Piping Plover

Charadrius melodus [A]

Federal Listing	T
State Listing	E
Global Rank	G3
State Rank	S1
Regional Status	Very High

Justification (Reason for Concern in NH)

Before the Migratory Bird Treaty Act of 1918, unregulated hunting caused the decline of the Atlantic coast Piping Plover population (USFWS 1996). Since the 1940s, the population has steadily declined due to increased development along coastal habitats. This development boom has increased habitat loss and degradation, human disturbance, and predation, all of which have contributed to population declines from Nova Scotia to North Carolina (USFWS 1985, Haig 1992). Though the Piping Plover was absent for several years along the New Hampshire coast, it was discovered nesting again in 1996. The Atlantic coast Piping Plover population is the aggregate of many small groups with many breeding sites, with most sites having fewer than 10 breeding pairs (A. Hecht, USFWS, personal communication). Therefore, even protecting breeding locations with only a few pairs is crucial to maintaining the integrity of the overall population.

Distribution

The Atlantic coast Piping Plover population breeds from Nova Scotia south to North Carolina. They are monogamous and territorial during the breeding season with pairs staying together to help raise their young.

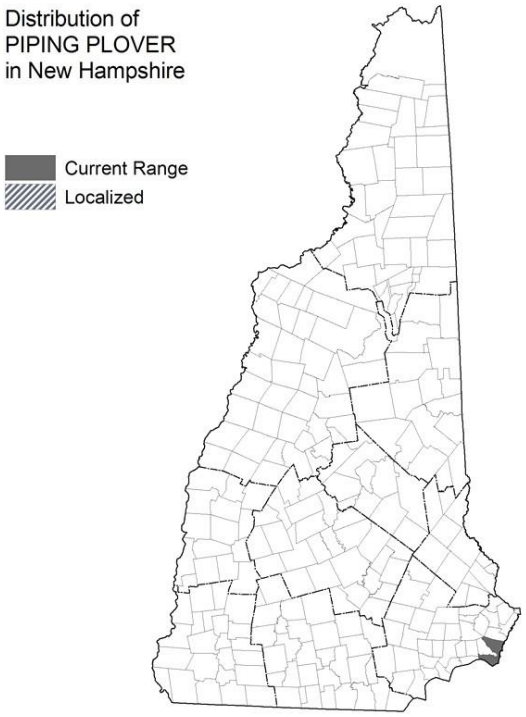
New Hampshire Fish and Game (NHFG) began a Piping Plover protection effort in 1997 after the nesting was observed the previous summer. Since then, Piping Plovers have consistently nested on the beaches and dunes along the Atlantic coast in the towns of Hampton and Seabrook. One to 3 pairs have consistently nested north of Hampton Harbor Inlet at Hampton Beach State Park with 1 to 5 pairs annually nesting south of Hampton Harbor Inlet on Seabrook Beach (NHFG data).

Habitat

Piping Plovers nest on sandy beaches in areas of sparse vegetation such as the edges of gently sloping foredunes or open sand flats that remain above the high tide line (USFWS 1996). Winter storms often shift sands and create blowouts or overwash which in turn provide attractive nesting habitat the following spring. The location of nesting areas may shift annually as habitat is lost from increased vegetation or created through sand deposits. In New Hampshire most nesting occurs along the fordunes where vegetation is sparse.

NH Wildlife Action Plan Habitats

- Dunes



Distribution Map

Current Species and Habitat Condition in New Hampshire

Piping Plovers that breed along the New Hampshire coast are part of the greater Atlantic Coast population. The Atlantic Coast population will be considered recovered when 2,000 breeding pairs are maintained for 5 years and are distributed throughout 4 recovery units, as delineated by the USFWS Piping Plover Atlantic Coast Population Revised Recovery Plan (1996). As of 2012, the Atlantic coast population was estimated to be 1,898 pairs (USFWS 2013).

