



United States Department of the Interior

FISH AND WILDLIFE SERVICE

73 Weir Hill Road
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September 14, 2004

Superintendent Larry Belli
Cape Hatteras National Seashore
Route 1, Box 675
Manteo, North Carolina 27954

Dear Larry:

This letter responds to your request for recommendations regarding the conservation of piping plovers (*Charadrius melodus*) at Cape Hatteras National Seashore (Seashore), with focus on threats from human disturbance. These recommendations constitute technical assistance and are intended to facilitate completion of on-going consultation under section 7 of the Endangered Species Act (ESA) with the U.S. Fish and Wildlife Service's (USFWS) Raleigh, North Carolina Field Office, as well as your efforts to comply with the prohibitions on take¹ under section 9 of the ESA and fulfill other natural resource protection mandates incumbent on the National Park Service.

I appreciated the opportunity to tour key piping plover habitats at Bodie, Hatteras, and Ocracoke Spits with you; Mary Doll, Steve Harrison, and Marcia Lyons of your staff; David Allen and Sue Cameron of the North Carolina Wildlife Resources Commission; and Pete Benjamin and David Rabon of the USFWS Raleigh Office on September 2, 2004. The flight over the Seashore on the return trip from Ocracoke to Manteo also provided a highly informative overview of habitat conditions on the barrier islands. I am also very grateful for written summaries of data on use of the Seashore by migrating and wintering piping plovers compiled on short notice by Seashore Biologist Marcia Lyons.

As you know, Cape Hatteras Seashore provides breeding habitat for the threatened Atlantic Coast piping plover population, as well as migration and wintering habitat for piping plovers from all three breeding populations, including the endangered Great Lakes population. As the only state where piping plovers are present year-round, North Carolina occupies a particularly important location in the species' range.

¹ "Take" is defined in the ESA to include harming and harassing listed wildlife. Regulations implementing the ESA (50 CFR 17.3) further define "harm" to include significant habitat modification or degradation that results in the killing or injury of wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. "Harass" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

The conservation needs of breeding and non-breeding piping plovers are addressed below. Barrier islands are inherently dynamic and the early succession habitats preferred by piping plovers are subject to rapid changes. For this reason, I am primarily articulating my recommendations in terms of habitat types, with references to some particular areas included on our September 2 tour. I believe that your current natural resources staff has the knowledge and experience to appropriately apply these recommendations to changing habitat conditions on the Seashore.

Protection of Breeding Piping Plovers

The current status of breeding piping plovers at Cape Hatteras Seashore is extremely dire. Since 1996, when 14 pairs nested on the Seashore, abundance of breeding pairs has plummeted to only two pairs in 2002, and three pairs each in 2003 and 2004 (NCWRC 2002-2004), and at least one of these pairs apparently failed to establish even a single nest (NPS 2003). The North Carolina breeding population has also declined in recent years, from 54 breeding pairs in 1994 to only 20 pairs in 2004 (J. Nicholls, USFWS, *in litt.* 1994; NCWRC 2004).

Evidence suggests that breeding piping plovers at Cape Hatteras are experiencing some of the very serious problems that occur when a population declines to very low density (Allee et al. 1949, Ferson and Akcakaya 1990; see also Appendix E in USFWS 1996). Of particular concern are cases of late initiation of first nests and exhibitions of territorial behavior that fail to culminate in nest initiation (NPS 2001-2003). These cases are likely indicators of such low numbers at Cape Hatteras Seashore that the remaining birds are experiencing difficulty finding and courting mates. Such situations increase the vulnerability of remnant populations and accelerate their extirpation. They require immediate implementation of extraordinary protection measures to attract and retain potential breeding adults, maximize their reproductive success, and rebuild the population as rapidly as possible.

The following actions are recommended in light of the highly precarious status of breeding piping plovers at Cape Hatteras Seashore:

- 1) On or before March 15, prevent entry of vehicles, pedestrians, and pets into all suitable habitats for piping plover courtship and nesting. Protected areas should be symbolically fenced² to afford every opportunity for prospecting piping plovers to establish territories, attract mates, conduct courtship, lay eggs, and incubate them without human or pet disturbance as early in the season as possible, and to expeditiously re-nest if earlier clutches are lost. Delaying protection until after biologists detect territorial birds is wholly inadequate, as even the most intensive monitoring program cannot assure immediate detection of sensitive birds 24 hours a day, seven days a week over the amount of suitable habitat at Cape Hatteras Seashore. Note that nocturnal activity has been documented in both breeding (Staine and Burger 1994) and wintering piping plovers (Zonick 1996).

