



United States Department of the Interior



FISH AND WILDLIFE SERVICE

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July 19, 2021

Brian Carlstrom
Superintendent
Cape Cod National Seashore
99 Marconi Site Road
Wellfleet, MA 02667

Re: Biological Opinion for Cape Cod National Seashore Piping Plover Flexible Management
TAILS: 2021-F-1110

Dear Mr. Carlstrom:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) based on our review of the National Park Service's (NPS) Cape Cod National Seashore Project Proposal (Project Proposal) and its effects on the federally threatened piping plover (*Charadrius melodus*) in accordance with section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1544, 87 Stat. 884) (ESA). We received your request to initiate formal consultation under the ESA on January 21, 2021.

This Opinion is based on (1) the Project Proposal, including the Cape Cod National Seashore 2018 Shorebird Management Plan (NPS 2018) (Shorebird Plan), which includes flexible management of piping plovers at the Seashore to accommodate certain recreational activities on a limited basis; (2) a memorandum from the Department of Interior Solicitor regarding the Shorebird Plan's compliance with the 1998 Negotiated Rule on Off Road Vehicle access (negotiated rule) (<https://www.govinfo.gov/content/pkg/FR-1998-02-24/html/98-4638.htm> [accessed July 2021]); (3) the February 22, 2021, updated project description and supplemental letter; (4) the Shorebird Plan Environmental Assessment (NPS 2018); (5) electronic correspondence, telephone conversations, and meetings between the Seashore and this office; and (6) information in our files and otherwise available sources of information. Parts of the Shorebird Plan will be incorporated by reference. The consultation history is located in the attached Appendix A. A complete administrative record of this consultation can be made available at the New England Field Office in Concord, New Hampshire.

In your February 22, 2021, supplemental letter, the NPS also requested Service concurrence with the NPS determination that the proposed action may affect, but is not likely to adversely affect,

the federally listed endangered roseate tern (*Sterna dougallii dougallii*) and threatened rufa red knot (*Calidris canutus rufa*).

Roseate tern

There is no overlap of piping plover and roseate tern breeding habitat on the Seashore. Potential overlap of staging¹ roseate terns and breeding piping plovers may occur on beaches where roseate tern adults and young of the year are concentrated prior to fall migration, particularly at the tips of barrier beaches adjacent to inlets. Occasionally, roseate terns may roost within symbolically fenced areas for piping plovers if occurring on barrier beaches, but more often they roost above the tide line or in exposed intertidal sand flats.

Staging areas are critical for terns to optimize their body condition in preparation for their southward migration to South America. Mid-July to August is the timeframe for most terns to arrive at staging areas. Date, time of year, and/or tide are thought to influence the abundance of roseate terns (and common terns since the species co-occur) at large staging sites. Roseate terns may switch staging areas in July and August from year to year if prey availability changes, predators or other forms of disturbance consistently impact the terns, or the beach changes configuration. Ongoing band resighting efforts continue to report primary staging areas (sites with more than 1,000 terns and/or high percentages of roseate terns) are mostly focused on outer Cape Cod, Massachusetts (Spendelov 2017). Known post-breeding staging areas on the Seashore that continue to be consistently used include Hatch's Harbor, Race Point and Wood End (Provincetown), Jeremy Point (Wellfleet), and Nauset Estuary (Eastham and Orleans) (Spendelov 2017). Staging site use may differ by site, time of the post-breeding period, and between years, making it difficult to predict when and where roseate terns may stage (USFWS 2020a).

Roosting roseate terns respond to disturbance from off road vehicles (ORV) and recreational users by taking flight. As a result of the disturbance, roseate terns may temporarily abandon the beach, or move farther afield from their original resting spot. Roseate terns may also take flight for no apparent reason and it is sometimes difficult to ascertain the cause of the flight behavior.

Activities on staging areas that disturb roosting terns, especially when large flocks are forced to relocate, increase the energy demands at a time when the terns should be building up reserves. Davis et al. (2019) quantified hatch-year roseate tern weekly residency and weekly recruitment rate into the staging population, and derived weekly hatch-year staging population growth rates at staging areas on the Seashore. The behavioral effect of potential natural (gulls and shorebirds) and anthropogenic (pedestrians) disturbance sources to roseate and common tern flocks on staging areas varies by the source of the effect (Althouse et al. 2019). The magnitude of response to approaching humans was much larger than the potential disturbance from gulls and shorebirds.

The NPS would implement flexible management for piping plovers when plovers are attempting to nest or are on nests, primarily late March through July. Roseate terns typically do not occur in

¹ "Staging" consists of adult and juvenile roseate tern congregations at barrier beaches during northward and southward migrations. Summer staging areas in New York and New England may be selected based on prey fish availability, may change from year to year, are important to optimize body condition for migration, and critical for parent roseate terns to teach young how to forage and become independent.

areas symbolically fenced for piping plovers, and we do not anticipate that reduced symbolic fencing and reduced buffers around nests at the six lifeguarded beaches and the ORV corridor would overlap with loafing, roosting, or staging roseate terns either physically or temporally, with the possible exception of occasional transient individuals. Therefore, the likelihood of roseate terns being adversely affected by flexible management is discountable.

The NPS would increase restrictions on recreational use in the vicinity of staging roseate terns. This would benefit roosting or staging roseate terns through the reduction of disturbance. The Shorebird Plan will extend pet closures in areas of historical importance to staging shorebirds and terns from April 1 through October 15. A minimum 60-meter (m) buffer will be established between symbolically fenced areas and those areas open to pets. Boat closures to protect migrating shorebirds and terns will also be established, protecting historically important staging and feeding areas.

For these reasons, based on the best information available, we concur with your determination that the proposed action may affect, but is not likely to adversely affect, the roseate tern.

Rufa red knot

Rufa red knots breed in the Arctic and may be present on Massachusetts beaches during their northward and southward migrations. During their fall migration, migratory red knots in Massachusetts use dynamic and ephemeral coastal habitats, including sand spits, islets, shoals, and sandbars often associated with inlets (USFWS 2020b), although they have also been documented to roost and forage along rocky shorelines and in mud flats associated with salt marsh.

The Seashore provides potential roosting and foraging habitat for north- and southbound migrating rufa red knots. There is some overlap between piping plover breeding habitat and red knot stopover or staging habitat, and rufa red knots could be present at any time from late April through November during migration. However, the peak staging and stopover season for red knots passing through Massachusetts during fall migration is in mid-August through late September, subsequent to the piping plover nesting season. Although red knots are not known to stage in large flocks on the Seashore, small numbers of red knots use suitable foraging and roosting habitat on the Seashore as stopover areas during migration and have been documented at Coast Guard Beach, Race Point Beach, and Hatches Harbor Beach (eBird.org, accessed March 9, 2021).

We anticipate disturbance to roosting red knots resulting from decreased symbolic fencing for piping plovers on the six lifeguarded beaches and ORV corridors would be rare, because these activities would occur outside peak migration season, and few red knots, if any, would be present in spring and early summer. Therefore, the likelihood of red knots being present during decreased symbolic fencing activities is discountable.

The reduced symbolic fencing and buffers around piping plover nests are restricted to an extremely small area relative to available red knot roosting habitat on the Seashore, and large areas of nearby, undisturbed, symbolically fenced plover nesting habitat will remain available to migrating red knots. In addition, foraging habitat will not be affected by the proposed flexible management. Therefore, the effects of this activity on red knot habitat would be insignificant.

The NPS would increase restrictions on recreational activities in the vicinity of migratory red knots. This includes extending pet closures in areas of historical importance to staging shorebirds, including red knots, from April 1 through October 15. A minimum 60-meter buffer would be established between symbolically fenced areas and those areas open to pets. Boat closures to protect migrating shorebirds would also be established, protecting historically important stopover and feeding areas. We anticipate these restrictions will benefit roosting or foraging red knots through the reduction of disturbance.

In summary, the likelihood of adverse effects on transient, migrating red knots is discountable, and the proposed action will benefit southbound migrating red knots using stopover areas on the Seashore. For these reasons, based on the best information available, we concur with your determination that the proposed action may affect, but is not likely to adversely affect, the red knot.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

As defined in the ESA section 7 regulations (50 CFR 402.02), “action” means “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas.”

The following is a summary of the proposed action. A detailed description can be found in the NPS 2018 Shorebird Management Plan (NPS 2018).

The proposed action is the NPS’s implementation of the 2018 Shorebird Management Plan during the piping plover nesting season. Under the Shorebird Plan, the Seashore will implement the Service’s “Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act” (USFWS 1994, hereafter referred to as the Federal guidelines), with the exception of a few activities. These deviations (flexible management) would be implemented in areas that receive heavy recreational use to allow pedestrian and/or ORV passage and parking in designated parking lots. The NPS proposes a 10-year project duration to implement the Shorebird Plan.

The NPS identified specific locations where flexible management may be utilized (see figures 2 through 9 in the Project Proposal): the Seashore’s six lifeguarded beaches, all parking lots, the ORV corridor, ORV access points, and the Pole Line and the Inner Dune routes. Within these areas, flexible management would be implemented at the Seashore’s discretion. Locations targeted for flexible management and specific management actions include the following:

Recreation management at six lifeguarded beaches

- a) reduce or eliminate proactive symbolic fencing of suitable piping plover habitat; and
- b) reduce symbolic fencing buffers around scrapes and nests.