New Hampshire falls within the New England recovery unit that must achieve and maintain 625 breeding pairs to meet the recovery goal (USFWS 1996). This goal was first attained in 1998 when 627 breeding pairs were recorded. This goal has been exceeded every year since 2006 and preliminary estimates for 2012 breeding season indicate 879 pairs for the New England recovery unit (USFWS 2013).

According to population monitoring by S.M. Melvin and J.P. Gibbs (1994), a minimum of 1.24 chicks fledged per pair is necessary to maintain a stationary population. However, the USFWS Piping Plover Atlantic Coast Population Revised Recovery Plan states that a higher productivity rate of 1.50 chicks fledged per pair is necessary to prevent extinction and maintain a population of 2000 breeding pairs (USFWS 1996).

Since 1997, when protection efforts began in New Hampshire, between 3 and 8 pairs have nested annually along the coast and have fledged a total of 127 chicks. Productivity for Piping Plovers in New Hampshire has varied between 0.0 and 2.7 chicks fledged per pair each year with the average productivity of 1.23 between 1997 and 2015 (NHFG Data).

Population Management Status

Piping Plovers are monitored each year throughout the breeding season. Nesting areas are protected with symbolic fencing to minimize human disturbance and nests are protected from predation with fenced exclosures. Chicks are monitored daily from hatching to fledging (25-35 days), and recreational activities are managed in breeding areas to prevent disturbance. Beach management activities such as beach raking and boardwalk maintenance are coordinated with local, town, state and federal officials.

Regulatory Protection (for explanations, see Appendix I)

- Federal Endangered Species Act
- Endangered Species Conservation Act (RSA 212-A)
- Comprehensive Shoreland Protection Act - NHDES
- Migratory Bird Treaty Act (1918)

Quality of Habitat

In New Hampshire there are only three known habitat patches that provide suitable nesting grounds for Piping Plovers. Each patch is subject to intensive recreational use during the breeding season and the high human densities have contributed to high predator densities.

Habitat Protection Status

All known Piping Plover breeding areas are protected under Federal Threatened and Endangered Species Laws. Coastal sand dune systems are protected under the Federal Coastal Zone Management Act (1972) and NH RSA 482-A pertaining to Fill and Dredge in Wetlands. Refer to the Dune habitat profile for more information.

Habitat Management Status

In areas where Piping Plovers are known to occur, habitat management protects nesting areas during the breeding season. Management activities include fencing suitable habitat areas during the breeding season, restricting motorized vehicle use and coordinating beach management activities, such as beach raking and boardwalk maintenance. Habitat management is conducted by NHFG according to USFWS Atlantic Coast Piping Plover Population Revised Recovery Plan guidelines and in cooperation with town and state officials.
Coastal sand dune systems are managed by local towns and New Hampshire State Parks, and are managed primarily for recreation.

Threats to this Species or Habitat in NH

Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a "medium" or "high" score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.

Mortality and disturbance from human recreational activities near nesting areas (Threat Rank: High)

Dune habitats in New Hampshire exist in areas that receive intense human use. Recreational activities that have been observed near plover breeding areas include sunbathing, swimming, jogging, dog walking, kite flying, volleyball, surfing and fishing. Human presence near plover nests may cause adults to flush off the nest exposing the eggs to adverse environmental conditions. Repeated flushing may result in nest failure or abandonment. Chicks are unable to fly for the first 25 days of life and are vulnerable to be stepped on.

Hampton Beach State Park receives over 100,000 visitors annually (J. Lyons, New Hampshire Department of Resource and Economic Development, personal communication). Although Seabrook beach receives fewer visitors, nesting plovers are often disturbed when people use private pathways across the dunes to access the beach. Human disturbance has been the suspected cause of abandonment for multiple nests in Seabrook and predator exclosures in Hampton have been occasionally tampered with by humans causing direct egg mortality . Children and adults have been observed chasing and capturing chicks and NHFG has documented one case in which a chick was stepped on and killed.