² "Symbolic fencing" (sometimes also called "psychological fencing") refers to one or two strands of light-weight string, tied to posts to delineate areas where pedestrians and/or vehicles should not enter. Piping plover biologists managing beaches along the Atlantic Coast have found that use of string substantially improves compliance of beach users, compared with the use of posts alone.

- a) Protected habitat must include moist sandflats and intertidal zones around dry sand areas at the island spits, as well as potential nesting habitat in the vicinity of ephemeral pools, moist swales, overwashes, and sparse vegetation³. Piping plover territorial and courtship behaviors typically encompass areas in excess of 100 meters (Cairns 1982). Very sensitive incubating piping plovers may flush in response to humans as far away as 150 to 200 meters (Cross 1990, Flemming et al. 1988, Loegering 1992). Protected habitat should include nearby foraging habitat for non-incubating adults, thereby maximizing their proximity for assisting their mates with nest defense.
- b) The critical status of the Cape Hatteras breeding piping plover population requires that human disturbance adjacent to symbolically fenced courtship and nesting habitat be kept to a minimum. In view of the large amount of beach use on the Seashore at all hours of the day and night, it is recommended that all non-essential⁴ vehicular access, boat landings, pets (with or without leashes), and kite flying be prohibited within 500 meters of suitable habitat, including the adjacent intertidal zone. Absent vehicular and boat access, light pedestrian activity seaward of the symbolic fencing should be tolerable for most piping plovers if anyone entering the symbolic fencing will be subject to a high probability of detection by enforcement personnel.
- c) In many cases, habitat that is protected for courting and nesting piping plovers will also include all potential brood foraging habitats. If, however, any nest is detected in an area where this is not the case, then the protected area should be accordingly expanded at least three days in advance of the expected hatch date. Similarly, if broods move or if unfledged chicks from undetected nests are discovered, symbolic fencing should be expanded to include their entire territories, plus a 100 meter buffer from potential disturbance.
- d) Symbolic fencing should be maintained as long as nests, chicks, or young of the year⁵ remain in the area where breeding occurred. Extra protection for recently fledged chicks will maximize opportunities for undisturbed foraging, thereby boosting first-year survival rates, which are typically much lower than for adult plovers (see table 1, USFWS 2003). Symbolic fencing can be removed (and pedestrian access allowed) after July 1 in any area where three thorough surveys, conducted on separate days by qualified monitors, determine that there are no nests, unfledged chicks, or young of the year within 500 meters.
- 2) The critical status of the Seashore's breeding plover population also requires continued implementation and intensification of predator management activities to maximize breeding

³ All three spits visited during our September 2, 2004 tour constitute such habitat. Biologists report that characteristics of highly suitable habitat also persist at Cape Point. If a spit that furnishes suitable nesting habitat reforms at the northern end of Ocracoke Island, protection measures should be promptly implemented there as well.

⁴ Essential vehicle use should be limited to NPS biological and law enforcement staff and conducted in accordance with procedures specified on page 196 of the Revised Atlantic Coast Piping Plover Recovery Plan (USFWS 1996).

⁵ The intention is to provide extra protection for juveniles, especially weak fliers, as long as they linger in the vicinity where they were reared. It is not anticipated that monitors will be able to distinguish young of the year once they leave the brood-rearing territory.

success and reverse trends in abundance as rapidly as possible. Top priority should be accorded to efforts to remove red foxes from Hatteras Island and feral cats from all portions of the Seashore. Other important actions include removal of foxes in the vicinity of Bodie Spit and other mammalian predators (including raccoons, mink, and opossum) around all suitable nesting habitat, with special emphasis on the period beginning in February and continuing until all chicks have fledged. In accordance with the Guidelines for the Use of Predator Exclosures to Protect Piping Plover Nests in Appendix F of the Revised Atlantic Coast Piping Plover Recovery Plan (USFWS 1996), Seashore biologists should deploy predator exclosures around nests unless they detect evidence that predators are keying in on and harassing piping plovers at exclosed nests. Care should be taken to avoid creating perches for avian predators when posting and fencing breeding areas. If perching by potential predators is observed, counter-measures such as installation of sharp material on tops of posts and use of triangular signs should be implemented immediately. Measures should be implemented to prevent pedestrians using shoreline areas adjacent to symbolic fencing from engaging in any activity that might attract potential predators, including littering, feeding gulls or crows, or cleaning fish.