Parking lots in the vicinity of unfledged (i.e., unable to fly) chicks

- a) herding chicks out of the parking lot.

ORV corridor,² ORV corridor access points, the Pole Line and Inner Dune routes in the vicinity of piping plover territories and nests

- a) reduce proactive symbolic fencing for territorial plovers; and
- b) reduce symbolic fencing buffers around scrapes and nests for traveling vehicles.

The NPS would expose the territories, nests, and/or broods of no more than five piping plover pairs per year to flexible management. See pages 11 through 18 of the Project Proposal for a detailed description of the proposed flexible management actions. Flexible management actions at each management location include the following:

Recreation at six lifeguarded beaches

The lifeguarded beaches and the length of each beach at which flexible management would occur include:

- Coast Guard Beach (Eastham): 498 m
- Nauset Light Beach: 402 m
- Marconi Beach: 402 m
- Head of the Meadow Beach: 87 m
- Race Point Beach: 367 m
- Herring Cove Beach: 367 m

The length of each lifeguarded beach is consistent from year to year. The total area of lifeguarded beaches varies depending on annual erosion or sand deposition. The NPS may eliminate or reduce proactive symbolic fencing of suitable habitat and/or reduce symbolic fencing buffers around scrapes and nests along one or more of these beaches annually.

Reduced proactive fencing

Under the proposed flexible management, the NPS may elect to not proactively fence an area of suitable habitat. Flexible management would occur if piping plovers subsequently use the suitable habitat and it remains unfenced. Flexible management would not be occurring at that location if piping plovers do not use the unfenced habitat that year. If piping plovers subsequently use the unfenced habitat, the NPS could fence that suitable habitat to avoid using flexible management.

The NPS also may proactively fence suitable habitat and use flexible management by reducing the area of symbolic fencing once territorial or courtship behavior is observed on lifeguarded beaches. This would occur if management objectives of ensuring recreational access are impeded. If a nest is located in an unfenced area, reduced symbolic fencing around the nest may be implemented under flexible management.

Reduced symbolic fencing around nests

Under the proposed flexible management, reduced symbolic fencing around nests may be implemented at any of the six lifeguarded beaches. The NPS will incrementally reduce buffers around nests by 10 m at a time to reduce the likelihood of disturbance, unless the nest location requires the complete closure of an access point. In this case, the Seashore may reduce the buffer

² Excluding Self-Contained Vehicle areas (Geoffrey Sanders, Cape Cod National Seashore, pers. comm. 2021)

immediately to reach the management objective of allowing access. The NPS would maintain a minimum 10 m buffer around nests.

Use of parking lots in the vicinity of unfledged chicks

Seashore parking lots do not provide suitable nesting or foraging habitat for piping plovers or bisect suitable nesting, foraging, or sheltering habitat. Under current shorebird management, when piping plover broods are present in areas adjacent to parking lots, shorebird monitoring staff increase monitoring efforts. Lots are closed when unfledged chicks are present until the chicks leave the lot. Parking lots with a history of chicks being led by adults into the lots are generally preemptively fenced. Under the proposed action, if unfledged chicks enter a parking lot, the NPS will close the lot temporarily until shorebird staff are able to "herd" chicks out of the parking lot. The NPS will erect silt fencing around the parking lot to prevent unfledged plover chicks from entering the area (if not already erected) and secure areas where chicks could access the parking lot if it was previously fenced.

ORV use in the vicinity of piping plover nests near the ORV corridor, ORV access points, the Pole Line route, and Inner Dune route

Under the proposed flexible management, reduced symbolic fencing will be implemented if the vehicle corridor is within 25 m of a nest. Buffers around nests will not be reduced to less than 9 m from the nest in order to reduce the risk of adult mortality. Vehicles will be limited to a speed of 5 miles per hour and are prohibited from stopping in these designated drive-through-only areas.

Under the proposed flexible management in the ORV access points, Pole Line and Inner Dune routes, reduced symbolic fencing will be implemented when the vehicle travel routes are within 25 m or less of territorial birds or nests. Vehicles will be limited to a speed of 5 miles per hour and the area will be closed to pedestrian access.

The use of flexible management in the ORV corridor will be restricted to those sections of the ORV corridor that are open to vehicles between April 15 and November 15 per the negotiated rule (see page 8 in the Project Proposal for specific dates and locations for vehicle closures).

Conservation Measures

The Shorebird Plan includes greater protection for staging and migratory shorebirds and outlines nonlethal and selective lethal management of avian and mammalian predators through an integrated selective predator removal program (NPS 2019). The NPS will continue to monitor the status and breeding success of beach-nesting shorebirds, specifically piping plovers.

Additional conservation measures include (see pages 19 to 21 of the Project Proposal for details):

- Parked vehicles will not be allowed closer than 50 m from piping plover nests, and reduced buffers are restricted to traveling vehicles (G. Sanders, NPS, *in litt.* March 12, 2021).
- The NPS will conduct outreach with consistent messaging to Seashore visitors regarding shorebird-related closures and restrictions via updated signs and volunteer Shorebird Ambassadors. Updated signs informing the public about shorebird management activities will be developed and posted at parking lots, the ORV corridor check points, and in collaboration with municipalities on town-managed beaches.

- Restrictions prohibiting pets from areas of historical importance to staging shorebirds will be extended to April 1 through October 15.
- The Seashore will temporarily close boat access in the vicinity of nesting shorebirds and historically important staging areas for shorebirds from July 15 through October 15. These areas include bay and ocean beaches and intertidal areas with high concentrations of staging and migrating shorebirds.
- The Shorebird Plan identifies predator management through lethal and non-lethal means as an activity to conserve the Seashore piping plover population. Predator management could be implemented on beaches with historically high numbers of breeding piping plovers and where more than 50 percent of nest loss is attributed to predation. As described in the Shorebird Plan, the NPS would use this activity to selectively remove individual predators or small groups of predators targeting piping plovers and/or other shorebirds. These predation incidents, and the potential response from the NPS, would vary in location, timing, and scope each year. Prior to selective predator removal actions, the NPS would coordinate with the Service and the U.S. Department of Agriculture Animal and Plant Health Inspection Service to insure that year's activities would not adversely affect piping plovers.

ACTION AREA

The action area is defined (50 CFR 402.02) as "...all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The Service has determined that the action area for this project consists of the areas in which flexible management will be implemented within the Seashore. Specifically, the action area includes the six lifeguarded beaches discussed above (see figures 2 through 7, pages 9 and 10 in the Project Proposal for maps of each location); the ORV corridor (excluding the Self-Contained Vehicle areas), ORV access points, the Pole Line route, and the Inner Dune route at which reduced symbolic fencing may be implemented for territories and/or nests (see figure 8, page 11 in the Project Proposal); and all parking lots adjacent to plover habitat where staff may herd chicks to suitable habitat.

The Seashore, a unit of the National Park Service located on outer Cape Cod in Massachusetts, is comprised of 44,600 acres of marine, estuarine, freshwater, and terrestrial ecosystems, including approximately 43 miles of beaches. Over four million people visit the Seashore annually for pedestrian and ORV recreation on the beaches, hiking and biking trails, and historic sites. The beaches, sand spits, and tidal flats of the Seashore are used by breeding piping plovers and recreational visitors. The Seashore intensively monitors and manages piping plovers to maintain recreational access.

All the lifeguarded beaches, ORV corridor, ORV access points, and Pole Line and Inner Dune routes provide suitable plover nesting and foraging habitat to some degree. The Massachusetts Division of Fisheries and Wildlife (MADFW) ranked Massachusetts breeding piping plover habitat based on site-specific evaluations of abundance of suitable nesting habitat and availability of different foraging habitats (e.g., oceanside, bayside, ephemeral ponds, saltmarsh, etc.) (MADFW 1996). The ranking system of "A+" habitat through "D" habitat estimated the number of pairs per mile that would be anticipated for each rank. The lifeguarded beaches and the ORV corridor vary in ranks depending on the habitat characteristics; however, most beaches were ranked

between “A” (estimated 16 pairs/mile capacity) and “B” (8 pairs/mile). The MADFW did not rank the Pole Line and Inner Dune routes. These areas provide limited plover nesting habitat.

Historically, most lifeguarded beaches were wide enough to permit pedestrian passage past piping plover nests. In 2009, Marconi Beach eroded to a width of approximately 20 to 60 m from mean high tide to the base of the dune scarp. That summer, a piping plover nest was located immediately south of the sole pedestrian access point. The Seashore erected a buffer around the nest as recommended by the Service's Guidelines to protect the nesting pair from disturbance by pedestrians. The symbolically fenced buffer prevented use of the recreational beach adjacent to the stairway and, at high tide, prevented pedestrian passage to the beach south of the closure. Marconi Beach receives approximately 10,000 to 13,000 visitors per week during the summer season. If piping plovers were to nest simultaneously on either side of the access point when the beach is narrow, a total closure could result in a significant loss of visitor use of the beach.

