in 1986 through 2000. Final range-wide numbers for the 2000 breeding season for the Atlantic Coast piping plover population are not yet available; numbers marked with an asterisk are preliminary.

The apparent increase in numbers of pairs between 1986 and 1989 (Table 3) is thought to at least partially reflect the effects of increased survey efforts following the proposed listing in 1985. Intensified survey effort may have played an especially important role in population estimates for New York and New Jersey. For example, Wich (1993) surmised that, although protection of beach nesting birds in New York increased after 1983, survey effort also intensified, especially at sites such as Breezy Point, Queens County, and Westhampton Beach, Suffolk County. While the relative contributions of each cannot be determined, he believes that "the stability of more recent estimates probably accurately reflects the status of New York's plover population." Ducey-Ortiz *et al*. (1989) documented an increasing plover monitoring effort in New York between 1984 and 1988 and found that, when results from 54 uniformly monitored sites were analyzed, the population trend did not increase or decrease significantly. The New Jersey plover coordinator conjectured that one quarter to one third of the apparent population increase observed in that state between 1987 and 1989 was due to increased survey effort (Jenkins, 1993).

The Atlantic Coast population increased from approximately 950 pairs in 1989 to over 1,400 pairs in 2000, but the increase has been very unevenly distributed. From 1989-2000, the New England subpopulation has increased by 424 pairs while the New York-New Jersey subpopulation gained only 58 pairs and the Southern and Atlantic Canada subpopulations declined by 16 pairs and 10 pairs, respectively (U.S. Fish and Wildlife Service, 2001). While rapid overall population growth between 1991 and 1995, driven largely by the New England subpopulation, was encouraging, recent growth has been more modest, with an essentially flat population trend from 1998 to 2000. The New York-New Jersey subpopulation experienced a net decrease of 43 pairs (11 percent) between 1996 and 1998 and a rebound of 39 pairs by 2000 (U.S. Fish and Wildlife Service, 2001).

Table 3. Summary of Atlantic Coast Piping Plover Population Estimates, 1986 to 2000

STATE/UNIT	PAIRS															Goal
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Maine	15	12	20	16	17	18	24	32	35	40	60	47	60	56	50	
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	5	5	6	6	
Massachusetts	139	126	134	137	139	160	213	289	352	441	454	490	495	501	503*	
Rhode Island	10	17	19	19	28	26	20	31	32	40	50	51	46	39	49	
Connecticut	20	24	27	34	43	36	40	24	30	31	26	26	21	22	22	
NEW ENGLAND	184	179	200	206	227	240	297	376	449	552	590	619	627	624	630*	625
New York[a]	106[b]	135[b]	172[b]	191	197	191	187	193	209	249	256	256	245	243	265*	
New Jersey	102[c]	93[c]	105[c]	128	126	126	134	127	124	132	127	115	93	107	112	
NY-NJ UNIT	208	228	277	319	323	317	321	320	333	381	383	371	338	350	377*	575
Delaware	8	7	3	3	6	5	2	2	4	5	6	4	6	4	3	
Maryland	17	23	25	20	14	17	24	19	32	44	61[d]	60	56	58	60	
Virginia	100	100	103	121	125	131	97	106	96	118	87	88	95	89	96	
North Carolina	30[e]	30[e]	40[e]	55	55	40	49	53	54	50	35	52	46	31	24	
South Carolina	3	-	-	-	1	1	-	1	-	-	0	-	-	-	-	
SOUTHERN UNIT	158	160	171	199	201	194	172	181	186	217	189[d]	204	203	182	183	400
U.S. TOTAL	550	567	648	724	751	751	790	877	968	1150	1162[d]	1194	1168	1156	1190*	1600
ATLANTIC CANADA	240	223	238	233	229	236	236[f]	236[f]	182	199	186	197[g]	204	230	223*	400
ATLANTIC COAST	790	790	886	957	980	987	1026	1113	1150	1349	1348[d]	1391	1372	1386	1413*	2000

Table 3, continued:

a The only statewide count tallied in New York in 1994-1999 is the window census.

b The recovery team believes that this estimate reflects an incomplete survey effort.

c 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.

d Reflects correction in 1996 Maryland population from 60 pairs reported in 1996 Status Update to 61 pairs.

e The recovery team believes that the apparent 1986-1989 increase in the North Carolina population is due to intensified survey effort. No actual surveys were made in 1987; estimate is that from 1986.

f 1991 estimate.

g 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.

* Final range-wide numbers for the 2000 breeding season for the Atlantic Coast piping plover population are not yet available; numbers marked with an asterisk are preliminary.

c. Productivity

Productivity needed to maintain a stationary population for Atlantic Coast piping plovers is estimated at 1.24 fledged chicks per pair (Melvin and Gibbs, 1994). However, because small populations may be highly vulnerable to extinction due to variability in productivity and survival rates, the average productivity for a stationary population may be insufficient to assure a high probability of species' survival (see discussion of effects of productivity rates on vulnerability to extinction below). Therefore, the recovery plan establishes productivity goals needed to assure a secure 2000-pair population at 1.5 chicks per pair in each of the four recovery units, based on data from at least 90 percent of each recovery unit's population.

Table 4 provides a summary of piping plover productivity from 1990 to1999[1]. Ten-year (1990-99) average productivity for piping plovers in the Atlantic Coast portion of their range is 1.33 chicks per pair. Peak productivity in the U.S. was observed in 1993 and 1994, when average productivity approached or exceeded the recovery plan productivity goal of 1.5 chicks per pair. However, productivity in 1997 was only 1.16 chicks per pair (based on data from 93 percent of the total U.S. breeding population), the lowest level since 1990 and well below the 1.24 chicks per pair required to produce a stationary population. While weather events were major contributors to egg and chick losses in 1997 (U.S. Fish and Wildlife Service, 1998), such periodic natural events are inevitable, and they underscore the need to reduce the species' vulnerability by increasing the breeding population and protecting the species against human-caused factors that impinge on productivity. Preliminary productivity results for the 2000 breeding season show a total U.S. average of only 1.17 chicks per pair, again well below that needed for a stationary population (U.S. Fish and Wildlife Service, 2001).