Mortality and disturbance from motorized vehicles on the beach (OHRVs and beach rakes) (Threat Rank: High)

Nests that are established outside of fenced-off areas are difficult to detect and vulnerable to being crushed by vehicles. Soon after hatching, chicks are very mobile, moving between intertidal zones and dunes and along the length of beaches. This errant nature, combined with the chicks' inability to fly, leaves them particularly vulnerable to motorized vehicles. Vehicles may also degrade Piping Plover habitat or disrupt normal behavior patterns. They may harm or harass plovers by crushing wrack into the sand and making it unavailable as cover or a foraging substrate (Hoopes et al. 1992, Goldin 1993) or may create ruts that can trap or impede movements of chicks (USFWS 1996).

Piping Plover mortality due to motorized vehicles has been well documented throughout its breeding range. In New Hampshire, motorized vehicles have been the documented cause of mortality for 5 chicks since 1997.

Mortality from subsidized or introduced predators (Threat Rank: High)

Predation is a major and well-documented threat to Piping Plover reproductive success along the Atlantic coast (Burger 1987, MacIvor 1990, Patterson et al. 1991, Cross 1991, Elias-Gerken 1994). The high human density surrounding the plover breeding areas in NH provides an attractive habitat for several potential predators. Foxes, Striped Skunks, crows, gulls, Common Grackles, domestic dogs and domestic and feral cats have all been documented near plover breeding areas. Predators may cause adults to flush from nests and may prey on unprotected eggs, chicks or adults.

In NH, feral cats have been documented in Piping Plover breeding areas at both Hampton and Seabrook, and cats are the suspected cause of mortality for several chicks and multiple adults since 2005 (NHFG Data). Dogs have been observed running freely through areas restricted for piping plovers, particularly in Seabrook, often flushing adults from nests (NHFG data). In recent years a skunk predated two nests before they could be protected by predator exclosures in Hampton, and a fox is suspected to have predated several chicks in Seabrook (NHFG Data).

Mortality from oil spills (Threat Rank: High)

Oil can enter marine waters as a result from platform construction, drilling, shipping and spillage, and low-level seepage from surface runoff or subsurface sources (Boesch et al 2001). The effect of oil spills may be localized or very extensive depending on the source and timing of the contamination and the affected species or habitat. Wildlife species that become coated in oil or that ingest food contaminated by oil may be killed or have reduced reproductive success.

To date Piping Plovers in New Hampshire have not been affected by oil spills.

Habitat conversion due to shoreline stabilization (Threat Rank: Medium)

Artificial dunes may not function in the same manner as natural dunes. They are often built as continuous ridges and may be too steep to serve as plover nesting sites. Beach renourishment may create habitat in the short term but it may promote dune growth and increased vegetation reducing the long term suitability of nesting habitat.

Deposits from harbor dredging are placed on Hampton and Seabrook every 5-7 years. Although the specifications on the location and slope of the material are set forth by the USFWS to minimize impacts to plovers there is the potential for a reduction in habitat over the long term.

Habitat conversion due to dune modification (Threat Rank: Medium)

Although dune habitats are protected from development, restoration efforts that focus on re-vegetating areas with little or no vegetation may reduce the habitat quality. Piping Plovers typically nest amongst sparse vegetation along gently sloping foredunes, blowouts or areas of sand overwash (USFWS 1996). Efforts to restore these areas by planting vegetation may degrade or eliminate nesting habitat.

Egg and chick mortality from increased storm intensity and frequency (Threat Rank: Medium)

Climate models predict an increase in the frequency and intensity of coastal storms. Inclement weather can disrupt bird migrations and make breeding and nesting sites inhospitable, forcing birds into marginal habitats (NHFG 2005). Piping Plovers that nest along the foredune are vulnerable to tidal overwash from abnormally high tides.

Most nesting habitat in NH is in close proximity to high tide lines. Several nests have been lost to tidal overwash since plover monitoring efforts were initiated (NHFG Data). Additionally, high tides from stormy weather have been the suspected cause of chick mortality at several sites in the Northeast.