The action proposed by the NPS consists of limited flexible management to allow visitation of lifeguarded pedestrian beaches, the ORV corridor, ORV access points, and the Pole Line and Inner Dune routes in the event piping plovers nest near access points, and when strict adherence to the Federal guidelines would otherwise require beach or travel corridor closures. Because the Federal guidelines will be implemented throughout the Seashore with the exception of up to five pairs, the action area is limited to the lifeguarded beaches, ORV corridor, ORV access points, Pole Line and Inner Dune routes, and parking lots when chicks access them.

Previous Consultations in the Action Area

The Service and the NPS previously consulted on flexible management for Coast Guard and Marconi beaches under section 7 of the ESA in 2010. The Service provided a Biological Opinion and Incidental Take Statement (2010 Biological Opinion) anticipating annual take of three piping plover pairs via effects on territories and/or nests (USFWS 2010). Specifically, the proposed flexible management was to eliminate symbolic fencing for suitable habitat adjacent to pedestrian access points irrespective of plover presence and/or breeding behavior, and to implement reduced symbolic fencing around a nest, should one be found in or near pedestrian access points. This action was limited to no more than three plover pairs (territories or nests) at two lifeguarded beaches.

The NPS proposed to implement flexible management at a maximum of 250 meters at one beach and 150 meters at a second beach. In the 2010 Biological Opinion, the Service anticipated that within the 250-meter section of unfenced beach, no more than two plover pairs would be affected if the entire 250-meter section contained suitable nesting habitat, and within the 150-meter section of unfenced beach, one plover pair would be affected.

The 2010 Biological Opinion was amended three times to extend the duration of the flexible management with no changes to the area in which flexible management could be implemented or the number of plover pairs that could be exposed to flexible management. Since 2010, only one pair of nesting piping plovers received a reduced buffer around the nest, equating to one take exposure. However, the nest was lost to overwash shortly after the buffer was reduced and loss of productivity was not as a result of flexible management.

STATUS OF THE SPECIES

Per ESA section 7 regulations (50 CFR 402.14(g)(2)), it is the Service's responsibility to "evaluate the current status of the listed species or critical habitat." The Service listed the Atlantic Coast breeding population of the piping plover as threatened on January 10, 1986 (50 FR 50726). Critical habitat in the breeding range of the Atlantic Coast population has not been designated. A complete species description, life history, population dynamics, threats, and conservation needs can be found in the Atlantic Coast Population Revised Recovery Plan (USFWS 1996), the 2009 5-year review (USFWS 2009), the 2020 5-year review (USFWS 2020c), and the Species Profile for Piping Plover (*Charadrius melodus*) (<https://ecos.fws.gov/ecp/species/6039>, accessed March 16, 2021). Continuing threats to Atlantic Coast piping plovers in the breeding portion of their range identified in the 1996 revised recovery plan include habitat loss and degradation, disturbance by humans and pets, increased predation, and oil spills (USFWS 1996). The 2020 5-year review updated information regarding these threats, as well as potential threats of climate change and wind turbine generators (USFWS 2020c). We considered the information in these documents in the evaluation of this project, and they are incorporated by reference into this Opinion. Information provided below describes the current status of the species. We also summarize information about threats most pertinent to the nature and duration of effects of the proposed action (e.g., breeding site fidelity and dispersal, recreation, predation).

To assess the current status of the species, it is helpful to understand the species' conservation needs. The Service frequently describes conservation needs via the conservation principles collectively known as the three Rs: resiliency,³ redundancy,⁴ and representation⁵ (Shaffer et al. 2002; Wolf et al. 2015; Smith et al. 2018). The Service can then apply the appropriate regulatory framework and standards to these principals to address a variety of ESA-related decisions (e.g., listing status, recovery criteria, jeopardy and adverse modification analysis). For section 7(a)(2) purposes, the 3 Rs can be translated into the reproduction, numbers, and distribution (RND) of a species.

Recovery criteria and strategy: The objective of the 1996 Atlantic Coast Population Revised Recovery Plan is to assure the long-term viability of the Atlantic Coast piping plover population in the wild, thereby allowing removal of this population from the Federal List of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12). The Atlantic Coast piping plover population may be considered for delisting when the following recovery criteria, established in the recovery plan, have been met:

- increase and maintain for 5 years a total of 2,000 breeding pairs, distributed among four recovery units;

³ Resiliency is the ability of species/populations to withstand stochastic events, which is measured in metrics such as numbers or growth rates.

⁴ Redundancy is the ability of a species to withstand catastrophic events, which is measured in metrics such as number of populations and their distribution.

⁵ Representation is the variation/ability of a species to adapt to changing conditions, which may include behavioral, morphological, genetics, or other variation.

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

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

The subpopulation abundance and distribution targets will ensure representation, redundancy, and resiliency for Atlantic Coast piping plovers in their breeding range (USFWS 2020c). Maintaining geographically well-distributed populations across the four recovery units serves to conserve representation of genetic diversity and adaptations to variable environmental selective pressures evidenced by the population's genetic structure, variable habitat requirements, differences in vital rates, and morphometric differences (USFWS 2020c). The ability of piping plovers in each recovery unit to rebound from events that depress unit-wide productivity or survival and to colonize newly formed or improved habitat (e.g., after storms or artificial habitat enhancement projects) depends on within-unit redundancy that is measured via progress towards abundance targets. Distribution of robust numbers of breeding pairs across the four recovery units will also provide Atlantic Coast piping plovers with a buffer against stressors (e.g., weather, habitat degradation, disturbance) in their migration and wintering range that may depress survival rates (USFWS 2020c).

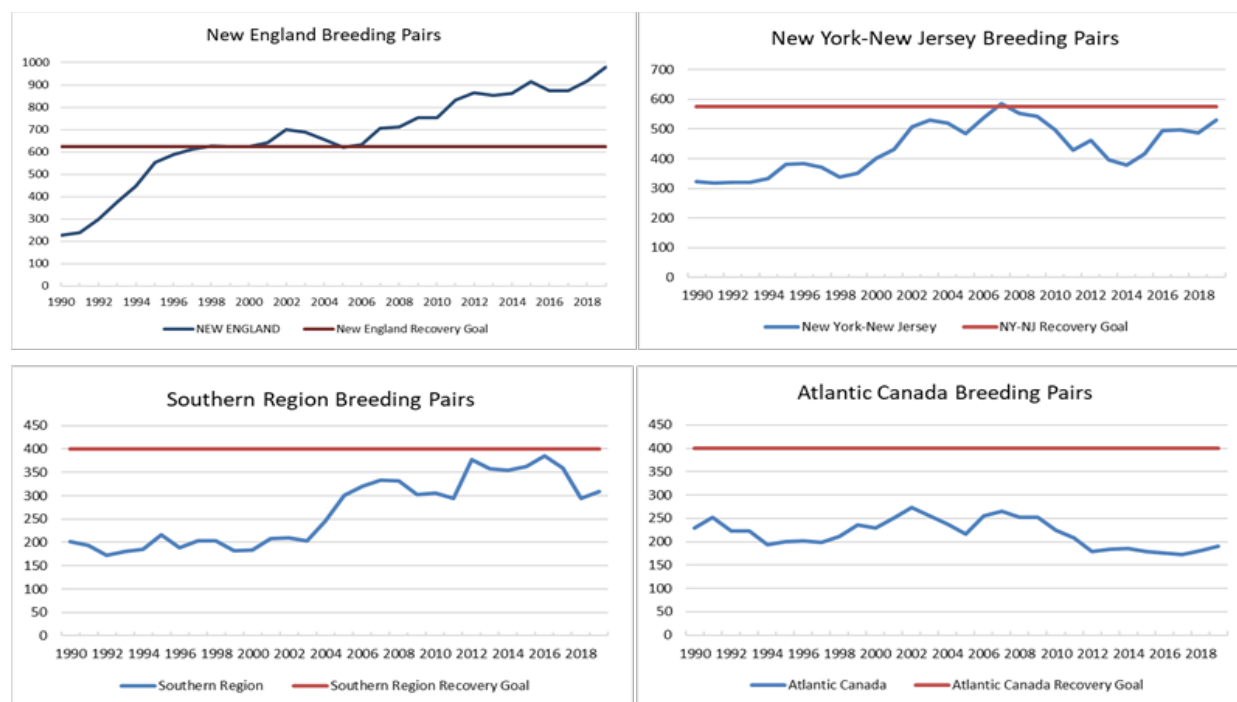
Population trends since listing under the ESA: Abundance of Atlantic Coast piping plovers is reported as numbers of breeding pairs (i.e., adult pairs that exhibited sustained [> 2 weeks] territorial or courtship behavior at a site or were observed with nests or unfledged chicks [USFWS 1996]). Annual estimates of breeding pairs of Atlantic Coast piping plovers are based on multiple surveys of almost all breeding habitat, including many currently unoccupied sites. The Service produces annual updates for rangewide abundance and productivity estimates for the Atlantic Coast piping plover. The most current comprehensive update, including data through 2018 and final data for 2019 can be found at the Service's Atlantic Coast piping plover website: https://www.fws.gov/northeast/pipingplover/pdf/Abundance-Productivity-2018-Update_final-with-tables.pdf and <https://www.fws.gov/northeast/pipingplover/pdf/2019-Update-Final.pdf> (both accessed July 16, 2021).

