



**The Goodwin-Niering Center for Conservation Biology and
Environmental Studies, Connecticut College**

**Summary of paper presented at the conference:
Saving Biological Diversity:
Weighing the Protection of Endangered Species vs. Entire Ecosystems
April 6 – 7, 2007**

The Piping Plover as an Umbrella Species for Barrier Beach Ecosystems

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The Audubon Society established the Coastal Bird Conservation Program in 2003, which carries out field research to support the establishment of effective Important Bird Areas (IBAs). These are areas recognized as holding particular value to the conservation of birds. Along with many partners, the CBCP focuses on many different coastal birds throughout their breeding range, including the piping plover and other species such as the snowy and Wilson's plover, three types of terns, the American oystercatcher, and the black skimmer. There are a high concentration of IBAs from Delaware to Massachusetts, which includes a large portion of piping plover breeding area, a species with a long history of declines and recoveries due to conservation responses.

Piping Plover Biology and Breeding Behavior

The piping plover (*Charadrius melodus*) is a small migratory shorebird found in coastal beach ecosystems and alkali wetlands, lakes, and rivers. These tiny birds are very well camouflaged, having the same sandy color as their barrier beach habitat. They also have a black band across their forehead, yellow-orange legs, and a black ring around the base of the neck. Their bill is orange tipped with black, and males and females have very similar plumage. Piping plovers have three distinct breeding populations: the Northern Great Plains, Great Lakes, and

Atlantic coast, and are thought to winter primarily in the Gulf of Mexico and the southeastern US coast, with some in the Caribbean.

Piping plovers breed between late March and mid-September. Common breeding areas are above the high tide line, including several types of dunes (sparsely vegetated) and washover areas between dunes. Feeding grounds include intertidal zones, mudflats, washover areas, sandflats, and shorelines of coastal waters. Males establish a breeding territory, and then perform an aerial display to attract a female, with whom they bond for the season. The parents dig out a small depression in the sand for nesting, often decorating it with stones or shell pieces. Both parents participate in the care of the young, which hatch in 25 days and are ready to fledge in another 30 days. Eggs and chicks are especially well camouflaged, to the point that they are in danger of being stepped on.

The Atlantic coast population, a focus of Scott Hecker's talk, winters from Atlantic Canada down to North Carolina. Typical habitats for this population are the ends of barrier islands, sandy peninsulas, and near coastal inlets. These habitats are subject to natural dangers, especially stormtides and predation, but human impact has been the most threatening to the species since the mid 1800s.

History

Piping plovers, despite their small size, were gunned to very low numbers by 1900, probably in sport, since they are too small to be a valuable food source. In 1909, the Plover Bill added some protection in Massachusetts, and in 1918 the US and Canada approved the Migratory Bird Act, which imposed restrictions on piping plover hunting. The species recovered well after the implementation of the Migratory Bird Act, but after World War II, development along beaches began to increase. One unfortunate point about the piping plover's breeding

habitat is that it is also an area that is very desirable for humans to live and recreate – temperate sandy beaches.

Development along beaches affects piping plovers in several ways. The most apparent is the physical loss of habitat, but nest destruction is also a problem. The eggs and chicks are so well camouflaged that a person might not even see them while walking, much less while driving an off-road vehicle on the beach. Also, human activity along the coast alters the distribution and behavior of predators by attracting rats, raccoons, feral cats and skunks, and also introduces new predators by allowing domestic cats and dogs onto the beach. Finally, alterations in water management may cause nesting sites to flood or reduce the number of exposed sandbars .

The Second Decline

This onset of human disturbance after WWII led to a second decline of the species population. On January 10, 1986, the species was listed as Endangered through the Endangered Species Act. At this point, there were just 790 known piping plover pairs breeding between Newfoundland and North Carolina. Even with the new listing status, the Massachusetts population declined from 139 pairs in 1986 to 126 pairs in 1987. In order to help boost hatching success, a program was instituted to fence off any piping plover nests located along the beach. This was very successful in increasing breeding for a while, by protecting eggs from both predation and from being trampled, but it proved to be a short-term solution. After about three to five years, predators learned that the presence of a fence was an easy indicator of a usually well-camouflaged piping plover nest, and chick mortality due to predation began to increase dramatically.