Mirroring the regional population trends, productivity rates have been unevenly distributed, with other recovery units lagging substantially behind New England. Average productivity from 1990 to 1999 in the New York-New Jersey recovery unit was 1.09 chicks per pair. The 1.24 chicks per pair productivity needed to maintain a stationary population has only been attained twice, in 1994 when productivity reached 1.25 chicks per pair and 1999 when productivity reached 1.36 chicks per pair. In addition, productivity estimates for this recovery unit reflect a substantial gap between the number of pairs for which productivity is monitored and the total breeding population, with the ten-year average based on productivity data from only 83 percent of the total. Nearly all pairs in the recovery unit for which productivity is unknown nested in New York. Preliminary 2000 nesting season productivity in the New York-New Jersey recovery unit was 1.23 chicks per pair, just slightly under the productivity needed for a stationary population (U.S. Fish and Wildlife Service, 2001).

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[1] Final 2000 Atlantic Coast nesting season results were unavailable as of the date of this Biological Opinion

Table 4. Summary of Piping Plover Productivity Estimates for the U.S. Atlantic Coast, 1990-1999

STATE/UNIT	CHICKS FLEDGED PER PAIR										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999[a]	10 year AVG[b]
Maine	1.53	2.5	2	2.38	2	2.38	1.63	1.98	1.47	1.63 (56)	1.88 (389/389)
New Hampshire	-	-	-	-	-	-	-	0.6	2.4	2.67 (6)	1.94 (16/16)
Massachusetts	1.38	1.72	2.03	1.92	1.8	1.62	1.36	1.32	1.5	1.60 (490)	1.59 (3388/3534)
Rhode Island	0.9	0.77	1.55	1.8	2	1.68	1.56	1.34	1.13	1.79 (39)	1.46 (357/363)
Connecticut	1.63	1.39	1.45	0.38	1.47	1.35	1.31	1.69	1.05	1.45 (22)	1.35 (299/299)
NEW ENGLAND	1.38	1.62	1.91	1.85	1.81	1.67	1.4	1.38	1.46	1.62 (613)	1.59 (4449/4601)
New York	0.8	1.09	0.98	1.24	1.34	0.97	1.14	1.36	1.09	1.35 (266[c])	1.17 (1641/2226)
New Jersey	0.93	0.98	1.07	0.93	1.16	0.98	1	0.39	1.09	1.34 (107)	0.98 (1196/1211)
NY-NJ UNIT	0.88	1.04	1.03	1.08	1.25	0.97	1.07	1.02	1.09	1.36 (373)	1.09 (2837/3437)
Delaware	2	1.6	1	0.5	2.5	2	0.5	1	0.83	1.50 (4)	1.39 (44/44)
Maryland	0.78	0.41	1	1.79	2.41	1.73	1.49[d]	1.02[e]	1.3	1.09 (58)	1.34 (385/385)
Virginia	0.65	0.88	0.59	1.45	1.65	1	1.54	0.71	1.01	1.21 (77)	1.08 (627/1032)
North Carolina	0.43	0.07	0.42	0.74	0.36	0.45	0.86	0.23	0.61	0.48 (31)	0.49 (388/465)
SOUTHERN UNIT	0.72	0.68	0.62	1.18	1.37	1.06	1.34[r]	0.68	0.99	1.04 (170)	1.00 (1444/1926)
U.S. AVERAGE	1.06	1.22	1.35	1.47	1.56	1.35	1.30[r]	1.16	1.27	1.45 (1156)	1.33 (8730/9964)
ATLANTIC CANADA	1.62	1.07	1.55	0.69	1.25	1.69	1.72	2.1	1.84	1.74 (189)	1.56 (1104/2135)

Table 4, continued:

a Parentheses indicate the number of pairs on which productivity is based.

b Parentheses denote number of pairs on which productivity is based/estimated number of pairs in the state or unit between 1990 and 1999.

c Number of pairs on which New York 1999 productivity is based exceeded the population estimate. Reasons for the relatively large discrepancy between the 1999 window estimate and the number of pairs on which the 1999 New York productivity estimate is based are currently unclear.

d Reflects a correction in 1996 Maryland productivity.

e Chicks surviving to 25 days projected from data collected through day 15 based on linear regression analysis.

d. Habitat Utilization

A growing body of information shows that overwash habitats, including bayside flats, unstabilized and recently closed inlets, ephemeral pools (areas on the beach where sea and/or rain water pooled 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, New York-New Jersey, and Southern Recovery Units (Wilcox, 1959; Strauss, 1990; Massachusetts Division of Fisheries and Wildlife, 1996; Jones, 1997).

Research indicates that plovers utilizing New England beaches are attracted to, and highly productive on, a wider variety of habitats (Massachusetts Division of Fisheries and Wildlife, 1996; Jones, 1997) than in the other recovery units in the southern half of their range. However, studies in the New England Recovery Unit also recognize the optimal value of overwash habitats with open connections to bayside foraging habitats. Out of 80 piping plover nests observed by Strauss (1990), no nests were found seaward of steep foredunes in Sandy Neck, Massachusetts, where this habitat constituted 83 percent of the beach front. Many areas in Strauss's study site had been artificially plugged with discarded Christmas trees and/or snowfences. Goldin and Regosin (1998) found significantly higher chick survival and overall productivity among chicks with access to salt-pond "mudflats" than those limited to oceanside beaches at Goosewing Beach, Rhode Island. Goldin and Regosin (1998) also reported that broods on the pondshore spent significantly less time responding to human disturbance (1.6 percent) than those limited to the ocean beach (17.0 percent). Since ocean beaches are highly attractive to recreational beach-goers, limiting plovers to these habitats may also increase the potential for disturbance from people and pets.