Substantial population growth, from approximately 790 pairs in 1986 to an estimated 2,008 pairs in 2019, has decreased the Atlantic Coast piping plover's vulnerability to extinction since ESA listing, although only the New England recovery unit has been able to reach and sustain its

abundance target. Discounting apparent increases in New York, New Jersey, and North Carolina between 1986 and 1989, which likely were due in part to increased census effort (USFWS 1996), the population doubled between 1989 and 2019, reaching the recovery criterion of a population of 2,000 pairs for the first time since the species was listed.

The security of the Atlantic Coast piping plover is fundamentally dependent on an even distribution of population growth to maintain a sparsely-distributed species with strict biological requirements in the face of environmental variation, buffer it against catastrophes, and conserve adaptive capacity. The New England recovery unit, in which the Seashore is located, has exceeded its subpopulation target for many more than the requisite 5 years, but the numbers of breeding pairs in the other three recovery unit populations remain below targets established in recovery criterion 1 (USFWS 2019; USFWS 2020d) (figure 1).

Figure 1. Abundance of Atlantic Coast piping plover breeding pairs by recovery unit, 1990 – 2019.



Productivity remains an important, albeit partial, predictor of trend in future abundance of piping plovers. Furthermore, because small populations may be vulnerable to extirpation due to variability in productivity and survival rates, productivity needed to assure a secure population (that can withstand, for example, catastrophic and stochastic events) may be higher than the rate sufficient for a stationary population. As abundance increases, the productivity rates required for demographic stability and security are likely to converge. Although the Service continues to monitor plover productivity rates and assess their implications for recovery, abundance of breeding pairs has become a more informative indicator of decreased extinction risk in the New England recovery unit than the annual productivity rate.

Thirty years of population growth, although unsteady in large sections of the range, evidences the general efficacy of the ongoing Atlantic Coast piping plover recovery program. However, all of

the major threats (habitat loss and degradation, predation, human disturbance) identified in the 1986 ESA listing and 1996 revised recovery plan remain persistent and pervasive (USFWS 2020c). Two threats, climate change (especially sea level rise) and wind turbines, identified in the 2009 5-year review (USFWS 2009) and discussed in detail in the 2020 5-year review (USFWS 2020c), are likely to affect Atlantic Coast piping plovers throughout their annual cycle. Some aspects of climate change remain uncertain, but ongoing acceleration of sea level rise is well-documented. Further increases in sea level rise rates are foreseeable with a high degree of certainty, and effects of sea level rise on Atlantic Coast piping plovers and their habitat will be partially determined by coastal management activities.

Although threats from wind turbine generators are foreseeable, their magnitude remains poorly understood. Currently, the Bureau of Ocean Energy Management (BOEM) has assumed that approximately 22 gigawatts of Atlantic offshore wind development within the North Atlantic Outer Continental Shelf lease area are reasonably foreseeable to occur along the East Coast from New Hampshire to North Carolina. The potential wind energy development includes 17 active wind energy lease areas that could construct about 2,000 wind turbines over a 10-year period. (BOEM 2020). Although some information has become available that will help assess effects of future proposed projects, collision risk for plovers migrating through offshore wind energy projects remains largely unknown.

In addition to climate change and the development of offshore wind energy projects, the following factors may also affect piping plover productivity and abundance.

Breeding site fidelity and dispersal: Adult piping plovers generally demonstrate nest site fidelity, returning to the same breeding beach or a nearby beach in consecutive years. First-time Atlantic Coast breeders are more likely to disperse from their natal sites, but their fidelity to their natal region is very high.

Although long-distance movements between natal and breeding sites (and even between breeding years) have been documented, they are rare. On the Atlantic Coast, almost all observations of inter-year movements of birds have been within the same or adjacent states. Extensive efforts to re-sight more than 1,400 Atlantic Coast piping plovers color-banded in Virginia, Maryland, Massachusetts, and five Eastern Canadian provinces between 1985 and 2003 resulted in only four records of plovers breeding outside the recovery unit in which they were banded ($n=86$, range=0.01 – 217.33 kilometers) (Rioux et al. 2011). Studies in New York, Massachusetts, Maryland, Virginia, and Canada documented that, in general, adults returned to their original nesting beaches or beaches nearby, and males demonstrated greater site fidelity than females (USFWS 2020c). More recent studies provide quantitative estimates of dispersal distances depending on the previous year's hatching failure (greater likelihood of dispersal) or success (likely to return to the vicinity of the breeding beach) (USFWS 2020c).

Genetic evidence is consistent with observed dispersal patterns. Miller et al. (2010) found strong genetic structure, supported by significant correlations between genetic and geographic distances in both mitochondrial and microsatellite data sets for Atlantic Coast piping plovers. Atlantic birds showed evidence of isolation-by-distance patterns, indicating that dispersal, when it occurs, is generally associated with movement to relatively proximal breeding territories.

In summary, piping plovers demonstrate high fidelity to their natal and breeding regions. Established males make smaller inter-annual movements than females, and first-time breeders disperse more than adults. Notwithstanding rare long-distance movements, population growth and stability are heavily dependent on survival and productivity of local populations (USFWS 2020c).

Threats from beach recreation: Threats to piping plovers from human beach users were cited in the final listing rule and described in detail in the 1996 revised Atlantic Coast recovery plan. Threats to breeding piping plovers from both motorized and non-motorized beach recreation activities are relatively well understood, and recommended management options are described in the Federal guidelines (USFWS 1994). Newer threats include the increasing popularity of “extreme sports,” such as kite-buggies and surf kites (also called “kite boards”), which accidentally land in and near breeding habitat.

Sufficiency of restrictions on dogs in piping plover nesting areas and consistency of enforcement are continuing concerns of biologists monitoring Atlantic Coast piping plovers. Literature on closely related beach-nesting plover species provides additional evidence of adverse effects on breeding activities from both leashed and unleashed dogs (USFWS 2020c).

Management activities to protect habitat, nests, and unfledged chicks from impacts of pedestrian recreation include symbolic fencing of courtship and nesting habitat, leashing or prohibition of pets during the breeding season, buffers between breeding piping plovers and fireworks, informational and interpretive signing, public education, and law enforcement patrols. On sites where ORVs are allowed to operate during the breeding season, protection requires additional closures of the lower beach and intertidal zone during periods when unfledged chicks are present. These management activities are predicated on frequent monitoring of individual breeding pairs during territory establishment and courtship, nesting, and chick-rearing periods (USFWS 2020c). Effectiveness of management measures to avoid or reduce threats is contingent on skilled monitoring and timely employment and enforcement of adequate buffers to protect piping plover courtship, nesting, and brood-rearing. All of these labor-intensive actions require continued implementation to counter threats that are present every year.

Threats from predation: The final listing rule identified predation by pets, feral dogs and cats, skunks, and raccoons as threats on the plover’s Atlantic Coast range. The 1996 revised recovery plan provides a more thorough discussion of predation threats, and recommends specific tasks to be implemented in an integrated approach to predator management that employ a full range of management techniques.

Research and reports indicate that predation poses a continuing (and perhaps intensifying) threat to Atlantic Coast piping plovers (USFWS 2020c). Although predator numbers are undiminished or increasing, effectiveness of predator exclosures⁶ has declined (USFWS 2020c). As effectiveness of exclosures has declined, managers have increased selective predator removal activities at many sites throughout the U.S. Atlantic Coast range (USFWS 2020c). Recent predator removal efforts focused on mammalian predators such as fox, skunks, and coyotes; and avian predators, primarily

⁶ Exclosures are wire cages placed around nests to exclude predators. They were a key management tool in the early years of the recovery program.

gulls and crows. Targeted predator management is annually implemented on select Massachusetts beaches because the MADFW Habitat Conservation Plan For Piping Plover (MADFW 2016) (HCP) requires predator management as the only method of mitigating impacts from activities authorized under the HCP.

Predation is a widespread and continuing threat to breeding Atlantic Coast piping plovers. Implementation of conservation measures for addressing predation threats is time-consuming and costly. Although site-specific predator pressures vary from year to year, predator management is a recurring need in the recovery of piping plovers.

Summary

Thirty-five years of intensive recovery efforts have reduced the near-term extinction risk of the Atlantic Coast piping plover by increasing the population and managing the continuing threats. However, the Atlantic Coast piping plover remains vulnerable to low numbers in three of its four recovery units. Furthermore, the factors that led to the piping plover's 1986 listing remain operative across its Atlantic breeding range, including in New England, and many of these threats have increased. Interruption of labor-intensive efforts to manage these threats would quickly lead to steep population declines.

