

## Chapter 7.7

### Status of the Threatened Piping plover, *Charadrius melodus*, population in the Maryland Coastal Bays

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#### Abstract

Assateague Island forms 22 miles of the eastern edge of the Maryland Coastal Bays. Managed primarily for natural coastal processes, the island influences tidal exchange, supports an array of terrestrial, wetland and aquatic communities and provides clean sandy sediments. Coastal storm tides that maintain the island's integrity result in the formation of habitats that support Piping plovers (*Charadrius melodus*) a Federally Threatened species. However, post-storm features eventually develop into more stable terrestrial communities that do not support this species. When Piping plovers were listed as a Threatened species, the Maryland breeding population was around 20 pair. Following a series of storm tidal events in the 1990s, the population tripled to around 61 pair. A recent lapse in strong storm surges has allowed plover habitat to wane, resulting in a decline to around 43 breeding pair.

#### Background

Assateague is one of the very few east coast barrier islands where natural coastal processes are allowed to occur largely unimpeded by human activities. Natural processes include the action of tides, wind, waves, currents, storms, and sea level rise which influence and shape the terrain of the barrier's terrestrial communities and adjacent aquatic habitats.

In response to these processes, Assateague Island is transgressing to the west via cross-island sand transport, a product of storm overwash. Many of the Island's terrestrial habitats are in a constant state of flux as these processes alter physical conditions and disrupt plant succession. The overwash action creates its own signature features that have become increasingly important to regional biodiversity as shore stabilization activities elsewhere along the Mid-Atlantic prevent natural habitat formation processes. The majority of rare, Threatened and Endangered species utilizing Assateague are linked to the sparsely vegetated washover habitats created and maintained by storm tide flooding.

Piping plovers (*Charadrius melodus*), a Federally Threatened species (U.S. FWS, 1996), restricts its breeding in to early successional coastline habitats that only occur on Assateague Island.

These habitats include the range of sediment transfer and depositional features that result from lunar and storm tides. They include seasonal ocean beach, winter debris wracks/storm berm, backshore beach, dune runnels, surge channels, washover fans, washover aprons, intertidal lagoon/bay beaches and emerging sand flats. These features may overlie existing vegetated communities capable of re-emerging, but they also carry transported seed and roots that can germinate under favorable soil conditions. Based on site conditions, washover deposits will usually support succession through a variety of plant species starting with the first growing season. The timing of subsequent tidal disruptions will determine the longevity of these communities.

The value of these features to Piping plovers is based on the bird's biological need for open surfaces for nesting, foraging and visibility of predators. The need for available forage is paramount and dependent on the biotic richness of the deposited sediment. Sediment transported from near shore bars can retain aquatic infauna remains. The erosion and transport of terrestrial vegetation also adds organic materials. Washover deposition with incorporated debris will support detritivores and scavengers, some of which will spend part of their life cycle on the exposed surface.

Piping plovers forage on surface-dwelling prey, which they find by sight. By sampling prey at plover foraging locations and random sparsely vegetated features, it is apparent that plovers preferentially select foraging locations with abundant prey (Loegering, 1992). Those locations are mainly major sediment deposition sites that are low enough to maintain soil moisture from a near-surface fresh water lens. This cross-island foraging habitat for Piping plovers is unique to Assateague Island on the East Coast. Competition for good foraging locations can lead to aggression to the point of injury to other adults and chicks. Later breeding or subordinate pairs use substandard foraging habitat, which can result in their chicks taking longer to develop flight ability.

Moist, sparsely vegetated features with occasional overwash or tidal action continue to host foraging plovers over multiple seasons. Moist sites maintained only by rain or a ground water lens show a gradual decline in use, while deposition features that dry out are only used for nesting. Habitat mapping over time shows the expansion of overwash features after significant tidal events and the contraction of sparsely vegetated features into vegetated communities when storm frequency or intensity decline. Annual mapping of plover nests and brood locations confirm the fidelity to high quality washover features. When the number or area of these features retracts, the reduced capacity to support successful plover breeding can be anticipated in the returning breeding population.

Besides food, the other necessary component for successful breeding is the nest site. Plover coloration is suited for nesting in a sand/shell substrate. Any of the dry, open habitats described above are suitable for plover nesting. Fortunately, overwash seldom occurs during the breeding season. Pairs usually select a nesting site close to their anticipated foraging area. The majority of nests are placed on open sand. Occasionally they will utilize individual plants or low lying, low density plant communities. With the availability of dune fields and former, dried up washover fans, nesting habitat is available essentially everywhere on Assateague. The critical need for the breeding pair is the forage location.

**Data Sets**

Monitoring of piping plover breeding success on Assateague Island National Seashore has been conducted since the species was federally listed as Threatened in 1986. The Atlantic Coast Piping Plover Recovery Plan (USFWS 1996) provides specific information on the species and recommends monitoring goals and management actions. Primary management objectives include limiting human disturbance and providing protection from predators. Monitoring efforts include surveys to document the breeding population and observations to estimate reproductive productivity.

The monitoring program splits the plover reproductive activities into two phases: nest and incubation activities, from which breeding population size is estimated, and hatching and fledging activities from which reproductive success is estimated. The size of the breeding Piping plover population is estimated from data collected on nesting activity. The monitoring program also completes a single annual census, standardized on the East Coast to occur during the first 10 days in June.

**Analyses**

Population estimates and breeding success as well as mapping of plovers and habitat.