In New York, Wilcox (1959) described the effects of storms on piping plovers in 1931 and 1938 that breached the Long Island barrier islands, forming Moriches and Shinnecock Inlets and leveling dunes across the south shore. Only 3 to 4 pairs of piping plovers nested on 17 miles (27.4 kilometer (km)) of barrier beach along Moriches and Shinnecock Bays in 1929. However, following the natural opening of Moriches Inlet in 1931, plover numbers increased to 20 pairs in 2 miles (3.2 km) of beach habitat by 1938. In 1938, a hurricane opened Shinnecock Inlet and also flattened dunes along both Shinnecock and Moriches Bays. In 1941, plover numbers along the same 17-mile (27.4 km) stretch of beach peaked at 64 pairs. Numbers then gradually decreased, a decline that Wilcox attributed to deposition of dredged sand to rebuild dunes, planting of beach grass, and construction of roads and summer homes.

A 1992-1993 study of nest site selection on 90 km (55.8 miles) of beach on Jones Beach Island, Fire Island, and Westhampton Island, New York (Elias *et al.*, 2000) found that all 1-km beach segments with ephemeral pools or bay tidal flats were used for nesting and brood rearing, whereas less than 50 percent of beach segments without these habitats were used. When the amount of time that plover broods used each habitat was compared with its availability, broods preferred ephemeral pools on segments where pools were present. Where present, bay tidal flats and wrack were the most preferred

habitats. On segments with neither ephemeral pools or bay tidal flats, wrack was the most preferred habitat, and open vegetation was second most preferred. Indices of arthropod abundance were highest on ephemeral pools and bay tidal flats. Chick peck rates were highest on ephemeral pools, bay tidal flats, and the ocean intertidal zone. To assist piping plover recovery, the authors recommend avoidance of beach management practices (e.g., jetty construction, breach filling, dune building, sand renourishment) that typically inhibit natural renewal of ephemeral pools, bay tidal flats and open vegetation habitats.

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. Results showed that both habitat selection and foraging behavior correlated inversely with the number of people present. In the absence of people, plovers fed in ocean and bayside habitats. Burger concluded that protection of the entire beach ecosystem with high habitat diversity will help mitigate competition with human beach recreation.

Based on observations by Service biologists during the 2000 nesting season, 7 of the 21 sites (33 percent) occupied by nesting plovers in New Jersey were areas with low recreational use and access to ephemeral pools and/or bayside tidal flats. These 7 sites supported 58 percent (65 pairs) of the 112 piping plover pairs nesting in New Jersey in 2000 and accounted for 62 percent of the Statewide productivity (97 of 157 chicks fledged).

On Assateague Island, Maryland, dramatic increases in productivity and breeding population occurred in response to overwash events between 1991 and 1992 on the northern 8 km of the island. Productivity, which had averaged 0.77 chicks per pair in a 5-year period before the overwash, averaged 1.67 chicks per pair from 1992 to 1996 following the overwash events. The nesting population also grew rapidly, doubling by 1995, and tripling by 1996, when 61 pairs nested there (MacIvor, 1990). Loegering and Fraser (1995) found that chicks on Assateague Island, which were able to reach bay beaches and the island interior, had significantly higher fledging rates than those that foraged solely on the ocean beach. The observed higher foraging rates, percentage of time spent foraging, and abundance of terrestrial arthropods on the bay beach and interior island habitats supported their hypothesis that foraging resources in interior and bayside habitats are key to reproductive rates on that site. Loegering and Fraser (1995) stressed the importance of sparsely vegetated cross-island access routes maintained by overwash, and the need to restrict or mitigate activities that reduce natural disturbance resulting from storms.

In Virginia, Watts *et al*. (undated) found that piping plovers nesting on 13 barrier islands in 1986-88 were not evenly distributed along the islands. Beach segments used by plovers had wider and more heterogenous beaches, fewer stable dunes, greater open access to bayside foraging areas, and closer proximity to mudflats. Watts *et al*. noted that characteristics of beaches selected by plovers are maintained by storms.

Further south at Cape Lookout National Seashore, North Carolina, 32 to 39 pairs of plovers nested on North and South Core Banks each year since 1992. While these unstabilized barrier islands total 44 miles (70.4 km) in length, nesting distribution is extremely patchy, with all nests clustered on the highly dynamic ends of the barrier islands, recently closed and sparsely vegetated "old inlets," expansive barrier mudflats, or new ocean-to-bay overwashes (Cape Lookout National Seashore, 1998). During a 1990 study, 96 percent of brood observations were on bay tidal flats, even though broods had access to both bay and ocean beach habitats (McConnaughey *et al.*, 1990).

4. Continuing Threats

Continuing threats to Atlantic Coast piping plovers in the breeding portion of their range include habitat loss and degradation, disturbance by humans and pets, increased predation, and oil spills. These threats are described within the revised recovery plan (U.S. Fish and Wildlife Service, 1996), and discussion here is largely limited to the specific situation in the New York-New Jersey recovery unit. Many recent protection efforts in New York and New Jersey have been funded by revenues collected to restore oil spill damages (see below), and long-term funding for future protection efforts is uncertain.

a. Predation

As noted within the revised recovery plan (U.S. Fish and Wildlife Service, 1996) substantial evidence exists that human activities are exacerbating natural predation on piping plovers, their eggs, and chicks. Where Wilcox (1959) had observed 92 percent hatching success of nests observed between 1939-58 on Long Island, New York, and loss of only 2 percent of nests to crows (*Corvus* sp.), Elias-Gerken (1994) experienced loss of 21 percent of nests in her study area to crows in 1992-93. Elias-Gerken (1994) also observed crows perching and nesting in exotic Japanese black pines along the Ocean Parkway on Jones Island and hypothesized that this vegetation and other artificial perches exacerbated depredation by crows. Other important predators of plover eggs and chicks in the recovery unit include foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*), Norway rats (*Rattus norvegicus*), herring gulls (*Larus argentatus*), and great black-backed gulls (*Larus marinus*) (Riepe, 1989; Jenkins and Nichols, 1994; Jenkins *et al.*, 1999a; Canale, 1997). Predators accounted for over half of all piping plover nest losses in New Jersey from 1995 to 1998 (Jenkins *et al.*, 1999a; Jenkins and Niles, 1999).

