

# Periodic Status Review for the Snowy Plover



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FISH AND WILDLIFE  
Wildlife Program*

The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 232-12-014 and 232-12-011). In 1990, the Washington Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 232-12-297). The procedures include how species listings will be initiated, criteria for listing and delisting, a requirement for public review, the development of recovery or management plans, and the periodic review of listed species.

The Washington Department of Fish and Wildlife is directed to conduct reviews of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing by the Washington Fish and Wildlife Commission. The periodic status reviews are designed to include an update of the species status report to determine whether the status of the species warrants its current listing status or deserves reclassification. The agency notifies the general public and specific parties who have expressed their interest to the Department of the periodic status review at least one year prior to the five-year period so that they may submit new scientific data to be included in the review. The agency notifies the public of its recommendation at least 30 days prior to presenting the findings to the Fish and Wildlife Commission. In addition, if the agency determines that new information suggests that the classification of a species should be changed from its present state, the agency prepares documents to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act.

This document is the Draft Periodic Status Review for the Snowy Plover. It contains a review of information pertaining to the status of the Snowy Plover in Washington. It was reviewed by species experts and will be available for a 90-day public comment period. All comments received will be considered during the preparation of the final periodic status review. The Department intends to present the results of this periodic status review to the Fish and Wildlife Commission at an upcoming meeting.

**Submit written comments on this report by e-mail by 7 December 2015 to:**  
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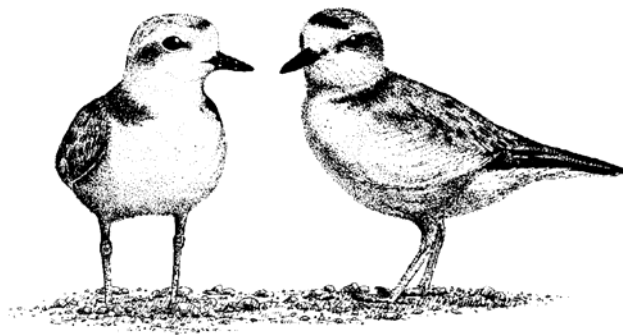
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*On the cover: photo of Snowy Plover by Joe Higbee; background of Midway Beach by Scott Pearson. Black and white illustration on title page by Darrell Pruett*

DRAFT  
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## EXECUTIVE SUMMARY

The Pacific coast population of Snowy Plover (*Charadrius nivosus*) breeds from Midway Beach, Washington, south to Bahia Magdalena, Baja California, Mexico, and winters mainly in coastal areas from southern Washington to Central America. The Snowy Plover is currently state listed as endangered in Washington and a state recovery plan was completed in 1995 (Richardson 1995). The Pacific coast population of the Snowy Plover was listed as threatened by the U. S. Fish and Wildlife Service in 1993, and a federal recovery plan was completed in 2007 (USFWS 2007).

Snowy Plovers currently nest at 3 sites in Washington, and the 2014 population was estimated at 41 adults. Factors affecting Snowy Plovers in Washington include degradation of habitat by introduced beach grasses, human disturbance during nesting season, and low productivity due to predation on eggs and chicks. In 2013, a new predator management strategy that includes direct hazing and removal of crows and ravens, the main nest predators, was initiated on Washington nesting beaches and this may be contributing to improved nesting and fledging success in recent years. A population viability analysis suggests that the West Coast population would not reach the recovery objective of 3,000 individuals identified in the federal recovery plan, without additional habitat restoration. As a result of this need for additional Snowy Plover habitat, control of beachgrass and management to reduce human disturbance are ongoing.

According to the Washington State Recovery Plan for the Snowy Plover, the species will be considered for down listing to threatened when the state supports a 4-year average of at least 25 breeding pairs that fledge an average of at least one young per adult male per year at two or more nesting areas with “secure” habitat. The current 4-year average is 22 breeding pairs at the two main sites, and they averaged  $\geq 1.0$  fledgling/male in 2011, 2013, and 2014. The 2014 winter window survey tallied 71 adults, the highest number since surveys began in 2007.

