Charadrius melodus Ord — piping plover

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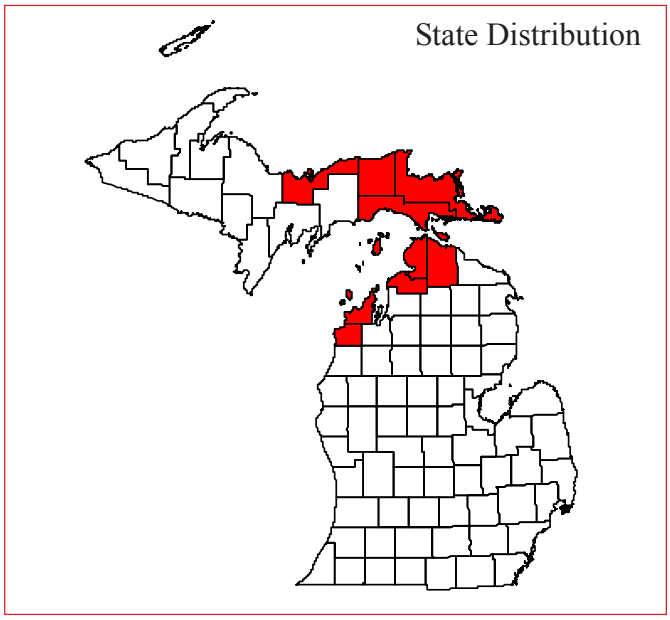

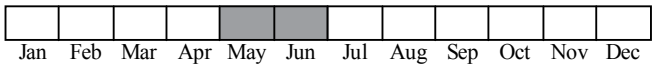

Status: Federal and State endangered

Global and state rank: G3/S1

Family: Charadriidae (plovers)

Total range: There are three geographic regions where piping plovers breed in North America including the beaches of the Atlantic coast from North Carolina to southern Canada, the shorelines of the Great Lakes, and along rivers and wetlands of the northern Great Plains from Nebraska to the southern Prairie Provinces. The winter ranges of the three breeding populations of piping plover overlap and extend from southern North Carolina to Florida on the Atlantic Coast and from the Florida Gulf Coast west to Texas and into Mexico, the West Indies and the Bahamas (Haig 1992).

State distribution: Historically plovers nested in 20 counties in Michigan along Lake Superior, Lake Michigan, Lake Huron, and Lake Erie (Weise 1991). Since the piping plover was listed as endangered in 1986, nests have been recorded at 30 breeding sites in nine counties in Michigan including Alger, Benzie, Charlevoix, Cheboygen, Chippewa, Emmet, Leelanau, Luce, and Mackinac counties (Wemmer 1999).

Recognition: The piping plover is a small compact robin-sized shorebird approximately 7¼" (18 cm) in length with a wing span measuring about 15" (38 cm) and a weight ranging from 1.5-2.2 oz (43-63 grams). It has a **very short and stout bill,** and **very pale upper-parts (the color of dry sand)**. The plover's sand colored plumage provides an effective camouflage in its preferred beach habitat. During the breeding season the **single narrow black band across the upper chest** (sometimes incomplete), **smaller black band across the forehead, orange-yellow legs and orange bill with a black tip** are distinctive. Its **white rump** is conspicuous in flight. Piping plovers can also be recognized by their distinctive **two-noted, "peep-lo", melodious whistle** (Bent 1929). The killdeer (*Charadrius vociferus*) is larger (approximately 10½") and darker overall, has two black breastbands and a bright reddish-orange rump, and has a distinctive loud "kill-dee" call (National Geographic Society 1983).

Best survey time: Although piping plovers can be seen in Michigan from late April through August, the optimal time to survey for piping plovers is during May and June.