A variety of techniques that have been employed to reduce predation on plovers are discussed within the revised recovery plan (U.S. Fish and Wildlife Service, 1996). While some of these techniques, most notably the use of predator exclosures (fences around nests) have been used with demonstrated success to reduce predation on piping plover eggs (Melvin *et al.*, 1992; Rimmer and Deblinger, 1990) and credited with an important role in population increases in some parts of their range (Jenkins and Nichols, 1994; Jenkins *et al.*, 1999a), these same devices have also been associated with serious problems including entanglements of birds in the exclosure netting and attraction of "smart" predators that have "learned" that there is potential prey inside. The downside risks may include not only predation or abandonment of nests, sometimes at rates that exceed those that might occur in the

absence of exclosures, but also induced mortality of adult birds. Exclosures provide no protection for mobile plover chicks, which generally leave the exclosure within one day of hatching and move extensively along the beach to feed.

While plovers have derived important benefits from use of exclosures in the New York-New Jersey Recovery Unit (Jenkins and Nichols, 1994; Jenkins *et al.*, 1999a; Canale, 1997), the incidence of problems associated with these devices has been especially prevalent. At the Arverne site in Queens, New York for example, vandalism of exclosures has been a substantial problem (Davis, 1997; Davis, 1998). In 1995, foxes keyed in on exclosures at Westhampton Dunes, New York, causing high rates of abandonment. Fortunately, trapping and removal of foxes at this site in 1996 and 1997 helped facilitate higher productivity (Houghton, 1997). At Sandy Hook, New Jersey, where exclosures had made important contributions to productivity between 1990 to 1996, heavy predation on exclosed and unexclosed nests was the major cause of a precipitous drop in productivity from 1.49 chicks per pair (1990-1996 average) to 0.36 chicks per pair in 1997 (McArthur, 1997).

b. Oil Spills

Oil and "tar balls"from the June 1990 discharge of 267,000 gallons of number 6 fuel oil from the B.T. Nautilus oil spill in the Kill Van Kull were found on southern Long Island beaches from Breezy Point to Fire Island and along the New Jersey coastline from Sandy Hook south to Brigantine. Evidence submitted in government claims for natural resource damages included direct visual confirmation of 27 oiled piping plovers, 10 in New York and 17 in New Jersey. Implementation of a restoration plan using funds collected from the responsible party was completed in New Jersey (1995-1999) and is currently underway in New York (1997-2001).

The May 1996 ANITRA oil spill discharged 42,000 gallons of light crude oil into Delaware Bay and spread oil along more than 70 miles of the southern New Jersey coastline. Oiling was detected on 51 adult plovers, nine of which were captured and cleaned (New Jersey Department of Environmental Protection, U.S. Department of the Interior, and National Oceanic and Atmospheric Administration, 1999). Negotiations between State and federal agencies and the responsible party to determine natural resource damages are still in progress at this time.

c. Disturbance from Humans, Pets, and Motorized Vehicles

Intensive management measures needed to protect piping plovers from disturbance by beach recreationists and their pets have been implemented at many New York-New Jersey plover nesting sites in recent years. In 2000, more than half of the occupied piping plover nesting sites in New Jersey were located on State or private land (12 out of 21 sites) (Jenkins, 2000). In New York, 95.8 percent of piping plover pairs nested on non-federal land in 1999 (Rosenblatt, 2000). Piping plover protection on non-federal lands is, therefore, highly dependent on the efforts of State and local government agencies and conservation organizations, and private landowners. Landowner efforts are often

contingent on annual commitments. While many landowners are supportive and cooperative, others are not.

Recreational activities can be a source of both direct mortality and harassment of piping plovers. Pedestrians may flush incubating plovers from nests (Flemming *et al.*, 1988; Cross, 1990; Cross and Terwilliger, 1993) exposing eggs to avian predators or excessive temperatures. Repeated exposure of shorebird eggs on hot days may cause overheating, killing the embryos (Bergstrom, 1991); excessive cooling may kill embryos or retard their development, delaying hatching dates (Welty, 1982). Pedestrians can also displace unfledged chicks (Strauss, 1990; Burger, 1991; Hoopes, 1993; Loegering, 1992; Goldin, 1993), forcing them out of preferred habitats, decreasing available foraging time, and causing expenditure of energy.

Concentrations of pedestrians may deter piping plovers from using otherwise suitable habitat. In Jones Beach Island, New York, Elias-Gerkin (1994) found less pedestrian disturbance in areas selected by nesting piping plovers than areas unoccupied by plovers. Burger (1991; 1994) found that presence of people at several New Jersey sites caused plovers to shift their habitat use away from the ocean front to interior and bayside habitats; the time plovers devoted to foraging decreased and the time spent alert increased when more people were present. Burger (1991) also found that when plover chicks and adults were exposed to the same number of people, the chicks spent less time foraging and more time crouching, running away from people, and being alert then did the adult birds.

Fireworks are highly disturbing to piping plovers (Howard *et al.*, 1993). Plovers are also intolerant of kites, particularly as compared to pedestrians, dogs, and vehicles; biologists believe this may be because plovers perceive kites as potential avian predators (Hoopes, 1993).