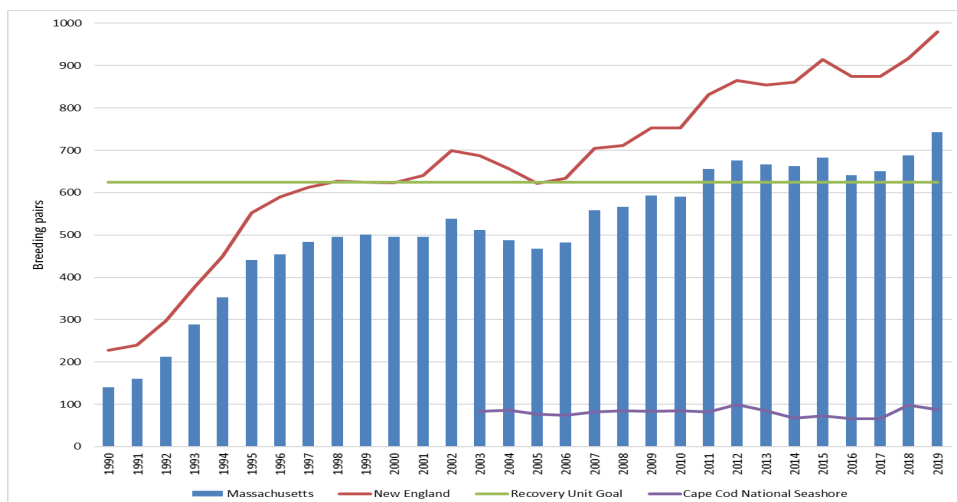
ENVIRONMENTAL BASELINE

In accordance with 50 CFR 402.02, the environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Status of the Species within the Action Area

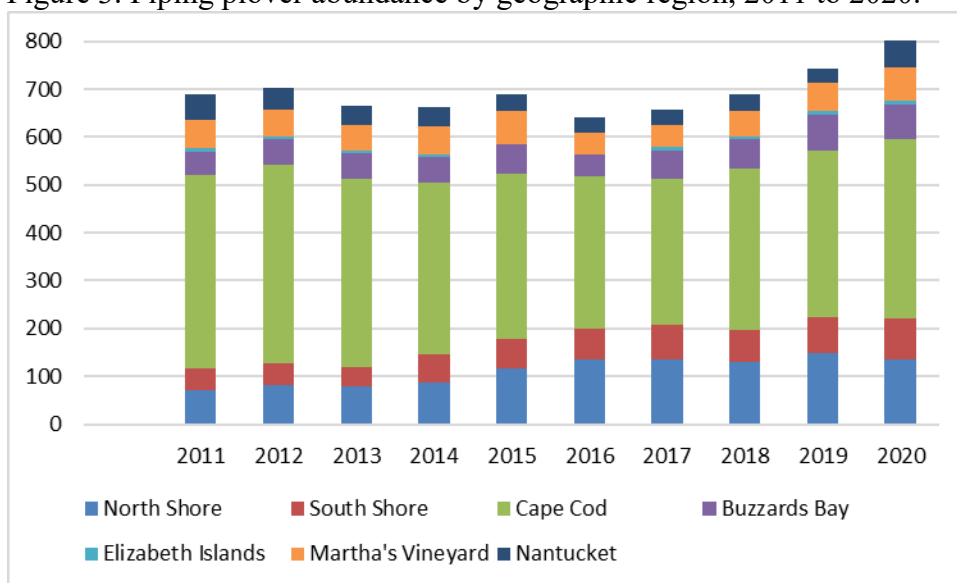
Within the New England recovery unit, Massachusetts maintains the largest population of breeding piping plovers. Since 1994, the Massachusetts population has comprised 32 to 43 percent of the Atlantic Coast population, and 74 to 80 percent of the entire New England plover population. During the last 9 years, the Massachusetts population annually exceeded the recovery goal of 625 pairs for the New England Recovery Unit (figure 2). In 2020, breeding piping plovers were documented at 180 sites in Massachusetts, for a total of 779 pairs (MADFW 2021), a 6.9 percent increase over 2019 breeding pairs.

Figure 2. Estimated abundance of breeding piping plovers in the New England Recovery Unit, Massachusetts, Cape Cod, and the Cape Cod National Seashore, 1990 – 2019.



The majority of Massachusetts’ breeding piping plovers occurs on Cape Cod (figure 3), and the Seashore plover population averaged approximately 23 percent of the Cape Cod population between 2011 and 2020. The number of beaches on the Seashore with breeding plover pairs ranged from 14 to 25 active sites. From 2015 to 2020, 36 to 49 percent of the breeding pairs of plovers at the Seashore were located at four sites: Race Point North, Coast Guard Eastham, Armstrong, and Wood End/Long Point. Race Point North averaged 11 pairs over this same time period, followed by Coast Guard Eastham with 9, Armstrong with 7.6 and Wood End/Long Point with 7. These beaches generally provide the largest, most continuous suitable nesting habitat within the Seashore.

Figure 3. Piping plover abundance by geographic region, 2011 to 2020.⁷



⁷ The MADFW split the State into eight regions and analyzed annual abundance and productivity estimates for each region in the annual piping plover census reports; the Lower Cape and Upper Cape are combined for this assessment.

As noted above in Population Trends Since Listing under the ESA, breeding pair abundance has become a more informative indicator of decreased extinction risk in the New England recovery unit than the annual productivity rate. However, because population growth and stability are heavily dependent on survival and productivity of local populations, regional productivity may be an indication of the stability of local populations (USFWS 2020c). From 1987 to 2019, the average productivity of the Massachusetts population was approximately 1.22 fledglings per breeding pair, equal to the 1.2 fledglings per pair estimated to be necessary to maintain a stable population in New England (Hecht & Melvin 2009). Seashore plover breeding beaches are critical to the stability of the regional plover population because of the abundance and geographic spread of the Seashore's populations.

Since 2000, piping plover productivity at the Seashore ranged from a low of 0.3 chicks per breeding pair in 2012 to a high of 1.88 chicks per breeding pair in 2016 (figure 1 in the Project Proposal). Because the NPS did not implement flexible management during this entire time frame, but did implement the Federal guidelines, lost productivity was primarily due to storms (overwash, sanding in of nests) and predation, not to implementation of flexible management.

Massachusetts Habitat Conservation Plan

The MADFW received a 26-year incidental take permit (ITP) (Federal Fish and Wildlife Permit number TE01281c-0 Incidental Take Permit) pursuant to section 10(a)(1)(B) of the ESA in June 2016. The permit covered take of piping plovers from the implementation of the "Massachusetts Division of Fisheries & Wildlife (DFW) Habitat Conservation Plan For Piping Plover" (MADFW 2016). The MADFW's HCP serves as an umbrella HCP whereby plan participants can receive incidental take coverage by opting into the HCP via Certificates of Inclusion (COI) to implement one or more covered activities. Covered activities include: *Use of Roads and Parking Lots in the Vicinity of Unfledged Piping Plover Chicks*, *Recreation and Beach Operation*, and *Oversand Vehicle (OSV) Use in the Vicinity of Unfledged Chicks*. To ensure the impacts of the HCP do not affect the recovery of the piping plover, the HCP limits the statewide allocated take to a maximum of 7 percent of breeding pairs in Massachusetts for years when the population exceeds 655 breeding pairs, and would phase out to zero take allocated should the population decrease to less than 500 pairs (MADFW 2016) (table 1). The HCP measures take in number of territories, nests, or broods affected, and the impact of the take is measured in loss of productivity for affected pairs. The statewide allocation also deducts any take authorized under other section 7 consultations in Massachusetts. From 2016 to 2020, the statewide allocation deducted three "takes" because of the Seashore's 2010 Biological Opinion for flexible management.

Table 1. Estimate of take correlated to statewide populations

MA Breeding Population Size Prior 3-year Average	Maximum Broods, Nests or Territories to be Exposed to Potential Take (percent of population)	Fledglings to be Taken; Upper Bound Estimate
>655	45 + (7%)	3.4%
625–655	37–39 (6%)	3.0%
594–624	29–31 (5%)	2.5%
563–593	22–23 (4%)	2.0%
532–562	10–11 (2%)	1.0%
500–531	5 (1%)	0.5%
<500	0	0.0%

The HCP outlines avoidance and minimization measures for each covered activity, and mitigation for plover pairs (territories, nests, broods) exposed to take. Selective predator management is the only mitigation measure allowed under the HCP to offset the take associated with implementation of covered activities. The HCP's conservation strategy requires selective predator management for 2.5 pairs of piping plovers for every pair (nest, brood, or territory) exposed to covered activities with the exception of additional predator management to benefit 0.5 breeding pairs that must be implemented for each instance of the *Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks*-covered activity. The increased mitigation ratio is due to the additional risk of injury or mortality to adults.

Since the HCP was permitted, 3 (2016) to 22 pairs (2020) were exposed to take from implementation of covered activities (MADFW 2021) with productivity of these sites ranging from 1.2 chicks fledged per breeding pair to 3.67 chicks per breeding pair. Productivity for sites participating in the HCP exceeded the estimated productivity of 1.2 chicks per breeding pair needed to maintain a stable population and exceeded the statewide average productivity every year (table 2) except 2020. However, in all cases, productivity of the pairs exposed to a covered activity either equaled or exceeded the average site productivity (table 2).

Table 2. Summary of take exposures and productivity, 2016 to 2020 (MADFW 2021)

Year	number broods, nests, territories exposed	Annual productivity of COI sites (chicks fledged/pair)	Average productivity of pairs exposed to covered activities	Annual statewide productivity (chicks fledged/pair)
2016	3	3.67	N/A	1.44
2017	5	1.8	N/A	1.07
2018	19	2.05	2.05	1.30
2019	19	1.95	1.95	1.54
2020	22	1.24	1.81	1.31

The MADFW has documented very few piping plover mortalities from covered activities. No direct mortality has been attributed to implementation of the covered activity *OSV Use In The Vicinity Of Unfledged Chicks*. From 2018 to 2020, of the 19 to 22 broods exposed to the covered activity *Use Of Roads And Parking Lots In The Vicinity Of Unfledged Chicks*, two mortalities were attributed to chicks crossing the road. No adult mortalities were documented. Overall, the productivity of pairs and broods exposed to this covered activity was high in 2018; 80 percent (33 of the 41) of the chicks that crossed roads fledged, and 33 percent (1 of 3) of the chicks from a parking lot nest fledged.