Although the Snowy Plover population in the region appears to be increasing as a result of management actions in Washington and Oregon, the number in Washington is still very small. It is recommended that the Snowy Plover remain listed as an endangered species in Washington at this time.

## DESCRIPTION AND LEGAL STATUS

The Snowy Plover (*Charadrius nivosus*) is a small shorebird (about 6.5 inches [15-17 cm] long; approximately 1.4 oz [40 g]); they are pale gray-brown above and white below, with dark bill and legs (Page et al. 1995). The Snowy Plover was formerly considered conspecific with the Old World *C. alexandrinus* (Kentish Plover) (Chesser et al. 2011). The birds in Washington and along the Pacific coast are the Western subspecies (*C. n. nivosus*), and are part of the Distinct Population Segment listed under the U. S. Endangered Species Act (USFWS 1993, 2006).



Gregg Thompson

Figure 1. Snowy Plover (photo by Gregg Thompson).

The species was listed as endangered in Washington in 1981, and a state recovery plan was completed in 1995 (Richardson 1995). The Pacific coast population of the Snowy Plover was listed as threatened by the U. S. Fish and Wildlife Service in 1993, and a federal recovery plan was completed in 2007 (USFWS 2007). Critical Habitat was designated in 2005 and revised in 2012 (USFWS 2012). According to the U.S. Fish and Wildlife Service (2007), “Habitat degradation caused by human disturbance, urban development, introduced beachgrass (*Ammophila* spp.), and expanding predator populations have resulted in a decline in active nesting areas and in the size of the breeding and wintering populations”.

## DISTRIBUTION

The Pacific coast population of the Snowy Plover breeds from southwestern Washington, south to Bahia Magdalena, Baja California, Mexico and winters mainly in coastal areas from southern Washington to Central America (Page et al. 1995). In Washington, Snowy Plovers historically nested in five areas including Graveyard Spit, Leadbetter Point, Damon Point, Westport Spit, and Copalis Spit (Richardson 1995). In recent years, they’ve only nested on Midway Beach, Graveyard Spit, Damon Point, and Leadbetter Point. (Pearson et al. 2007). During the 2009-2013 nesting seasons, only Leadbetter Point and Midway Beach were occupied and Graveyard Spit was again occupied in 2012–2014.

## NATURAL HISTORY

**Habitat requirements.** Snowy Plovers nest primarily above the high tide line in unvegetated or sparsely vegetated areas of coastal



Figure 2. Snowy Plover nesting in Washington, 2006-2014.

beaches. Less common nesting habitats include bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and river bars. In winter, Snowy Plovers are found on many of the beaches used for nesting as well as on beaches where they do not nest, in man-made salt ponds, and on estuarine sand and mud flats. Snowy Plovers also seem to nest semi-colonially (territorial, but aggregating at low densities) (Pearson et al. 2014a).

**Diet and foraging.** Snowy Plovers are primarily visual foragers, using the run-stop-peck method of feeding typical of *Charadrius* species. They forage on invertebrates in the wet sand and amongst surf-cast kelp within the intertidal zone, and in dry sand areas above the high tide. They sometimes probe for prey in the sand and pick insects from low-growing plants. They eat marine and terrestrial invertebrates; during the breeding season on the Oregon coast, adult Snowy Plovers fed on sand hoppers (Orchestoidea) and tiny fish (USFWS 2007). Other food items reported include Pacific Mole Crabs (*Emerita analoga*), Striped Shore Crabs (*Pachygrapsus crassipes*), polychaetes (Neridae, *Lumbrineris zonata*, *Polydora socialis*, *Scoloplos acmaceps*), amphipods (*Corophium* spp., *Ampithoe* spp., *Allorchestes angustus*), tanadacians (*Leptocheilia dubia*), shore flies (Ephydriidae), beetles (Carabidae, Buprestidae, Tenebrionidae), clams (*Transenella* sp.), and ostracods (Page et al. 1995).