Species disturbance from the potential development of wind turbines near nesting areas (Threat Rank: Medium)

The noise associated with the construction of wind turbines near Piping Plover nesting areas may cause flushing and reduce nest success.

To date no turbines have been constructed or proposed along the New Hampshire coast.

Species impacts from beach raking that removes wrack (foraging substrate) (Threat Rank: Medium)

There is a high public demand to remove wrack (seaweed) from town and state beaches for aesthetic

purposes. However, the wrack build-up provides an important foraging source for Piping Plover chicks. The removal of wrack reduces the food availability and may force adults and chicks to move further and more frequently to find suitable foraging sites.

Beach raking occurs annually on Hampton Beach State Park and Seabrook beach. The NHFG Piping Plover monitor coordinates raking activities with the town and state raking crews to ensure wrack is left to build up near plover nests prior to hatching. Sections of beach on either side of nests are left unraked in the two weeks prior to expected hatching to allow wrack build-up.

Habitat degradation from naturally increasing dune vegetation that reduces available nesting habitat (Threat Rank: Medium)

Piping Plovers typically nest amongst sparse vegetation along gently sloping foredunes, blowouts or areas of sand overwash (USFWS 1996). Increases in vegetation may reduce the habitat suitability in traditional breeding areas and force plovers to select marginal habitats for nesting.

The dunes at Hampton Beach State Park and Seabrook beach have grown substantially in height and width since the initiation of Piping Plover protection efforts in 1997 (Brendan Clifford, personal observation). Many traditional nesting areas that supported plovers in the past have become overgrown with beach grass and are now unsuitable for nesting. The succession of the dunes in Seabrook has forced plovers to nest closer to the high tide line and closer to human activities (e.g., walkers).

Mortality from nuclear contamination (Threat Rank: Medium)

The Seabrook nuclear power plant is located less than two miles from Piping Plover breeding areas. Contaminants may cause mortality or reduced reproductive success of Piping Plovers.

To date Piping Plovers in New Hampshire have not been affected by nuclear contaminants.

List of Lower Ranking Threats:

Habitat degradation from introduced or invasive plants that invade nesting habitats

Disturbance from construction activities (including on existing structures)

Habitat conversion due to development

Actions to benefit this Species or Habitat in NH

Annually monitor and manage Piping Plover habitat during the breeding season

Primary Threat Addressed: Mortality and disturbance from human recreational activities near nesting areas

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Monitor and manage known and potential breeding areas to limit disturbance from recreational use of beaches

General Strategy:
Manage Piping Plover breeding areas in accordance with the Piping Plover Atlantic Coast Population Recovery Plan (USFWS 1996). Install symbolic fencing to protect all potential nesting areas and hire a seasonal Piping Plover monitor to identify all nest locations, install predator exclosures and monitor the movement and survival of chicks. Provide annual productivity data to the USFWS.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Provide technical assistance to beach managers to prevent negative impacts from the use of motorized vehicles on the beach

Primary Threat Addressed: Mortality and disturbance from motorized vehicles on the beach (OHRVs and beach rakes)

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Protect Piping Plover nests and chicks from the use of motorized vehicles.

General Strategy:
Hold pre-season meetings with town and state officials, police and lifeguards to reinforce the guidelines for plover management. Maintain regular communication with town and state officials that may use vehicles on the beach. Close sections of the beach to vehicular traffic as necessary to protect nests or chicks. Identify areas where beach maintenance or vehicle use can occur without impacting plovers (per the USFWS guidelines) and inform town officials.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Improve enforcement of existing laws and town ordinances to reduce impacts to Piping Plovers

Primary Threat Addressed: Mortality and disturbance from human recreational activities near nesting areas

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Improve enforcement of existing laws and town ordinances to reduce impacts to Piping Plovers

General Strategy:
Work with town and state officials to identify strategies that better enforce dog leash laws and the use of personal fireworks on the beach. Consider hiring a part time law enforcement officer to enforce violations.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Reduce the number of natural and introduced predators in breeding areas

Primary Threat Addressed: Mortality from subsidized or introduced predators

Specific Threat (IUCN Threat Levels): Invasive & other problematic species, genes & diseases

Objective:
Protect eggs and chicks to increase productivity and minimize the risk of adult mortality.