Using motorized vehicles on beaches is a threat to piping plovers. Vehicles can crush eggs, adults and chicks (Wilcox, 1959; Tull, 1984; Burger, 1987; Patterson *et. al.*, 1991). In Massachusetts and New York, 18 piping plover chicks and 2 adults were killed by off-road vehicles (ORVs) in 14 documented incidents (Melvin *et al*., 1994). Goldin (1993) compiled records of 34 chick mortalities (30 on the Atlantic Coast and four on the Northern Great Plains) due to vehicles. Biologists that monitor and manage piping plovers believe that vehicles kill many more chicks than are found and reported (Melvin *et al.*, 1994).

Beaches used by recreational vehicles during nesting and brood-rearing periods generally have fewer breeding plovers than available nesting and feeding habitat can support. In contrast, plover abundance and productivity has increased on beaches where recreational vehicle 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 chicks are unable to fly. The number of nesting pairs of piping plovers at this site rose from 8 pairs in 1998 to 11 pairs in 2000; productivity

rose from 1.50 chicks per pair in 1998 to a State record of 3.17 chicks per pair in 1999, with 2.45 chicks fledged per pair in 2000 (Jenkins *et al.*, 1998; Jenkins *et al.*, 1999b; Jenkins, 2000).

Once hatched, piping plover broods are mobile and may not remain near the nesting area. Typical behaviors of piping plover chicks increase their vulnerability to vehicles. Chicks frequently move between the upper berm or foredune and feeding habitat within the wrack line and intertidal zone. These movements place chicks in the paths of vehicles driving along the berm or through the intertidal zone. Chicks stand in, walk, and run along tire ruts, and sometimes have difficulty crossing deep ruts or climbing out of them (Eddings *et al.*, 1990; Strauss, 1990; Howard *et al.*, 1993). Chicks sometimes stand motionless or crouch as vehicles pass by, or do not move quickly enough to get out of the way (Tull, 1984; Hoopes *et al.*, 1992; Goldin, 1993). Wire fencing placed around nests to deter predators (Rimmer and Deblinger, 1990; Melvin *et al.*, 1992) is ineffective in protecting chicks from vehicles because chicks typically leave the nest within a day after hatching and move extensively along the beach to feed.

Vehicles also significantly degrade piping plover habitat or disrupt normal behavior patterns by crushing wrack into the sand and making it unavailable as cover or a foraging substrate (Hoopes, *et al.* 1992; Goldin, 1993). Additionally, 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). Vehicles that are driven too close to the toe of the dune may destroy vegetation that may also serve as piping plover habitat (Elias-Gerken, 1994).

While removal of human-created trash on the beach is desirable to reduce predation threats, the indiscriminate nature of mechanized beach-cleaning adversely affects piping plovers and their habitat. In addition to the danger of direct crushing of piping plover nests and chicks and the prolonged disturbance from the machine's noise, this method of beach-cleaning removes the birds' natural wrack line feeding habitat (Eddings and Melvin, 1991; Howard *et al.*, 1993).

d. Habitat Loss and Degradation

While loss and degradation of habitat have been major contributors to the rangewide decline of the piping plover (U.S. Fish and Wildlife Service, 1996), this threat is especially prominent in the New York-New Jersey recovery unit. Within the New York Bight, which includes the species' entire range in New Jersey and the southern Long Island shoreline, more than half the beaches are classified as "developed" (U.S. Fish and Wildlife Service, 1997). The remaining so-called "natural, undeveloped beaches" in the New York Bight enjoy some protection from development through the Coastal Barrier Resources Act's limitations on federal assistance and flood insurance. However, many of these areas are also subject to extensive stabilization activities that promote the formation of mature dunes, thus preventing overwash, inlet migration, and other natural coastal processes that create and maintain optimal plover habitat.

The beaches on the south shore of Long Island are affected by a variety of federal and non-federal management activities including inlet management, beach nourishment, dune construction, and dune stabilization. There are six inlets stabilized by hard structures along the barrier chain system from Montauk Point west to East Rockaway Inlet. Within this stretch, multiple groin fields also exist. Gilgo Beach and Jones Beach on Jones Island, and Robert Moses State Park on Fire Island have been artificially nourished during the course of several Corps projects (see below). Almost exclusively, dune construction and beach nourishment are implemented solely to protect developments on the barrier island or mainland by reducing the potential for breaches and overwashes. Over the last 40 years, all major barrier island breaches have been artificially closed. Artificial plantings of American beachgrass and other species such as Japanese black pine (*Pinus thunbergii*), as well as the erection of snowfencing, are used to promote the formation of large, heavily vegetated dunes, thus reducing the potential for breaches and overwashes.

From 1986 to the present, the Corps has formally consulted with the Service's New York and Long Island Field Offices under the interagency ESA regulations for seven beach nourishment or navigation project activities between Jones Inlet and Montauk Point within the New York - New Jersey Recovery Unit. Biological Opinions (issuance date give in parentheses) were prepared for the following:

(1) Shinnecock Inlet Reformulation Project (December 8, 1986);
(2) Fire Island Inlet and Shore Westerly to Jones Inlet Combined Navigation and Beach Erosion Control Project (May 1987);
(3) 30-year Westhampton Interim Storm Damage Protection Project (December 1994);
(4) 3-year Breach Contingency Plan (BCP) (July 1995);
(5) Fire Island Inlet and Shore Westerly to Jones Inlet Combined Navigation and Beach Erosion Control Project, Seabeach Amaranth Transplantation Program (May 1995);
(6) 15-year Shelter Island, New York, Erosion Control Project (June 1995; revised October 1997); and
(7) 6-year West of Shinnecock Interim Storm Damage Protection Project (Draft Biological Opinion August 1999; final Biological Opinion pending).