In 1989, it became undeniably clear that coastal beaches were being overrun by off-road vehicles, which were permitted to drive along most of the shore. Off-road vehicles turned out to

be a great threat to piping plovers, since their habitat was suddenly converted to a highway and parking lot, and their nests were disturbed and crushed in the process. The constant use of the beach by vehicles also altered the structure of the dunes, largely reducing them and the accompanying vegetation. Once the impact on the piping plover breeding population was realized, state officials immediately issued temporary closure of the beach to off-road vehicles. Environmental changes were soon apparent as the system returned to a more natural state.

The Massachusetts Wetland Protection Act was modified to accommodate plovers and terns, and closed many beaches to cars. Also, it became illegal for vehicles to come within 100 yards of piping plover chicks on beaches that were still open to driving. This led to an increase the number of breeding pairs on Massachusetts beaches from 126 in 1987 to 538 in 2002. Recent year-round restrictions, although loosened in the non-breeding season, are beneficial to the habitat because it provides some constant protection for dune grasses and rhizomes that define the piping plover habitat.

Threats in the Wintering Habitat

Piping plovers are not subject to human threats in their breeding habitat alone. In wintering areas such as the Gulf Coast of Florida and Texas, booming population growth is driving coastal development up. A desire to cater to tourists' expectations of a "clean beach," debris and grasses are raked off the beach, taking piping plovers nests and food sources. Also, many of the beaches are still designated as highways. South Padre Island, for example, can be host to more than 10,000 cars during university spring break. In some areas, it is even possible to buy a dead piping plover charm bracelet. There is clearly a lot that needs to be done to protect the wintering habitat of piping plovers, but there is good news. In the winter bird counts that take

place every 5 years, 3818 piping plovers were counted at 285 wintering sites, showing that the conservation efforts in the breeding grounds are positively affecting the population size.

An Umbrella Species

The entire barrier beach system, and other species living in that habitat, can accrue many benefits because of the piping plover's widespread range. The large range and charisma of the piping plover makes it an ideal umbrella species. Lesser nighthawks, American avocets, and many other rare, threatened, and endangered species can benefit from habitat protection focused on the piping plover because they have similar habitat requirements. The large range in both the breeding and wintering habitats of the piping plover means that if this one species is protected, many other species and thousands of miles of coastline will benefit from that protection as well.

Continued Recovery Plans

The FWS has set specific goals for population sizes of piping plovers before the species may be removed from the list of threatened species – at least 2000 breeding pairs distributed among Atlantic Canada (400 pairs), New England (625 pairs), New York – New Jersey (575 pairs), and DE to NC (400 pairs), provided that this number proves to support genetic diversity sufficiently. Another criterion is a five-year average reproductive rate of 1.5 fledged chicks per pair per year. They also require that long-term agreements are enacted to ensure maintenance of target populations and a set average breeding rate. Through scientific research, monitoring of wintering and breeding areas, and public education, they hope to achieve this goal by 2010. The FWS has recently been using GPS technology extensively to mark nest sites.

In 2003, BirdLife estimated that the total population of piping plovers was 6410, and 3350 of these birds were from the Atlantic coast population. Since 3818 piping plovers were counted in the most recent wintering survey in 2006, the population seems to still be increasing,

and the goal of 2000 breeding pairs along the Atlantic coast seems attainable. Hopefully, with continued conservation initiatives, and new initiatives in the wintering grounds, the piping plover will stay on the track to recovery and barrier beach ecosystems in the US will benefit as a whole.

Useful Links

Audubon: Piping Plover

<http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=160>

Audubon: IBA Program

<http://www.audubon.org/bird/iba/>

Audubon : Coastal Bird Conservation Program (Donations)

<https://loon.audubon.org/payment/donate/SCICBCP.html>

BirdLife International: Piping Plover

[http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp
&sid=3127&m=0](http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=3127&m=0)

FWS: Piping Plover.

<http://www.fws.gov/northeast/pipingplover/>

FWS: Recovery Plan

<http://www.fws.gov/northeast/pipingplover/recplan/index.html>