**Reproduction.** Males defend nesting territories from conspecifics, but “off-duty” parents often forage with other plovers in non-defended areas of wet sand up to several kilometers from the nest (Page et al. 1995). Snowy plovers initiate clutches of eggs (3 typically) from April through July. Nests are a simple shallow scrape on open sand, or sometimes under an object or clump of vegetation. Many clutches are lost to predators, or abandoned due to human disturbance during the incubation period of about 27 days. The precocial chicks are led from the nesting territory shortly after hatching and quickly become mobile and elusive. The female leaves the mate and brood within a few days of hatching to obtain a new mate and initiate a new nest, while the male rears the brood. Females attempt to produce two or occasionally three clutches during a season. Males may also remate to initiate a second nest after the brood learns to fly.



Figure 3. Snowy Plover eggs in a nest scrape.

**Migration and dispersal.** Snowy Plovers are a partial migrant, with some individuals residing year-round in their breeding areas and others migrating, typically further south, for the winter. Many Washington birds winter locally, while some winter in Oregon and northern California, and a very small number have been observed further south. In northern California, chicks that fledged early in the season were more likely to be migratory, while later fledging birds more often joined a local post-breeding flock and became winter residents (Colwell et al. 2007). In central California, most birds (64%) settled <10 km from natal sites, but 16% moved >50 km for their first breeding season (maximum = 360 km for males, 790 km for females; Stenzel et al. 2007). Colwell et al. (2007) reported that the average dispersal distance for both males and females in northern California approached 20 km (median distances were ~5 km; similar to those reported by Stenzel et al. 2007).

The Pacific coast populations of Snowy Plovers are linked by occasional dispersal between breeding areas. Plovers banded on nesting areas in California and Oregon have been observed on Washington nesting beaches during the breeding season, and birds banded in Washington have been observed elsewhere, including 2 banded in 2013, observed in Oregon in 2014 (Lauten et al. 2014). Colwell et al. (2007) recorded several plovers from northern California that bred at Leadbetter Point or Midway Beach, Washington. The serially polygamous mating system, long mating season, dynamic habitats, and high

nest failure rates from predation for Snowy Plovers may tend to favor dispersal rather than being faithful to a particular nest site (Stenzel et al. 1994, Colwell et al. 2007).

## POPULATION AND HABITAT STATUS

Snowy Plovers are believed to have nested at about 78 locations on the U.S. West Coast prior to 1970, but today only 28 major nesting areas remain (USFWS 2007). Historically, five areas supported nesting plovers in Washington (Fig. 2; Richardson 1995), but that number has slowly declined to just 2 or 3 areas since 2009 (Table 1). The standardized range-wide Breeding Window Survey in 2012 tallied 1,855 adult Snowy Plovers along the U.S. Pacific Coast (Colwell et al. 2013).

Table 1. Mean counts<sup>a</sup> (95% CI) of breeding adults at four nesting areas in Washington, 2006-2014 (Pearson et al. 2015).

Year	Damon Point	Midway	Graveyard	Leadbetter Pt.	Total
2006	1 (0–2)	21(14–28)	2 (-1–5)	35 (26–45)	59 (48–70)
2007	0	18 (14–21)	2 (-1–4)	25 (20–30)	44 (36–53)
2008	0	14 (10–19)	1 (0–2)	32 (23–40)	47 (33–60)
2009	0	15 (13–17)	0	17 (10–24)	31 (23–39)
2010	0	14 (11–18)	0	21 (17–26)	36 (33–38)
2011	0	19 (8–30)	0	12 (6–19)	31 (15–47)
2012	0	14 (5–23)	2 (0–3)	18 (6–29)	33 (15–52)
2013	0	20 (16–24)	4 (1–6)	20 (19–20)	43 (41–45)
2014	0	11(9–13)	7 (6–8)	24 (21–28)	41(40–43)

<sup>a</sup>Breeding window protocol with ~3 replicates.