The Service has also conducted informal section 7 consultations with the Corps for many projects in the New York portion of the New York - New Jersey Recovery Unit. Some recent examples are provided below. In the case of the navigation projects, these consultations are conducted consistent with the Corps channel maintenance schedule, or about every 2-3 years.

(1) Long Beach Island Beach Erosion Control (May 1994);
(2) Moriches Inlet Navigation Project (March 1996 and July 1998);
(3) Jones Inlet Jetty Rehabilitation Project (June 1995 and July 1998);
(4) Shinnecock Inlet Navigation Inlet Maintenance Dredging (July 1998);
(5) Fire Island Inlet and Shore Westerly to Jones Inlet Combined Navigation and Beach Erosion Control Project (June 1999);

(6) Coney Island; and
(7) East Rockaway Shore Protection Project.

Of approximately 125 miles of Atlantic coastline in New Jersey, stretching from Sandy Hook to Cape May, all but approximately 13 miles (Sandy Hook Unit, Gateway National Recreation Area and Little Beach Island within the Edwin B. Forsythe National Wildlife Refuge) are encompassed within a Corps beach nourishment project area. Shore protection projects within the New Jersey portion of the New York-New Jersey 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.

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

(1) Manasquan Inlet;
(2) Barnegat Inlet; and
(3) Cape May and Ocean City.

The Service is currently conducting formal consultation with the Corps regarding renourishment activities at Ocean City, New Jersey and 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) Avalon and Stone Harbor (Fall 2001);
(2) Sea Bright to Manasquan Inlet (Fall 2001);
(3) Lower Cape May Meadows and Cape May Point (Fall 2001);
(4) Brigantine (2003);
(5) Southern Ocean City and Sea Isle City (2004);
(6) Long Beach Island (2004);
(7) Manasquan Inlet to Barnegat Inlet (2005); and
(8) Great Egg Harbor Inlet to Townsends Inlet (2005).

The above consultations are a part of the many section 7 consultations that the Service performs for federal agency actions and do not reflect those undertaken by the Corps pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act for state, local, or private beach nourishment or dredging activities. Ultimately, 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 sparsely vegetated, low-lying barrier beach habitats that are important to the piping plover. Under natural conditions, barrier beaches continually erode and accrete. Storms and high tides create overwash fans and flats behind and between dunes. Periodic breaches along barrier islands allow for the formation of new inlet areas, while accretion over time fills in inlets. The piping plover evolved in this highly dynamic ecosystem and has adapted to relocating nesting areas as natural coastal processes occur. As dune or back beach areas become established in accreting areas and vegetated through natural succession, these areas decline in suitability as piping plover habitat.

Throughout much of the New York-New Jersey Recovery Unit, periodic beach nourishment has interfered with natural coastal processes by precluding formation of newly forming inlets, overwash zones, and accreting beach habitats that would create, replace or revitalize piping plover nesting and foraging habitat.

5. Vulnerability to Extinction

The Atlantic Coast Piping Plover Recovery Plan (U.S. Fish and Wildlife Service, 1996) provides a discussion of the demographic and genetic factors that were used to assess the species vulnerability to extinction. A population viability analysis estimated probabilities of extinction, as well as probabilities that populations of various sizes and rates of fecundity would fall below thresholds of 50, 100, and 500 pairs during the next 100 years. The modeled scenarios that most closely approximate the current status of the Atlantic Coast population (i.e., 1200 and 1500 pairs with average productivity of 1.25 chicks per pair) showed extinction probabilities of 35 percent and 31 percent over 100 years, respectively. In addition, the model showed 95 percent and 92 percent probabilities of the population dropping below 500 pairs during the same period.

While the scenarios described above are based on survival rates observed in a 1985-1989 Massachusetts study, modeling also showed that even small drops in survival rates could very substantially increase the risk of extinction. Such long-term declines in survival rates could occur due to continuing declines in availability or quality of wintering or migration habitat, increased human disturbance on wintering grounds, increased mortality due to disease, parasites, or environmental contaminants, increased predation, or reduced longevity or fitness due to unforeseen genetic factors. When declines in adult and chick survival rates of just 5 percent and 10 percent, respectively, were modeled for a 1,500 pair population with average fecundity of 1.5 chicks per pair (far above the 1990-99 average of 1.33 chicks per pair), the extinction probability increased from 9 percent to 40 percent, and the probability that population size would drop below 500 pairs increased from 44 percent to 97 percent.

The assessments of continuing vulnerability to extinction based on modeling, described above, are validated by empirical data from 1986-1999 coast-wide population and productivity monitoring. For example, the nearly flat population trend between 1995 to 1996, following 1995 productivity of 1.35 chicks per pair (well above the estimated rate needed to maintain a stationary population) and productivity of 1.47 and 1.56 chicks per pair in 1993 and 1994, respectively, suggests that survival rates may have been lower in 1995 to 1996 than in preceding years. While fluctuations in survival rates are to be expected, their occurrence provides vivid illustration of the inherent vulnerability of such small populations.

Another graphic demonstration of the Atlantic Coast piping plover's continuing precarious status is provided by the population trend in New Jersey. A highly encouraging 44 percent population increase in the State population, from 93 pairs in 1987 to 137 pairs in 1992, was followed by a flat trend between 1993 and 1995. The New Jersey population then dropped precipitously over the next two years, returning to 1987 levels by 1998, when only 93 pairs were counted in the State. Since listing (1986 to 2000), despite the intensive protection efforts, productivity in the New York - New Jersey Recovery Unit has been below that needed to maintain a stationary population in all but two years.

