

THE PIPING PLOVER IN MASSACHUSETTS: STATUS OF RECOVERY AND RESEARCH EFFORTS

by David W. Rimmer

Efforts to protect and study the Piping Plover (*Charadrius melodus*), a small, ground-nesting shorebird endemic to North America, greatly intensified after January 1986, when the U. S. Fish and Wildlife Service joined Canada in listing the species as threatened or endangered throughout its range. Habitat loss, human disturbance, and predation have all contributed to the decline of the plover population in North America (Dyer et al. 1988). The current population, based on the results of the 1991 international census, is estimated at 2337 breeding pairs (Hecht 1991), representing a six percent increase since 1986. Along the Atlantic coast, results from the 1991 surveys indicated 987 pairs (742 in the U.S; 245 in Canada) breeding from the maritime regions of Canada to South Carolina (Hecht 1991), an approximate increase of 200 pairs since 1987. In Massachusetts the plover population remained stable (126 to 140 pairs) between 1986 and 1990, but increased to 160 pairs in 1991 (Melvin 1991). It is unclear whether any of these regional or local population increases are real or simply reflections of more comprehensive survey efforts.

Recovery Efforts

Since 1986 Massachusetts has become one of the leaders in the Atlantic coast Piping Plover recovery effort, utilizing protection techniques such as land conservation, legislation, land and species management, and education (Deblinger and Rimmer 1990). In addition, research designed to provide information on the reproductive ecology, limiting factors, habitat selection, effects of human disturbance, food habits, and innovative predator protection techniques has been conducted. This statewide recovery and research effort has been spearheaded by the Massachusetts Division of Fisheries and Wildlife, specifically, endangered species zoologist Dr. Scott Melvin and state ornithologist Brad Blodget. Untold numbers of dedicated individuals from the public and private sectors have assisted with countless hours of field work.

The public and private agencies responsible for Piping Plover protection in Massachusetts have worked closely with one another to develop comprehensive protection strategies. These groups included the U. S. Fish and Wildlife Service, the National Park Service, the Massachusetts Division of Fisheries and Wildlife, the Massachusetts Department of Environmental Management, numerous county and town agencies, and private, nonprofit organizations, such as The Trustees of Reservations, the Massachusetts Audubon Society, the Nature Conservancy, the Lloyd Center for the Environment, and the Sheriff's Meadow Foundation. Each breeding site has unique requirements. Some sites experience much human disturbance, while other sites experience high predation levels that

Table 1
Distribution of Piping Plovers at Selected Sites in Massachusetts
1986-1991
(Numbers Represent Piping Plover Pairs)

	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
NORTH SHORE						
Parker River NWR, Newbury	3	2	1	3	10	5
Crane Beach, Ipswich	5	6	9	14	10	12
Other Sites	1	2	1	1	2	2
SOUTH SHORE						
Duxbury Beach, Duxbury	6	5	5	3	1	2
Plymouth Beach, Plymouth	4	3	2	2	2	1
Other Sites	4	2	2	2	4	5
BUZZARDS BAY						
Little Beach, Dartmouth	7	7	15	7	6	6
Barney's Joy, Dartmouth	2	1	2	2	-	6
Horseneck Beach, Westport	7	5	3	7	11	7
Other Sites	6	7	9	8	8	6
UPPER CAPE						
Scorton Creek, Sandwich	7	6	6	4	4	5
Sandy Neck, Barnstable	6	7	3	5	5	5
Other Sites	15	16	16	13	14	11
LOWER CAPE						
Nauset Heights, Orleans	2	4	5	4	4	7
Coast Guard Beach, Eastham	13	8	6	3	5	7
Marconi Beach, Wellfleet	2	2	2	2	2	6
Other Sites	25	23	18	25	20	30
ELIZABETH ISLANDS						
Cuttyhunk Island, Gosnold	4	6	6	5	4	7
Other Sites	5	2	2	4	6	5
MARTHA'S VINEYARD						
All Sites	4	4	7	9	9	11
NANTUCKET						
Great Point/Galls, Nantucket	4	2	7	8	7	8
Other Sites	7	6	7	6	6	6
TOTAL	<u>139</u>	<u>126</u>	<u>134</u>	<u>137</u>	<u>140</u>	<u>160</u>

Sources: Melvin, 1991, 1990, 1988, 1986; Blodget, 1989.

may limit nesting success. Therefore, protection efforts have included partial or total closures of breeding sites, limits on certain human activities, such as over-sand vehicle operation and boat landings, and predator control via fencing and removal.

Population Status

Between 1986 and 1990, the Piping Plover population in Massachusetts fluctuated from 126 to 140 pairs (Table 1), and annual mean productivity levels from 1987 to 1990 ranged between 1.07 and 1.59 fledglings per breeding pair (Melvin 1990, 1988, 1987, 1986; Blodget 1989). Prior to 1991 both of these critical indices (annual breeding pairs and productivity) failed to display a consistent upward trend despite increased statewide protection. The 1991 breeding season, however, appeared to indicate that the intensive statewide protection effort was producing positive results. Breeding plovers rose to 160 pairs (a fourteen percent increase over 1990), and productivity exceeded all other years at 1.72 chicks fledged per breeding pair (Melvin 1991). An increase from thirty-one to fifty pairs on Lower Cape sites (Table 1) was primarily responsible for the statewide increase. Census results from the next several years will indicate if the 1991 figure was the first step forward in the recovery process for the Piping Plover in Massachusetts or just another fluctuation. Regardless, the current population status is encouraging.