Between 2016 and 2020, the portion of the statewide piping plover population allocated for take exposure ranged from 0.62 percent to 3.6 percent, far less than the maximum exposure of 7 percent allowed for a statewide population greater than 655 pairs. The minimization and avoidance measures and the selective predator management mitigation appear to reduce the likelihood of lost productivity and/or compensate for lost productivity that occurred from the HCP-covered activities.

EFFECTS OF THE ACTION

Regulatory background: In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see § 402.17).

The Service established additional requirements for making the determination of reasonably certain to occur, which must be followed after October 28, 2019, the effective date of new regulations under 50 CFR 402. After determining that the “activity is reasonably certain to occur,”

based on clear and substantial information,⁸ using the best scientific and commercial data available, there must be another conclusion that the consequences of that activity (but not part of the proposed action or activities reviewed under cumulative effects) are reasonably certain to occur. In this context, conclusion of reasonably certain to occur must be based on clear and substantial information, using the best scientific and commercial data available after consideration of three factors in 402.17(b)(1-3).

There is no intent that the 2019 regulatory changes alter how we will analyze the effects of a proposed action or the scope of effects. We will continue to review all relevant effects of a proposed action as we have in past decades, but the Service determined it was not necessary to attach labels to various types of effects through regulatory text. That is, we intend to capture all of those effects (now “consequences”) previously listed in the regulatory definition of effects of the action—direct, indirect, and the effects from interrelated and interdependent activities—in the new definition. These effects are captured in the new regulatory definition by the term “all consequences” to listed species and critical habitat.

The test for determining effects includes the consequences resulting from actions previously referred to as “interrelated or interdependent” activities. In order for consequences of other activities caused by the proposed action, but not part of the proposed action, to be considered effects of the action, both those activities and the consequences of those activities must satisfy the two-part test: they would not occur but for the proposed action and are reasonably certain to occur. As a result, when we discuss effects or effects of the action throughout the Opinion, we are referring only to those effects that satisfy the two-part test. Requiring evaluation of all consequences caused by the proposed action allows the Service to focus on the impact of the proposed action to the listed species and critical habitat, while being less concerned about parsing what label to apply to each consequence.

Effects of the Action: The NPS will manage breeding piping plovers under the Shorebird Plan according to the Federal guidelines except when pedestrian recreational access or ORV access is restricted by territorial or nesting plovers or when piping plover chicks enter parking lots. To meet recreational management objectives, the Seashore may choose to implement flexible management at any of the six lifeguarded beaches, parking lots, the ORV corridor, ORV access points, and the Pole Line and/or the Inner Dune routes. Flexible management is limited to the territories, nests, and/or broods of no more than five pairs of piping plovers. We are measuring adverse effects by the number of territories, nests, or broods exposed to flexible management, and the impact on the species is measured in loss of productivity for affected breeding pairs. The flexible management measures described in the Shorebird Plan and this Opinion may be implemented over the next 10 years to allow for analyses of flexible management on recreational use objectives and impacts to the piping plover population. For the purpose of this Opinion, the duration of the action will be 10 years.

⁸ By *clear and substantial*, we mean that there must be a firm basis to support a conclusion that a consequence of an action is reasonably certain to occur. This term is not intended to require a certain numerical amount of data; rather, it is simply to illustrate that the determination of a consequence to be reasonably certain to occur must be based on solid information. This added term also does *not* mean the nature of the information *must support* that a consequence is *guaranteed* to occur, but must have a degree of certitude.

The NPS anticipates that adaptive management measures may be identified in the intervening years that could refine piping plover management activities and require subsequent changes to the Shorebird Plan. Adaptive management is subject to the criteria listed in the Reinitiation Notice below.

The proposed flexible management activities may result in adverse effects in the form of reduced productivity for those pairs exposed to the reduced pro-active symbolic fencing and reduced fencing around nests in the six lifeguarded beaches, the ORV corridor, ORV access points, and the Pole Line and Inner Dune routes. We anticipate disruption of territory establishment, abandonment of territories, and mortality of eggs would reduce annual productivity of the exposed pair on average by 50 percent. This estimate is consistent with our past analyses of actions with similar effects (USFWS 2016), although this may be an overestimate of impacts. Take may occur as reduced productivity from herding chicks out of parking lots. Adverse effects on adult piping plovers may occur in the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes due to reduced symbolic fencing between nests and the travel corridors.

Reduced proactive fencing at the six lifeguarded beaches

Recreational activity would occur in suitable piping plover nesting, feeding, and sheltering habitat that otherwise would be protected by the placement of proactive symbolic fencing according to the Federal guidelines.

Recreational activity within unfenced suitable nesting habitat may disrupt territorial and breeding behavior, including courtship; may force piping plovers to seek alternative nesting habitat either close by or at another beach; may trample undetected nest scrapes or nests with eggs, especially incomplete clutches that are not being incubated; and overall will discourage plovers from successfully nesting within unfenced areas.

Adult piping plovers generally return to the same nesting beach, or a nearby beach (see Status of the Species for discussion on dispersal). If less suitable habitat is available for establishing territories and nests, plovers may be forced to seek out different breeding habitat, possibly increasing energetic demands, especially on late arriving birds as they seek new nesting options farther from their traditional breeding areas. Plovers forced from their traditional nesting locations may encounter later territory establishment and nesting than previous years when sufficient habitat was available. If the piping plover population in a region approaches the available habitat's carrying capacity, some adults that are displaced may not breed at all and potential new recruits may not find territories. Therefore, it is possible that this flexible management activity could affect the abundance and distribution of nesting pairs at sites in the Seashore where it is implemented. Moreover, breeding pairs forced to relocate as a result of less available habitat may relocate closer to another occupied territory, causing an increase in agonistic behavior between pairs, delayed nesting of either pair, or competition for resources, especially once chicks have hatched and adults are defending their broods.

Reduced symbolic fencing around nests at lifeguarded beaches, the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes

Pedestrian recreation would be allowed in areas less than 50 m from a piping plover nest that otherwise would be symbolically fenced and restricted from use if management was implemented in accordance with the Federal guidelines. Pass-through vehicle corridors (no stopping) would be allowed within 25 m or less from nesting piping plovers. Recreation and ORV traffic close to piping plover nests that have reduced symbolic fenced buffers have the potential to cause repeated disturbance of nesting adults and result in egg mortality through increased risk of nest abandonment or lower hatch rates due to inconsistent incubation. Increased flushing of incubating adults from nests could expose eggs to predators (e.g., crows, gulls, cats) and could cause excessive cooling or heating of eggs. Eggs repeatedly exposed on hot days may overheat, killing the embryos (Bergstrom 1991). Excessive cooling may kill embryos or delay their development, thus delaying hatching dates. The reduced distance between traveling vehicles and nesting piping plovers could result in injury or mortality of adult plovers if they flush repeatedly when vehicles pass, or if they are startled and fly into the vehicle corridor while a vehicle is passing.

Lastly, the reduction of proactive symbolic fencing and reduced buffers around nests could also result in repeatedly affecting the ability of unfledged chicks to find shelter and to forage if protected areas of the beach are decreased. The reduced symbolically fenced beach areas may cause chicks to move greater distances between protected foraging and sheltering habitat as they avoid humans or are forced to move away from disturbances caused by recreational beachgoers or beach operations. Adverse effects and reduced chick survival may affect either the displaced brood or broods in the territory into which they move.

Minimization Measures for Reduced Fencing

The Shorebird Plan includes minimization measures to reduce adverse effects to breeding piping plovers and their broods from reduced proactive symbolic fencing and reduced fencing around nests.

- The NPS would immediately install symbolic fencing around any nest found outside of the reduced proactive fencing to limit disturbance and prevent destruction of eggs.
- The NPS would implement the measures consistent with the flexible management of reducing fenced buffers around nests (see discussion under reduced symbolic fencing [pages 5 and 6 of this document]).
- Fencing would be reduced only to the extent necessary to achieve specific recreational objectives (e.g., opening a specific beach access trail, allowing vehicles access to a beach managed according to the Federal guidelines but constricted at one point).
- The NPS will incrementally reduce buffers around nests unless doing so precludes pedestrian access to a lifeguarded beach, in which case the buffer would immediately be reduced to 10 m.
- A minimum 10 m buffer will be maintained around nests on lifeguarded beaches.
- A minimum of 9 m buffer will be maintained around nests in drive-through-only corridors to minimize the risk of adult mortality.

Herding Chicks Out of Parking Lots

Adverse effects on adults and their young may occur if their normal movement patterns are disrupted by barriers or by monitors herding broods out of a parking lot. Seashore parking lots do

not bisect prime foraging habitats or sheltering habitat. However, adults may move chicks into parking lots to avoid predators or agonistic behavior from other breeding piping plovers. Chicks may expend energy as they are being forced to move away from their initial destination. Repeated incidences of chick herding in this manner could increase the energetic demand of chicks and cause a disruption to feeding, breeding or sheltering; delay fledging; or possibly cause the death of the chick. Delayed fledging may result in birds insufficiently developed in time to survive migration.