General Strategy:
Survey for the presence of potential predators prior to the breeding season and conduct trapping accordingly to minimize the number of active predators during nest establishment. Continue intermittent trapping throughout the breeding season as necessary.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Provide education and outreach to residents and day-visitors about plover protection efforts

Primary Threat Addressed: Mortality and disturbance from human recreational activities near nesting areas

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Alert beachgoers about the presence of Piping Plover nests or chicks to minimize disturbance.

General Strategy:
Provide outreach to beachfront residents before the start of each breeding season to raise awareness. Educate beachgoers about plover management during the summer months with signs, brochures and direct communication. Give presentations at beach commission meetings and local schools to build support for conservation efforts.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Recruit volunteers to assist with Piping Plover monitoring and protection.

Primary Threat Addressed: Mortality and disturbance from human recreational activities near nesting areas

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Increase awareness and reduce the disturbance to nesting plovers and chicks from beachgoers.

General Strategy:
Identify potential volunteers and provide training for plover monitoring. Give presentations to local conservation groups and schools and stress the importance of volunteers. Communicate with plover monitors in adjacent states to identify opportunities to 'share' volunteers.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Conduct habitat management to enhance breeding habitat

Primary Threat Addressed: Habitat degradation from naturally increasing dune vegetation that reduces available nesting habitat

Specific Threat (IUCN Threat Levels): Natural system modifications

Objective:
Maintain, enhance or create suitable nesting habitat through vegetation management.

General Strategy:
Reduce the density of beach grass along foredunes that have become too vegetated for nesting and transplant to existing or potential dune habitats that lack vegetation (but are not known breeding areas for Piping Plovers).

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

Reduce the use of private dune paths by beachgoers

Primary Threat Addressed: Mortality and disturbance from human recreational activities near nesting areas

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:
Reduce the use of private dune paths by beachgoers to minimize disturbance to nesting plovers and chicks

General Strategy:
Work with the town and state to minimize foot-traffic through the dunes. Explore conservation strategies such as the installation of boardwalks or sand fencing that funnels beachgoers into designated public access points.

Political Location:
Rockingham County

Watershed Location:
Coastal Watershed

References, Data Sources and Authors

Data Sources
Information on Piping Plover habitat, population distribution and status was collected from recovery plans, USFWS data, NHFG data and scientific journals.
Information on habitat protection and management was obtained from NHFG Piping Plover monitoring data and annual reports, personal communication, and the Dune habitat maps created for this process.

Data Quality
Piping Plovers have been intensively managed throughout their breeding range along the Atlantic coast since their listing under the Federal Endangered Species Act (ESA) in 1986. In New Hampshire,

breeding habitat has been managed and Piping Plovers have been monitored annually since 1997. Piping Plovers have been intensively managed throughout their breeding range along the Atlantic coast since their listing under the Federal Endangered Species Act (ESA) in 1986. In New Hampshire, occupied breeding habitat has been managed, and Piping Plovers have been monitored annually since 1997.
Information on the location of coastal sand dunes and associated natural plant communities is available from New Hampshire Natural Heritage Inventory (NHNHI) . However, there is a lack of information available about the overall health and condition of coastal sand dune systems and Piping Plover breeding habitat.

2015 Authors:
Brendan Clifford, NHFG

2005 Authors:
Allison Briggaman, NHFG

Literature

Bourque, N. R., Villard, M. A., Mazerolle, M. J., Amirault-Langlais, D., Tremblay, E. and S. Jolicoeur. 2015. Piping Plover response to coastal storms occurring during the nonbreeding season. Avian Conservation and Ecology 10(1):12

Burger, J. 1987. Physical and social determinants of nest site selection in Piping Plover in New Jersey. Condor 98: 811-818.