Distribution

In 1991 Piping Plovers were distributed widely along the Massachusetts coastline except between Ipswich and Scituate, where no pairs were reported (Melvin 1991). One hundred and sixty breeding pairs of plovers were observed at fifty-five sites, and the mean number of pairs per site was 2.9 (Melvin 1991). Sites with the highest numbers of pairs were Crane Beach (12), Little Beach and Barney's Joy (each with 6), Nauset Spit (8), Coast Guard Beach (7), Cuttyhunk Island (7), Horseneck Beach (7), Parker River National Wildlife Refuge (6), Great Point, Nantucket (6), and Marconi Beach, Wellfleet (6). These ten sites accounted for forty-four percent of the state's population (Melvin 1991). Regionally, plovers were most abundant on Cape Cod, where seventy-one pairs (forty-four percent of state total) nested in 1991.

Table 1 provides a breakdown of plover distribution by region, and shows that nineteen pairs of plovers (twelve percent of the state total) nested at North Shore sites. The productivity level was 2.21 chicks fledged per pair. Crane Beach continued its successful management program, reporting nine or more pairs and high productivity (1.8 to 3.0 chicks fledged per pair annually) for the fourth consecutive year. On the South Shore, eight pairs of plovers (five percent of the state total) nested with a productivity level of 1.00 chicks fledged per pair. Human disturbance apparently continues to limit plover success in this region,

especially at Plymouth and Duxbury beaches.

Upper Cape sites supported twenty-one pairs of plovers (thirteen percent of the state total), with Sandy Neck Beach and Scorton Creek the critical nesting locations. This region had a productivity level of 1.95 chicks fledged per pair. The Lower Cape reported fifty pairs (thirty-one percent of the state total) and productivity levels of 2.35 chicks fledged per pair. Efforts to manage plovers on Cape Cod National Seashore lands have been increasingly successful and appear to be contributing to the growing number of plovers in that region.

Sites along the shores of Buzzards Bay had twenty-five pairs (sixteen percent of the state total) and 1.16 chicks fledged per pair. Little Beach and Barney's Joy continue to be the most significant sites in the region. The two sites consistently attract six or more pairs annually. Sites on the Elizabeth Islands and Martha's Vineyard combined to support twenty-three pairs (fourteen percent of the state total), while Nantucket reported fourteen pairs (nine percent of the state total). These two areas had productivity levels of 1.35 and 0.91 chicks fledged per pair, respectively.

Research Results

The research conducted in Massachusetts has provided valuable new information on Piping Plover ecology and management, with much of the data coming from Cape Cod. MacIvor (1990) reported that plovers typically arrive in the state in mid-March, lay eggs in late April and May, incubate the eggs for approximately twenty-seven days, hatch chicks in late May and June, and fledge chicks between June 30 and August 29. MacIvor (1990) also reported hatching success was only twenty-five percent and was limited primarily by predation. Research conducted at Crane Beach and on Cape Cod on the efficacy of predator exclosures to reduce predation on plover nests (Rimmer and Deblinger 1990; MacIvor 1990; Strauss 1990) has shown that predation rates can be decreased using this technique, resulting in hatching success greater than ninety percent. Strauss (1990) also reported from Cape Cod that plovers breeding in high disturbance areas had reproductive rates lower than plovers breeding in low disturbance areas. He suggested that plover chicks in high disturbance areas spend less time feeding and more time avoiding disturbance, thereby reducing their survival rate. Food habit studies have been conducted, and the results are being analyzed.

MacIvor (1990) and Strauss (1990) also investigated habitat parameters on Cape Cod. MacIvor (1990) reported that plovers use a wide variety of habitats, including the beach berm, foredune, interdune, overwash, and blowout areas. These habitats may be unvegetated or densely vegetated, primarily with American beachgrass. Although it is difficult to predict where plovers will nest, MacIvor (1990) suggested that nesting on the beach berm was observed most frequently in her study. Strauss (1990) found that plovers at his study site

(Sandy Neck Beach and Scorton Creek, Barnstable) preferred nesting habitats associated with dune blowouts and newly forming sandspits. These results underscore the fact that Piping Plovers appear able to nest in an array of beach habitats and will often respond to local changes in beach morphology, such as those created by the August 1991 Hurricane Bob and the 1991 Halloween northeaster.

Summary

Human destruction and disturbance of Piping Plover habitat combined with predation have contributed widely to the decline of this species, resulting in an endangered or threatened status throughout its North American range (Dyer et al. 1988). In Massachusetts, as well as other states and provinces, Piping Plovers are unlikely to recover to sufficient levels without the aid of intense management and protection programs. In 1991 the plover population in Massachusetts increased substantially, the probable result of comprehensive statewide protection programs implemented since 1986. However, the state continues to have sites that pose difficult management dilemmas. If this upward trend of the Piping Plover population in the Commonwealth is to continue, public and private agencies involved in Piping Plover protection, management, and research must remain committed. Ongoing communication must continue between plover biologists and coastal land owners and managers, particularly on important issues that may affect Piping Plovers, such as over-sand vehicle use, beach restoration efforts, and pedestrian and boater access to critical nesting areas. Balancing the need for coastal recreation with an expanding plover population may be the greatest challenge facing beach owners and managers in the future.

For more information on Piping Plovers in Massachusetts, contact Dr. Scott Melvin, endangered species zoologist, Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, at 508-792-7270.

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