The overall probability of extinction for the Atlantic Coast piping plover is exacerbated by the fact that increases in yearly productivity and abundances of the Atlantic Coast plover population over the last five years are largely attributable to the New England portion of the range (see Tables 3 and 4). In contrast, populations of the other three Recovery Units have remained low, as has productivity in New York-New Jersey and the Southern Recovery Units (see Tables 3 and 4). Failure to distribute population gains evenly across Recovery Units increases overall vulnerability to catastrophes (such as oil spills or disease). It also leaves the population vulnerable in the event that a hiatus in the occurrence of large storms leads to a decline in habitat conditions in the New England portion of the range.

The New York-New Jersey Recovery Unit provides a vital link between the New England and Southern subpopulations. Available information demonstrates slow rates of dispersal between subpopulations (U.S. Fish and Wildlife Service, 1996); movements of birds (adults or chicks) between Recovery Units are few and movement large enough to span the distance between non-adjacent Recovery Units has never been documented. Thus, loss or even near-extirpation of the New York-New Jersey Recovery Unit could acutely destabilize the population by isolating the Southern Recovery Unit, thereby forestalling exchange of breeding birds and genetic material across more than half the species' range. In light of the fundamental underlying importance of accessible overwash habitats to both the productivity and carrying capacity of plovers in the Recovery Unit; overall scarcity of these habitats, the systematic and widespread practice of forestalling the formation of overwash habitats in the New York-New Jersey Recovery Unit threatens the security of the Recovery Unit and the entire Atlantic Coast population.

C. ENVIRONMENTAL BASELINE

1. Status of the Species Within the Action Area

Piping plovers nest adjacent to the Ocean City - Longport Bridge on the north end of Ocean City along Great Egg Harbor Inlet. In 2000, 5 pairs of piping plovers nested in the area, fledging 11 young for a fledging rate of 2.20 chicks fledged per pair (Jenkins, 2000) (well above the rate of 1.24 chicks fledged per pair needed to maintain a stable population). Table 5 summarizes nest data for northern Ocean City over the past 10 years (Jenkins *et al.*, 1995; Jenkins *et al.*, 1996; Jenkins *et al.*, 1998; Jenkins, 2000).

Historic piping plover nesting occurrence has been documented adjacent to the Ocean City - Longport Bridge at Longport Sodbanks. Piping plovers last used the Longport nesting area in 1988 (Jenkins *et al.*, 1998); suitable habitat is no longer present at the Longport site.

Table 5. North Ocean City Piping Plover Nesting Summary

Year	Number of Breeding Pairs	Number of Nests Hatched	Number of Chicks Fledged	Number of Chicks Fledged / Pair
1991	0	0	0	0.00
1992	0	0	0	0.00
1993	1	1	0	0.00
1994	2	2	3	1.50
1995	3	3	2	0.67
1996	4	2	3	0.75
1997	4	2	0	0.00
1998	3	2	3	1.00
1999	4	4	4	1.00
2000	5	5	11	2.20
10-year avg	2.6	2.1	2.6	1.00

2. Factors Affecting Species Environment Within the Action Area

a. Habitat

Sand accretion on the north end of Ocean City in recent years has increased the amount of available nesting habitat adjacent to the inlet and the Ocean City - Longport Bridge. The piping plover nesting area in northern Ocean City was referred to by the ENSP as the Waverly Beach nesting area, but in more recent years, as the birds moved north onto the accreting beach, the area has been referred to as the North Ocean City nesting area (Jenkins *et al.*, 1995; Jenkins *et al.*, 1996; Jenkins *et al.*, 1998; Jenkins, 2000). The increasing availability of habitat at the North Ocean City nesting area is reflected in the increasing number of pairs establishing territories at the site (Table 5).

Since the North Ocean City nesting area appears to be in an accreting phase, available piping plover habitat within the action area is likely to remain the same or increase in size through naturally occurring coastal processes. However, should this trend reverse, the area could be subject to erosion, resulting in the loss of suitable piping plover nesting and foraging habitat.
It is likely that for the duration of the Project (2001 to 2002) the North Ocean City nesting area will continue to accrete overall, but that some erosion will occur during the winter season and the area will be subjected to periodic coastal storms, flooding and overwash as is typical for Atlantic coastal beaches in New Jersey.

b. Other Beach Nesting Birds

A small colony of least terns, a State-listed endangered species, became established at the North Ocean City nesting area in 1994. By 2000 the least tern colony had grown to 379 pairs (Table 6) (Canale, 2000). Piping plovers often nest in association with least tern colonies, benefitting from the more aggressive behaviors of terns in driving way predators.

Table 6. North Ocean City Least Tern Nesting Summary

Year	1994	1995	1996	1997	1998	1999	2000
Number of Pairs	33	12	89	24	103	195	379

c. Recreational Use

The North Ocean City nesting area is used by a variety of beach recreationists during the summer months. To decrease disturbance to beach nesting birds from beach users, the ENSP erects signs and symbolic string and post fences around piping plover and least tern nesting areas. Disturbance from leashed and unleashed pets is a chronic problem at the North Ocean City nesting area for both species.

D. EFFECTS OF THE ACTION

In evaluating the effects of the federal action under consideration in this consultation, 50 CFR 402.2 and 402.14(g)(3) require the Service to evaluate both the direct and indirect effect of the action on the species, together with the effects of other activities that are interrelated or interdependent with the 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 project justification. Interdependent actions are those that have no independent utility apart from the action under consideration. The proposed replacement of the Ocean City - Longport Bridge will cause direct and indirect effects on piping plovers nesting within the action area as discussed below.