These actions for the protection of breeding piping plovers require immediate implementation to capitalize on the reproductive potential of the remnant population. Furthermore, it is highly probable that the piping plover population response will require tenacious implementation over a number of years. Both observations of banded birds (L.H. MacIvor, C.R. Griffin, and S.M. Melvin, unpubl. data; Strauss 1990; Loegering 1992; Cross 1996) and genetic data (S. Haig, USGS, pers. comm. 2002) show slow rates of dispersal within the Atlantic Coast breeding population. Experience at a number of other Atlantic Coast locations where breeding populations had dropped to very low numbers (e.g., Parker River National Wildlife Refuge in Massachusetts, Fire Island Seashore in New York) indicate that persistent implementation of intensive protection measures in depleted populations can produce positive responses in both abundance and reproduction. Encouraging indications are also furnished from the southern Virginia barrier islands, where the breeding population declined from 25 pairs in 1995 to only two pairs on a single island in 2001; while still far from secure, plover numbers in this area are now exhibiting promising signs, rebounding to 11 pairs on four islands this year (VDGIF 1995-2004).

Protection of Migrating and Wintering Piping Plovers

Cape Hatteras Seashore also provides extremely important habitat for migrating and wintering piping plovers from the Atlantic Coast and Great Lakes breeding populations. Observations of banded piping plovers provided by your staff include:

- 1) At least five marked plovers from the endangered Great Lakes population: One of these birds has now been observed on the Seashore during four of the last five years and in every month from October to April. Use by Great Lakes plovers has also been documented in July and August. These numbers are particularly significant in light of the very small size of that population, which now stands at 55 breeding pairs.

- 2) Wintering and migrating plovers that breed in four provinces in Atlantic Canada: Use by plovers from the Atlantic Canada recovery unit is significant because population increases there lag substantially behind those in New England and New York-New Jersey, despite markedly higher long-term average productivity rates. This segment of the population may be especially sensitive to factors that affect juvenile and adult survival during the nonbreeding season. Importance of Cape Hatteras Seashore to plovers that breed in Atlantic Canada is underestimated by sightings of marked birds, since only a small fraction of that population is banded.
- 3) Extended stopover use by migrants, including repeated observations over 20-30 day periods.
- 4) Banded piping plovers from the Northern Great Plains and U.S. Atlantic Coast populations. Note that the proportion of banded plovers in these populations is extremely small.

Banded piping plovers constitute only a small fraction of the total observations of nonbreeding piping plovers at Cape Hatteras Seashore, including peak counts of over 70 and 40 birds at Ocracoke and Bodie Island Spits, respectively. Stopovers of southward ("fall") migrants at Cape Hatteras Seashore begin in early July, while spring migrants may linger through the month April and occasionally into early May. While counts between mid-October and mid-February are lower, wintering piping plovers may be especially vulnerable to disturbance during periods of harsh weather. Observations of nonbreeding plovers include ocean, soundside, and washover habitats, but the opportunistic collection of this information prevents a quantitative assessment of their relative importance or the factors (including disturbance) that may be affecting habitat selection.

Several studies document effects of human disturbance on nonbreeding piping plovers and very closely related species. A step-wise multiple regression model identified beach length (positive) and beach vehicular density (negative) as factors most strongly influencing the number of piping plovers at nine winter sites along the Texas Coast (Zonick 2000). Zonick (1996, 2000) also found that washover passes⁶ provided critical refugia for piping plovers during periods of extreme high tides and harsh weather. A study of disturbance to wintering western snowy plovers (*Charadrius alexandrinus*) in California (Lafferty 2001) found that feeding rates declined with increased human activity, and that dogs off leash were a disproportionate source of disturbance. Studies such as these form the basis for task 2.14 in the Great Lakes Piping Plover Recovery Plan (USFWS 2003):

Reduce disturbance to piping plovers at wintering sites by humans and pets. (1) As on the breeding grounds, public land managers should use recreation management techniques such as vehicle and pet restrictions and psychological fencing to reduce disturbance and risk of take to piping plovers during the winter.