Cross, R.R. 1991. Monitoring, management, and research of the Piping Plover at Chincoteague National Wildlife Refuge. Unpublished report. Virginia Department of Game and Inland Fisheries, Richmond, Virginia. 76 pp.

Eddings, K.J., and S.M. Melvin. 1991. Biology and conservation of Piping Plovers at Breezy Point, New York, 1991. Unpublished report submitted to the U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 38 pp.

Elias-Gerken, S.P. 1994. Piping Plover habitat suitability on central Long Island, New York barrier islands. M.S. Thesis. Virginia Polytechnic Institute and State University, Blacksburg, Virginia. 48 pp.

Galbraith, H., DesRochers, DW., Brown, S., and J.M. Reed. 2014. Predicting vulnerabilities of North American shorebirds to climate change. PLoS ONE 9(9):1-13

Goldin, M.R. 1993. Effects of human disturbance and off-road vehicles on Piping Plover reproductive success and behavior at Breezy Point, Gateway National Recreation Area, New York. M.S. Thesis. University of Massachusetts, Amherst, Massachusetts. 128 pp.

Haig, S.M. 1992. Piping Plover. In The Birds of North America, No. 2 (A. Poole, Pl Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Hoopes, E.M., C.R. Griffin, and S.M. Melvin. 1992. Relationships between human recreation and Piping Plover foraging ecology and chick survival. Unpublished report. University of Massachusetts, Amherst, Massachusetts. 77 pp.

Howard, J.M., R.J. Safran, and S.M. Melvin. 1993. Biology and conservation of Piping Plovers at Breezy Point, New York. Unpublished report. Department of Forestry and Wildlife Management, University of Massachusetts, Amherst. 34 pp.

MacIvor, L.H. 1990. Population dynamics, breeding ecology, and management of Piping Plovers on outer Cape Cod, Massachusetts. M.S. Thesis. University of Massachusetts, Amherst, Massachusetts. 100 pp.

Melvin, S.M. and J.P. Gibbs. 1994. Viability analysis for the Atlantic Coast Population of Piping Plovers. Unpublished report to the USFWS, Sudbury, Massachusetts. 16 pp.

National Survey on Recreation and the Environment (NSRE): 1994. The Interagency National Survey Consortium, Coordinated by the USDA Forest Service, Recreation, Wilderness, and Demographics Trends Research Group, Athens, GA and the Human Dimensions Research Laboratory, University of Tennessee, Knoxville, TN.

New Hampshire Office of State Planning. 2003. Department of Resources and Economic Development. New Hampshire Outdoors, Statewide Comprehensive Outdoor Recreation Plan, 2003-2007. Concord, NH. 122 pp.

Patterson, M.E., J.D. Fraser, and J.W. Roggenbuck. 1991. Factors affecting Piping Plover productivity on Assateague Island. Journal of Wildlife Management 55(3): 525-531.

Tull, C.E. 1984. A study of nesting Piping Plovers of Kouchibouguac National Park 1983. Unpublished report. Parks Canada, Kouchibouguac National Park, Kouchibouguac, New Brunswick. 85 pp.

USFWS. 1985. Endangered and threatened wildlife and plants: Determination of endangered and threatened status for the Piping Plover: Final rule. Federal Register 50 (238): 50726-50734.

USFWS. 1996. Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan. Hadley, Massachusetts. 258 pp.

USFWS. 2004. 2002-2003 status update: U.S. Atlantic Coast Piping Plover population. Sudbury, Massachusetts. 8pp.

USFWS. 2013. Preliminary 2004 Atlantic Coast Piping Plover Abundance and Productivity Estimates. <http://www.fws.gov/northeast/pipingplover/pdf/preliminary2012_18April2013.pdf > Accessed 2015 March 16.