1. Direct and Indirect Impacts From Project Construction

The project has incorporated measures limiting construction activities to a confined work area; therefore, no direct mortality of piping plover adults, nests, or chicks is anticipated. However, noise associated with pile driving activities may interrupt normal piping plover nesting and foraging behavior at the North Ocean City nesting area. Noise-related disturbance may influence the birds' choice of nesting sites, causing the birds to nest further from the construction activity. Noise occurring after establishment of nests may cause the birds to abort nesting or may disturb the birds during incubation by causing stress or by flushing the incubating bird off of the nest. Egg cooling or heating could result causing the death of one or more embryos. Excessive stress during incubation could cause increased metabolism in adults, increasing the amount of time the birds are away from the nest by increasing the need for foraging for longer periods of time. Such disturbance could result in reduced productivity. Vocalizations by piping plovers reacting to noise may attract predators, resulting in loss of adults, eggs, or chicks.

2. Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

E. CONCLUSION

After reviewing the current status of the piping plover, the environmental baseline for the action area, the effects of action and the potential cumulative effects, it is the Service's Biological Opinion that replacement of the Ocean City - Longport Bridge is not likely to jeopardize the continued existence of the piping plover. The Service's evaluation of the effects of the proposed project on the piping plover were based on a project description that included protective measures and construction limitations proposed by the NJDOT to minimize or avoid adverse impacts to the piping plover, as described within the BA. These protective measures and construction limitations were relied upon by

the Service in making this non-jeopardy finding. Because the FHWA forwarded the BA prepared by ASGECI on behalf of the NJDOT to the Service as the FHWA's project description and assessment of impacts, the aforementioned measures and limitations proposed within the BA to minimize impacts on the piping plover were considered as an integral part of the project description and are, therefore, nondiscretionary, as are the reasonable and prudent measures and terms and conditions provided in the below incidental take statement.

No critical habitat has been designated for this species; therefore, no critical habitat will be affected.

IV. INCIDENTAL TAKE STATEMENT

A. DEFINITION OF INCIDENTAL TAKE

Section 9 of the ESA and the federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or 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 Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

B. EXTENT OF ANTICIPATED TAKE

The project has incorporated measures limiting construction activities to a confined work area; therefore, no take due to the direct effects of project construction or demolition are anticipated. However, the Service anticipates that incidental take of piping plovers will occur in the form of harassment from noise associated with project construction activities. Such harassment could result in unsuccessful nesting attempts, nest abandonment, or impaired reproduction. Since the effects of project-related noise can be expected to decrease as the distance from the bridge increases, only those birds nesting in closest proximity to the bridge will likely be affected. Therefore, the Service anticipates that the amount of incidental take attributable to the subject project will be harassment and impaired reproduction in two pairs of piping plover in each of the 2001 and 2002 nesting seasons, resulting in total loss of four fledglings (two in 2001 and two in 2002). This level of take is based on the number of pairs occupying the project area in 1999 and 2000 and a productivity rate of 1.00

chicks per pair based on the ten year average (1991-2000) fledge rate at the North Ocean City nesting area.

C. EFFECT OF THE TAKE

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

D. REASONABLE AND PRUDENT MEASURES

The measures described below are nondiscretionary, and must be implemented by the FHWA. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA: (1) fails to demonstrate clear compliance with the reasonable and prudent measures and their implementing terms and conditions in this Biological Opinion; or (2) fails to require the NJDOT or its contractors or co-operators to adhere to the terms and conditions of the incidental take statement and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Reasonable and prudent measures are measures considered necessary or appropriate to minimize the amount or extent of anticipated incidental take of the species. The Service has concluded that the following reasonable and prudent measures are necessary and appropriate to minimize take of piping plover.

(1) Ensure that the project-related impacts to nesting piping plovers are limited to no more than two piping plover breeding seasons.

(2) Ensure that measures proposed by the NJDOT to minimize impacts during the piping plover nesting season are carried out.

E. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

(1) Review the construction schedule (revised quarterly) to ensure that changes in scheduling do not result in an increase in pile driving or demolition activities during the piping plover nesting season. If construction activities are ahead of schedule or delayed, where feasible, require that the project be sequenced such that activities

closest to the nesting area are scheduled during the non-nesting season (August 16 to March 31).

(2) Ensure that the NJDOT Resident Engineer and all project contractors have reviewed and understand the measures to minimize impacts to nesting piping plovers as outlined by the NJDOT within its BA.

(3) Expand monitoring efforts to include observations of any adverse reactions by piping plovers to noise from pile driving or demolition activities during the courtship and nest establishment period. Monitoring of birds prior to actual nest establishment should follow the same protocol proposed by NJDOT for observations of nesting birds and should begin following arrival of piping plovers within the nesting area at Ocean City.

(4) Require that if any of the conditions or restrictions on construction activity, as proposed by the NJDOT within its BA cannot be satisfied, all pile driving and/or demolition activities must be ceased immediately or be postponed until the activity can be brought into compliance.

(5) 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 has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead or non-viable specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable 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 bird, 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
Sea Land Building, 2nd Floor
1210 Corbin Street
Elizabeth, New Jersey 07201
(973) 645-5910

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

Supervisor
U.S. Fish and Wildlife Service
New Jersey Field Office
927 N. Main Street, Bldg. D
Pleasantville, New Jersey 08232
(609) 646-9310

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

V. 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 endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The following conservation recommendations are directed to the FHWA as the lead federal authority for this action.

(1) Ensure that impacts to State-listed endangered beach nesting birds (i.e, least tern) from project-related activities are minimized. In addition to the positive benefits to these species that would result from such protection, piping plovers nesting within or adjacent to tern colonies may benefit from the defensive behaviors against avian predators that is typical of this colonial species.

(2) Collect information on the effects of noise on least terns.

(3) Conduct outreach and education efforts regarding the piping plover to increase community and recreational users understanding of the species and its protection needs.

(4) Concurrent with piping plover monitoring to be conducted by the NJDOT, as described with the BA, monitor and document any activity by the roseate tern occurring within the project area.

VI. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the effects of the proposed Ocean City - Longport Bridge replacement and demolition project on the piping plover. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been 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 amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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