Habitat: In Michigan, piping plovers prefer fairly wide, sandy, open beaches along the Great Lakes with sparse vegetation and scattered cobble for nesting (Lambert and Ratcliffe 1981, Powell and Cuthbert 1992). Nesting may occur on the open beach near the edge of the foredune or in the cobble pan behind the primary dune. Territories often include rivers, lagoons, channels, or interdunal wetlands that provide additional food sources for chicks. Nests consist of a shallow scrape in the sand that are sometimes lined or surrounded with fragments of shells, driftwood or small pebbles (Haig 1992). During the breeding season, the plover's home range is generally confined to the vicinity of the nest. Various Michigan studies describing nest site characteristics report mean beach widths

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>30 m (98.4'), mean distance from nest to treeline from 35 to >600m (115-1968'), and vegetative cover around the nest from 0-50% (Lambert and Ratcliffe 1981, Powell and Cuthbert 1992). On the wintering grounds plovers forage and roost along barrier and mainland beaches, mudflats, sandflats, algal flats, washover passes, salt marshes and coastal lagoons (Haig 1992, Wemmer 1999).

Biology: Plovers begin departing the wintering grounds in late February with the peak migration occurring in March. The breeding season in Michigan begins when the adults reach their nesting grounds in late April or early May. After females arrive, males initiate courtship behaviors that include aerial displays and calls, digging of several nest scrapes, tilt displays and a ritualized stone tossing display (Haig 1992). Nests are initiated by mid to late May and are usually spaced 200 feet or more apart (Wilcox 1959). Clutches consist of three to four eggs that both parents incubate for approximately 28 days (Haig 1992).

Chicks are precocial and within hours of hatching are able to walk a short distance from the nest before running back to their parents to be brooded. Chicks forage near the brooding parent and immediately use the "peck and run" foraging behavior of adults (Haig 1992). Field observations reveal that piping plovers feed primarily on exposed beach substrates by pecking for invertebrates at, or just below, the surface (Wemmer 1999). Analyses of gizzards from dead plovers have identified insects (particularly fly larvae and beetles), crustaceans, and mollusks as key components of their diet (Bent 1929, Haig 1992). Adults and chicks rely on their cryptic coloration to avoid predators. When approached, chicks will crouch on the ground and hold this posture until they are almost touched, at which point they run away very rapidly. Adults use distraction displays to lure predators away from their territories. Chicks breed the first spring after hatching (Haig 1992).

Longevity records indicate that only 13% of females and 28% of males live to be five years of age or older, while eleven years of age it thought to be the maximum age attained (Wilcox 1959). Recent data from piping plovers banded in Michigan suggest adult survival is about 70% and fledgling survival is approximately 30%, similar to that reported for populations in other regions (Wemmer and Cuthbert 1998). Adults return to beaches where they previously nested approximately 65% of the time, thought to be a reflection of previous nesting success. Yet most young birds return to nest at sites far from their natal areas (Wemmer 1999). Only moderate mate retention has been observed in piping plovers (less than 50%), when compared to other shorebirds with similar mating systems (Wiens and Cuthbert 1988).

Plovers depart their breeding areas in the Great Lakes from mid July to early September (Wemmer 1999). It is thought that since few plovers are sighted at inland migration stopover sites, that inland birds may fly non-stop to and from Gulf Coast sites (Haig and Plissner 1993). However, spring and fall observations of transient plovers in Michigan suggest historical breeding sites may function as foraging sites for migrating plovers. Piping plovers banded in Michigan have been sighted in both Atlantic and Gulf Coast states, which may indicate a strong eastward component to migration and dispersal through the winter range (Wemmer 1999). While substantial progress has been made on understanding winter distribution, Haig and Plissner (1993) only accounted for 63% of the 1991 breeding population on the wintering grounds, suggesting that some wintering habitat remains unidentified.

Conservation/management: The Great Lakes population of the piping plover was listed as endangered under provisions of the U. S. Endangered Species Act on January 10, 1986. The population declined from a historical population of several hundred breeding pairs to 17 breeding pairs in 1986. The initial decline of piping plovers was primarily due to hunting in the late 19th century and early 20th century until the Migratory Bird Treaty Act of 1918 stopped this activity. Although populations began to recover, they started to decline again in the 1950s due to increasing habitat loss, recreational pressure, predation and contaminants. In the late 1970s to mid 1980s, high Great Lakes water levels temporarily reduced available nesting areas by flooding beaches (Weise 1991). Since listing in 1986, the population has fluctuated between 12 and 25 breeding pairs with breeding areas largely confined to Michigan. The current small size of the Great Lakes piping plover population renders it extremely vulnerable to chance demographic or environmental events which could potentially eradicate this species from the region (Wemmer 1999). Michigan has a State piping plover recovery plan and recovery team, whose members meet annually to direct monitoring and management activities. In addition, coordination meetings take place regularly to organize seasonal field-based conservation efforts. Annual breeding site surveys are conducted in Michigan, and all located nests are monitored throughout the breeding season. Historical breeding areas are surveyed at least once every five years during the International Piping Plover Census.