⁶ "Washover passes" or "overwashes" are created by the flow of water through the primary dune line with deposition of sand on the barrier flats, marsh, or into the lagoon, depending on the storm magnitude and the width of the beach (Leatherman 1979). Piping plovers utilize both moist and bare sand areas in the middle of washovers, and patches of sparse vegetation around their edges.

The plan assigns a priority of "1" to this task, meaning that implementation is essential to prevent the endangered Great Lakes population of piping plovers from becoming extinct in the foreseeable future.

Diligent implementation of recommended protections for breeding piping plovers described above will provide for the conservation needs of many spring migrants. Additional protections are needed, however, to protect piping plovers during the fall migration, winter, and early spring:

- 1) Prohibit vehicles, boat landings, dogs (with or without leashes), and kite-flying within 500 meters of all large spits and any islands featuring large moist foraging habitats. At present the large moist sandflats and adjacent roosting areas selected by nonbreeding piping plovers are found at the southern ends of Bodie, Hatteras, and Ocracoke Islands, and on Green Island. If future changes in barrier island configuration result in formation of similar habitats in other locations, then management should be adjusted accordingly. Current information does not indicate a need for restrictions on pedestrian-only access, as long as their overall numbers remain relatively low.
- 2) Prohibit vehicle access and dogs (with or without leashes) within 500 meters of overwashes. An example of this type of habitat is currently found about one kilometer south of Ramp 55 on Hatteras Spit.

I also recommend that the Seashore institute regular and systematic monitoring for nonbreeding piping plovers to more fully ascertain factors affecting timing and location of use. I would be happy to provide detailed recommendations for a monitoring program on request or to review any draft protocol that your staff might develop.

Conservation of Natural Habitat Formation Processes

While our discussions on September 2, 2004 centered on management of direct human disturbance to piping plovers, it is important to recognize that the distribution of piping plovers is heavily restricted by artificial stabilization of barrier islands. This situation is poignantly illustrated at Cape Hatteras Seashore, where large portions of Bodie, Hatteras, and Ocracoke Islands are subject to sand scraping with bulldozers, construction of artificial dunes, artificial inlet closure, and other activities that impede natural overwash and inlet formation processes that create and maintain the highest quality piping plover habitats. The importance of protecting suitable piping plover habitat from human disturbance is magnified by the overall habitat shortage induced by development and stabilization activities.

A priority of "1" is assigned to tasks related to maintenance of natural coastal formation processes that perpetuate high quality habitat for breeding Atlantic Coast piping plovers (USFWS 1996, tasks 1.21, 1.22, 1.23) and wintering Great Lakes piping plovers (USFWS 2003, task 2.22). This issue has multiple ramifications for piping plover recovery. I understand that this important and highly complex issue is currently under discussion between the Seashore and the USFWS Raleigh Field Office.

The recommendations described in this letter are directed to needs of piping plovers. Implementation of these practices at the Seashore will contribute to the conservation of other coastal species listed under the ESA (sea turtles, scabweach amaranth), as well as birds protected under the Migratory Bird Treaty Act that nest, forage, and/or roost on Seashore beaches. However, adequate protection of these species will likely require additional protection measures that should be discussed with the USFWS' Raleigh Field Office and the North Carolina Wildlife Resources Commission.

I hope this information is useful to you and your staff. In an effort to provide you with rapid feedback regarding an urgent issue, I may have omitted information that would be helpful to you. If questions arise or if you would like me to elaborate on the reasoning behind any statements in this letter, please do not hesitate to contact me via telephone (978-443-4325) or email (anne_hecht@fws.gov). I recognize the challenges inherent in management of piping plovers at Cape Hatteras Seashore and appreciate your efforts to protect this imperiled species.

Sincerely,

Anne Hecht
Endangered Species Biologist and Leader,
U.S. Atlantic Coast Piping Plover Recovery Team

cc: USFWS, Raleigh Field Office (Pete Benjamin, David Rabon)
North Carolina Wildlife Resources Commission (Sue Cameron, David Allen)
Canadian Wildlife Service (Diane Amirault)
USFWS, Michigan Field Office (Jack Dingedine)
Martin Miller, Endangered Species Coordinator, Hadley, MA

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