**Management Objective:**

Maintain a breeding population of the threatened Piping Plover on Assateague Island.

**Status of piping plover breeding population**

Significant tidal events through the 1990s have resulted in westward island migration along several sections of Assateague Island. The remaining landscapes of potential plover foraging habitat resulted in a tripling of the local population, from a 7 year pre-storm mean of 20 pair (1986-1992), to a 12 year post-storms mean of 61 pair (1996-2007).

Major tidal events were not experienced along Assateague from 2000 until 2009. Sparsely vegetated habitat resulting from the 1990s events decreased slowly over time. The critical features lost over this time were the surge channels, washover fans and washover aprons. All converted to dune fields or dense vegetated communities which prohibited plover chicks from reaching the remaining foraging habitat along the island's open bayside habitats (Figure 7.7.1).

In 2007 the breeding population was still high with 64 pair. The breeding population began to drop in 2008 (49 pair). Storms in 2009 (Ida) and 2012 (Sandy) produced minor washover features that reached only about 200 meters west of the winter storm berm. While the numbers of discrete washover fans from both storms were rather small, each fan was occupied by plover breeding pairs during each season. The washover fans from both events appear to have provided habitat to maintain a breeding population that averaged 43 pair (2008-2013). Observations and subsequent mapping indicate that washover fans from Hurricane Sandy are already transitioning through vegetative succession.

**Summary**

Piping plovers migrate up the eastern seaboard each spring looking for a mate and favorable breeding conditions. Adults tend to return to the same site after a successful breeding season. On Assateague Island, potential plover breeding habitat undergoes a change each winter season: the habitat undergoes flooding or it becomes more stable. As plovers arrive in the spring, older birds may claim their former locations, while other birds search out new or existing forage habitat. The birds pick sites in anticipation that forage will be available in three months when chicks will hatch. The winters leading up to 2007 lacked significant storm tides and Assateague had less high quality breeding habitat. The reduction of foraging habitat led to a gradual decline in breeding adults. Assateague's capacity to maintain breeding adults and attract new breeding stock will depend on the near-term tidal processes and local storm climate.

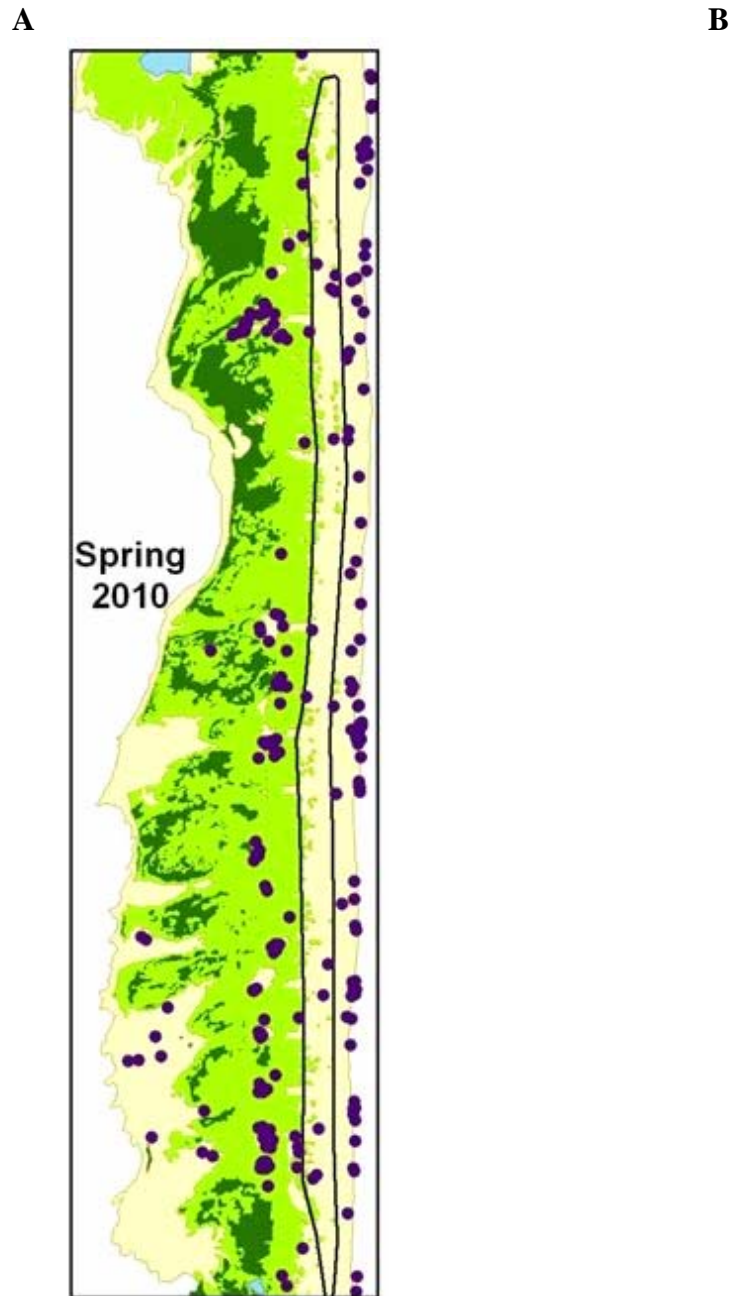
## **References**

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**Figure 7.7.1** Brood movement of Piping Plovers on Northern Assateague in 2014 (A) and 2010 (B). The effects of the berm (black outlined area) are shown in panel B.