Habitat destruction, habitat alteration and human development of shorelines has resulted in the extirpation of piping plovers from most formerly occupied Great Lakes states. Marina construction, inlet dredging, and artificial structures such as breakwalls, can eliminate breeding areas and disrupt natural processes that maintain shoreline habitats. Local planning and zoning boards can address this problem by incorporating shoreline protection and piping plover

habitat needs into land use plans and permitting processes. It is very important to protect current and historical nesting habitat, as well as potential breeding sites to allow population growth and to support the population in the future (Wemmer 1999).

In Michigan, predation has been identified as the cause of nest failure for approximately 9% of clutches, and is suspected in the majority of disappearances of unfledged chicks. Michigan studies have identified actual and potential predators to include the ring-billed gull, herring gull, American crow, merlin, peregrine falcon, great horned owl, snowy owl, common raven, red fox, coyote, raccoon, thirteen-lined ground squirrel, striped skunk, domestic cat and dog. Predator exclosures have been used consistently around plover nests since 1988 to protect plover eggs from predation and have increased hatching success significantly. Captive rearing of orphaned piping plover chicks and abandoned eggs has been implemented since 1992 and resulted in the successful release of fledglings that otherwise would not have survived. Loss of chicks continues to be a major source of mortality that is very difficult to predict and control. (Wemmer 1999).

Although plovers do sometimes nest on Michigan beaches where residential development has occurred, reproductive success is generally lower due to disturbance by humans and pets (Wemmer 1999). Increased use of the shoreline by recreationists often causes parent birds to be frightened away from nests during critical periods of incubation, and the camouflaged eggs or young are easily trampled. A program was initiated in 1994 to organize volunteers to patrol and protect plover nesting areas over holiday weekends since Memorial Day and the Fourth of July coincide with peak egg laying and hatching of piping plovers (Weise 1991). The use of motorized vehicles on the beach, beach walking, bike riding, kite flying, fireworks, bonfires, horseback riding, and camping have been observed to disturb piping plovers and disrupt normal behavior patterns (Wemmer 1999). Pedestrians accompanied by their pets result in an even greater disturbance to breeding plovers as dogs frequently chase adults and chicks (Lambert and Ratcliff 1979). Landowners can assist plovers by keeping their dogs leashed in areas where plovers are nesting. Psychological fencing, which consists of bailing twine and "Unlawful to Enter" and/or "Closed Area" signs, and the use of predator exclosures have been successful in limiting human activity in the vicinity of plover nests and have increased hatching success from 37% to 70%.

Research needs: The amount and quality of existing habitat should be carefully quantified to assess the number of plover pairs that the region is capable of supporting and to determine whether additional land should be acquired, protected and/or restored to promote recovery of the population. The level and effect of disturbance on chicks at nesting sites should be closely monitored to better understand the causes of chick mortality (Stucker et al. 1998). Important resting and foraging habitat for migrating plovers should be identified. A better understanding of wintering ecology and distribution is warranted so that wintering sites can be protected. An analysis should be conducted to elucidate the level, source, and effects of contaminants in piping plovers and evaluate the sub-lethal impact on reproductive success (Wemmer 1999).

Related abstracts: Caspian tern, common tern, dune cutworm, Houghton's goldenrod, Lake Huron locust, Lake Huron tansy, open dunes

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Funding for abstract provided by Michigan Department of Environmental Quality - Land and Water Management Division, Coastal Zone Management Program and Michigan Department of Natural Resources - Parks and Recreation Division and Wildlife Division, Non-Game Program.