Minimization Measures for Herding Chicks

- The NPS will temporarily close parking lots with chicks until shorebird staff are able to "herd" chicks out of the parking lot.
- Barriers (e.g., silt curtains) will be placed preemptively around parking lots where piping plover adults and chicks have been found in the past to minimize or avoid the likelihood of herding the chicks.
- If silt curtains are not already in place, once chicks are herded out of a parking lot, silt curtains will be installed to prevent chicks from entering the area.

Effects on the Massachusetts population

The primary impact of the flexible management is likely to be egg mortality because of nest failure from reduced proactive fencing or reduced nest buffers. Nest abandonment and subsequent egg loss may decrease the probability of successful nesting and may result in reduced productivity as plovers are forced to renest later in the breeding season or if they renest at a location where increased competition impinges on the productivity of other pairs. Herding chicks may also reduce productivity through loss of chicks as they experience the stress of being forced out of a parking lot. This is most likely to occur if chicks are very young (a few days old) or if they are repeatedly herded out of a parking lot.

We estimate for every territory, nest, or brood exposed to flexible management, the affected breeding pair will experience a 50 percent reduction in productivity. This estimate includes mortality and sublethal effects from all flexible management activities. We anticipate for every nest where symbolic fencing is reduced to less than 25 m in the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes, 0.05 adult may be injured or killed by passing vehicles. Mortality could occur during inclement weather with poor visibility when vehicles pass close to an incubating plover or if the bird is suddenly startled and flies into a vehicle (both types of incidents have been reported to occur).

We anticipate the effects on the Massachusetts piping plover population of the proposed flexible management affecting up to five pairs of breeding piping plovers would be insignificant. Flexible management would not eliminate productivity for affected pairs. In addition, it would affect a small portion of the pairs at the Seashore and an extremely small percentage of the statewide population. The maximum percent of broods, nests, or territories that would be exposed to flexible management in a given year is approximately 6 percent of the average annual Seashore population and 0.5 percent of the average annual statewide population (calculated for the last 10 years).

Although we have to conduct our effects analysis assuming that the maximum adverse effects would occur annually, in practice, the NPS anticipates that implementing all five uses of flexible management in the ORV corridor, ORV access points, and Pole Line and Inner Dune routes in a

given year would happen rarely, if ever. Exposure of five pairs of piping plovers from flexible management may not occur in all years. The previous flexible management allowed exposing three piping plover pairs (territories or nests) at two beaches and was implemented once for one pair between 2010 and 2020. It is reasonable to assume that in some years, less than five pairs may be exposed to flexible management under the Shorebird Plan, reducing the overall impact of loss of productivity or adult plovers on the Massachusetts population over the life of the proposed action.

Effects on the New England recovery unit and the Atlantic Coast population

Because we anticipate the effects on the Massachusetts piping plover population would be insignificant, there would be no measurable effect on the much larger New England and Atlantic Coast populations. Attainment and maintenance of population abundance targets for the four recovery units provide resiliency, redundancy, and representation that are fundamental to the overall security of the Atlantic Coast piping plover population. The New England population has attained (or been within three pairs of) its abundance goal for 18 years, and it currently exceeds its goal (which is the largest of the four recovery units) by approximately 47 percent. No impairment of physical or biological characteristics of habitat is anticipated that could impinge on future carrying capacity or productivity of affected Seashore beaches. The majority of Seashore beaches will continue to be managed under the Guidelines. Should the NPS implement predator management at sites where predation is a primary cause of lost productivity, we expect that increased productivity would offset loss of productivity of piping plover pairs exposed to flexible management. The minimal number of piping plover pairs affected by flexible management and the annual variability of the numbers of pairs that would be exposed to flexible management (0 to 5) assure that flexible management will not diminish the contribution of the Massachusetts population to the survival and recovery of the New England recovery unit, nor the Atlantic Coast population as a whole.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion (50 CFR 402.02). 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. Because the action area is completely encompassed by the Seashore, any activities occurring within the action area would have a nexus to a discretionary action by the NPS and would require additional section 7 consultation.

JEOPARDY ANALYSIS

Section 7(a)(2) of the ESA requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

“Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and

recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). In accordance with policy and regulation, the jeopardy analysis in this Opinion relies on four components: (1) Status of the Species, which evaluates the piping plover rangewide condition, the factors responsible for that condition, and its survival and recovery needs; (2) Environmental Baseline, which evaluates the status of the piping plover in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the piping plover; (3) Effects of the Action, which determines impacts of the proposed action; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the piping plover. The jeopardy analysis in this Opinion emphasizes the rangewide survival and recovery needs of the listed species and the role of the action area in providing for those needs. It is within this context that we evaluate the significance of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination (see 50 CFR 402.14(g)).

In this section, we add the effects of the action and the cumulative effects to the status of the species and critical habitat and to the environmental baseline to formulate our Opinion as to whether the proposed action is likely to appreciably: (1) reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing the RND of that species; or (2) diminish the value of critical habitat for both the survival and recovery of a listed species.

Per the Service's consultation handbook (USFWS and NMFS 1998), survival is defined as "the species' persistence as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow for the potential recovery from endangerment. Said another way, survival is the condition in which a species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a species with a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter."

Per the Service's consultation handbook (USFWS and NMFS 1998), recovery is defined as "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the ESA." The "criteria set out in Section 4(a)(1)" means determining when a species no longer meets the definition of an "endangered species" or a "threatened species" because of any of the following factors:

- (A) present or threatened destruction, modification, or curtailment of habitat or range;
- (B) overutilization for commercial, recreational, scientific, or educational purposes;
- (C) disease or predation;
- (D) inadequate existing regulatory mechanisms; and
- (E) other natural or manmade factors affecting the species' continued existence.

An endangered species is "in danger of extinction throughout all or a significant portion of its range" (see ESA Section 3(6)). A threatened species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (see ESA Section 3(20)).

To conduct this analysis, we begin by assessing whether there are effects to any individuals of the species of interest (as discussed in the effects analysis section above). If all effects are insignificant, discountable, or wholly beneficial, no further consultation is required. In other words, if we conclude that individuals are not likely to experience reductions in reproductive success or survival likelihood, fitness consequences for the species rangewide would not be expected as well. In this case, the agency has ensured that their action is not likely to jeopardize the continued existence of the species and our analysis is completed. Conversely, if we are unable to show that individuals are unlikely to experience reductions in their reproductive success or survival likelihood, we are required to assess how those effects are or are not anticipated to result in an appreciable reduction in the likelihood of both the survival and recovery of the species. We do not assess appreciable reduction of reproduction, numbers or distribution at an individual level because we do not assess appreciable reduction of survival and recovery at an individual level.

Because many species are composed of multiple populations and there may be meaningful differences in those populations (e.g., genetics, morphology, size) to the overall species survival and recovery, it is a logical intermediate step to evaluate the effects of impacts to individuals on the population(s) they are associated with. If our analyses indicate that reductions in the fitness of the population(s) are not likely to occur, there can be no appreciable reductions in reproduction, numbers, or distribution at a species level and we conclude that the agency has ensured that their action is not likely to jeopardize the continued existence of the species. If there are reductions in the fitness of the population(s) impacted, we then assess whether those changes affect the overall species survival and recovery rangewide based on the importance of the population(s) for species level representation, resiliency and redundancy, the level of impact, and the status of the species.

CONCLUSION

As discussed in the “Effects of the Action” section, the primary consequence of the proposed action is the 50 percent reduction of productivity for each pair of piping plovers exposed to flexible management and the loss of 0.05 adult plover per pair exposed to flexible management in the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes. No more than five pairs of piping plovers may be exposed per year over 10 years. The jeopardy analysis in this Opinion assesses whether the proposed action reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of the Atlantic Coast piping plover by reducing its reproduction, numbers, or distribution in the wild.

The action area for this consultation is located in the New England recovery unit. This and three other recovery units were defined in the final recovery plan for this species (USFWS 1996). Recovery units are special units of a listed entity that are geographically or otherwise identifiable and are essential to the recovery of the entire listed entity. Therefore, we start by considering the effects of the proposed action on the piping plover population in Massachusetts. We then consider those effects in the context of the current status of piping plovers in the New England recovery unit and the environmental baseline in the action area, taking into account any cumulative effects. Finally, we determine whether implementation of the proposed action is likely to appreciably reduce the likelihood of both the survival and recovery of the species in the wild.

In formulating this Opinion, we consider the following points discussed earlier in this document:

1. The flexible management is limited in scope to five pairs of piping plovers (territories, nests, broods) per year.
2. The flexible management is limited to suitable habitat within a given distance at six lifeguarded beaches, the ORV travel corridor, ORV access points, the Pole Line and Inner Dune routes, and parking lots. Suitable habitat not affected by flexible management will continue to be managed protectively according to Federal guidelines.
3. Flexible management exposing the maximum number of piping plovers to take will affect approximately 6 percent of the average annual Seashore population and 0.5 percent of the average annual statewide population.
4. Measures to minimize the loss of productivity of pairs exposed to flexible management are anticipated to ensure that their productivity is not reduced by more than 50 percent.
5. Only flexible management of reduced nesting buffers in the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes could cause take of adult piping plovers. Reduced symbolic fencing in these areas is anticipated to result in 0.05 adult killed per breeding pair exposed; adult or chick mortality is not anticipated for flexible management at lifeguarded beaches or parking lots.
6. The NPS does not anticipate implementing all five uses of flexible management in the ORV corridor, ORV access points and Pole Line and Inner Dune routes, further limiting the impact of loss of breeding adults over the life of the proposed action.
7. Impacts to the abundance and distribution of nesting pairs of piping plovers in Massachusetts will be minor.
8. The proposed action will take place in Massachusetts where the piping plover population has exceeded the recovery unit goal of 625-pairs since 2011.
9. The proposed action will take place in the New England recovery unit, where the piping plover population has exceeded (or been within three pairs of) its 625-pair abundance goal since 1998, attaining a post-listing high of 1,058 pairs in 2021, 69 percent above the recovery unit goal.

After reviewing the status of the species, environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, we find that the proposed action is not reasonably expected to reduce appreciably the likelihood of both survival and recovery of piping plovers in the New England recovery unit by reducing their reproduction, numbers, or distribution in the wild. Our analysis indicates that the effects of the flexible management are likely to be minimal and site-specific. We expect the net effects of the proposed action on the New England recovery unit would be insignificant, and the potential for effects on the numbers or distribution of piping plovers in the other recovery units is negligible. We conclude that the proposed action is not likely to jeopardize the continued existence of the Atlantic Coast piping plover population as a whole.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined in section 3 of the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of this incidental take statement (ITS).

The measures described below are nondiscretionary, and must be undertaken by the NPS for the exemption in section 7(o)(2) to apply. The NPS has a continuing duty to regulate the activity covered by this ITS. If the NPS fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the NPS must report the progress of the action and its impact on the species to the Service as specified in the ITS [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

We anticipate that some piping plovers would be taken as a result of the proposed action and that the majority of take will result in a 50 percent reduction of productivity for those piping plover pairs exposed to the flexible management. We expect the incidental take to be in the form of harassment, harm, and/or killing of adults, although adult mortality would be extremely limited.

Harass

Flexible management that could result in harassment of chicks and adults includes:

- reduced proactive symbolic fencing of suitable habitat;
- reduced symbolic fencing around nests; and
- herding chicks out of parking lots.

Take via harassment may occur when flexible management creates the likelihood of injury to such an extent as to significantly disrupt normal breeding, feeding, and sheltering/roosting behaviors. Reduced proactive symbolic fencing and reduced buffers around nests may lead to reduced nest attendance if incubating adults are repeatedly disturbed by pedestrians leading to overheating or cooling of eggs or abandonment. As a result of disturbance, adults may reneest closer or within other plovers' territories, causing multiple disruptions if pairs become antagonistic towards each other. Reduced proactive fencing may also disrupt normal behavior, including territory establishment, territory abandonment if plover pairs relocate, and a delay or extension of their

breeding period if forced to relocate. Herding chicks, especially very young chicks, may cause stress to the individuals and slow development.

Harm

Flexible management that could result in harm to chicks and adults includes:

- reduced proactive symbolic fencing.

Harm may occur when significant habitat modification or degradation results in death or injury by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. The functional suitability of habitat may be temporarily affected when proactive symbolic fencing is reduced and recreational use of the area precludes plovers from nesting or roosting in undisturbed habitat.

The anticipated impact of these take mechanisms to piping plovers is a 50 percent reduction in productivity; however, we are unable to anticipate the actual number of piping plover chicks that would not hatch due to take by the flexible management over the 10-year life of the Shorebird Plan implementation. Therefore, the exposure of one pair's territory, nest, or brood to flexible management is a surrogate indicator of a 50 percent reduction in that pair's productivity for that territory, nest, or brood. We anticipate 5 pairs would be exposed to take annually and 50 pairs over the 10-year implementation of the Shorebird Plan.

Kill

Flexible management that could result in the killing of adults includes:

- reduced symbolic fencing around nests in the ORV travel corridor, ORV access points, and Pole Line and Inner Dune routes.

Adults could be killed if struck by a vehicle passing close to a nest. The likelihood of adult mortality by vehicles in the ORV travel corridor, ORV access points or Pole Line and Inner Dune routes is very low and on average, only 0.05 adult per exposure (one pair) is anticipated to be killed. We expect the minority of exposures to occur annually via reduced symbolic fencing around nests in the ORV travel corridor, ORV access points and Pole Line and Inner Dune routes. However, in the extremely unlikely scenario that all take exposures occur via this covered activity, we would expect 3 adults to be killed over the 10-year term of the proposed action (0.05 per exposure, maximum of 5 exposures annually, 10 years of flexible management).

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize take of piping plovers by the proposed action.

- The NPS must ensure that only qualified individuals implement reduced fencing around piping plover nests and herding piping plovers out of parking lots.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the NPS must comply with the following term and condition, which implements the reasonable and prudent measure described above.

- Ensure flexible management activities are implemented only by personnel experienced in piping plover biology and familiar with how piping plovers may respond to efforts to herd broods. Individuals must be adept at identifying piping plover habitat, nests, and all life stages of the species.

MONITORING AND REPORTING REQUIREMENTS

The NPS shall provide the New England Field Office an annual report describing the number of pairs exposed to reduced proactive symbolic fencing, reduced fencing around nests, and broods herded out of parking lots. The report should include:

- the flexible management implemented by location including a description of the pass-through ORV travel corridor (single lane/double lane) in front of each exposed nest;
- the suitable habitat area (general estimate) not proactively symbolically fenced or the area of reduced fencing around nests;
- number of territories abandoned and where pairs relocated (if known);
- the fate of nests and/or broods;
- any adults injured or killed by vehicles in the flexibly managed ORV corridor, ORV access points, and Pole Line and Inner Dune routes; and
- the productivity for each pair exposed to flexible management.

Please email the report to newengland@fws.gov. The contact for these reporting requirements is:

Audrey Mayer, Field Supervisor
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301
Telephone number: 603-223-2541

Care must be taken in handling any dead specimens of listed species to preserve biological material in the best possible state. In conjunction with the preservation of any dead 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 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 specimen, notify the Service's New England District Office of Law Enforcement at 617-889-6616 and the New England Field Office at 603-223-2541.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR 402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the ITS is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of sections 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this Opinion, please contact Ms. Susi von Oettingen of this office at 603-227-6418, or by e-mail at susi_vonoettingen@fws.gov.

Sincerely yours,

AUDREY MAYER

Audrey Mayer
Supervisor
New England Field Office

Digitally signed by AUDREY
MAYER
Date: 2021.07.19 09:49:15
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Attachment

cc: Reading file
Geoffrey Sanders/CCNS via email
Kelly Medeiros/CCNS via email
Carolyn Mostello/MADFW via email
Eve Schlüter/MADFW via email
ES: SvonOettingen:jd:7-19-21:603-223-2541

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Appendix A

Consultation History

March 7, 2019	Electronic correspondence from the Seashore to the USFWS New England Field Office (NEFO) providing the signed Shorebird Management Plan EA and FONSI.
March 26, 2019	Conference Call with the Seashore and NEFO regarding the Seashore Shorebird Management Plan.
June 19, 2019	Electronic correspondence from NEFO to the Seashore regarding adverse effects and flexible management.
July 10, 2019	Site visit with NEFO at the Seashore.
November 13, 2019	Electronic correspondence from the Seashore to NEFO regarding section 7 consultation.
November 18, 2019	Conference call between the Seashore and NEFO regarding section 7 consultation.
November 19, 2019	Electronic correspondence from the NEFO to the Seashore regarding section 7 and the ORV corridor negotiated rule.
December 31, 2019	Electronic correspondence from the Seashore to NEFO regarding project proposal preparation and flexible management proposal.
April 24, 2020	Electronic transmission of the draft Shorebird Management Plan project proposal and shorebird management plan for review.
June 5, 2020	Conference call between the Seashore and NEFO regarding the Shorebird Management Plan.
June 18, 2020	Conference call between the Seashore and NEFO regarding section 7 consultation.
July 24, 2020	Conference call between the Seashore and NEFO regarding section 7 consultation.
November 11, 2020	Electronic correspondence from the Seashore to NEFO providing draft project proposal.
November 30, 2020	Electronic correspondence from NEFO to the Seashore providing comments on the draft project proposal.

January 12, 2021	Electronic correspondence from the Seashore to NEFO regarding solicitor review of the project proposal and the ORV corridor negotiated rule.
January 21, 2021	Electronic correspondence from the Seashore to NEFO formally requesting the section 7 consultation for the Shorebird Management Plan
February 5, 2021	Electronic correspondence from NEFO to the Seashore with comments and questions on the project proposal.
February 8, 2021	Electronic correspondence from NEFO to the Seashore requesting red knots and roseate terns be included in section 7 consultation.
February 9, 2021	Microsoft Teams call between the Seashore and NEFO regarding formal section 7 consultation.
February 16, 2021	Electronic correspondence between NEFO and the Seashore regarding clarifications of proposed flexible management at the park.
February 22, 2021	Electronic correspondence from the Seashore to NEFO submitting updated project description and supplemental letter.
March 12, 2021	Electronic correspondence from the Seashore to NEFO clarifying Self-Contained Vehicle flexible management.