Between 2006 and 2011, the Washington population declined, but the population has been stable or increased during the last 4 years (Fig. 4). Given the relatively low fledging rates, the population decline in Washington would likely be greater without immigration. Many birds banded in Oregon and California as chicks, are observed at Leadbetter and Midway Beach in their first potential breeding season. Oregon’s plover population is larger and increasing (Lauten et al. 2014), which has resulted in immigration of Oregon birds into Washington. In 2014, nest success was high—of 47 monitored nests, 32 (68%) hatched (later observation of broods and remains of additional nests indicated that 39 of 57 known nests were successful) and 45–49 chicks fledged (8–10 at Midway, 14 at Graveyard Spit, and 23–25 at Leadbetter Point) (Pearson et al. 2015).

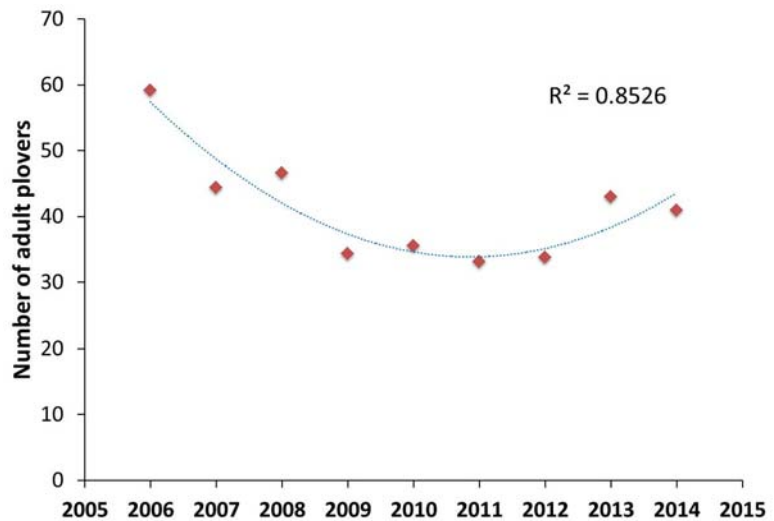


Figure 4. Trend of average yearly count of adult plovers for all Washington sites, 2006–2014 (S. Pearson, unpublished data).

Population modeling indicates that productivity of at least 1 chick fledged per breeding male per year is needed



for a stable population and productivity of 1.2 or more chicks fledged per breeding male should increase population size at a moderate pace (Nur et al. 1999). In 2014, the average number of young fledged per adult male in Washington was 1.88 (range = 1.67– 2.13). The Washington population clearly produced  $\geq 1$  fledgling/male in 2011 and 2014, and about 1/male in 2013, but did not in 2012; (Table 2; Pearson et al. 2013, 2014b, 2015). Nesting and fledging success likely has improved since predator management began in 2013, but fledging success was also high in 2011, prior to predator management.

**Viability assessments.** Recent viability analyses suggest a north-south gradient, with southern populations being more productive due to a longer breeding season and lower over-winter mortality (Hudgens et al. 2014). The Washington and northern California populations appear to be ‘sinks,’ which are supported by immigration from the more productive areas (Eberhart-Phillips and Colwell 2014). For example, Colwell et al (2013) reported that in 2013, 1/3 of breeding adults in northern California came from elsewhere, primarily Oregon. Colwell et al. (2013) reported that reproductive success was highly skewed toward a few individuals, with 13% of males and 14% of females producing 50% of fledglings. Most adults (72%) fledged <2 juveniles over their lifetime, and 40% of adults fledged no young. They suggested that this pattern of unequal progeny production is likely a consequence of differences in breeding lifespan, as well as habitat quality that affects the level of corvid predation, human disturbance, and substrate type. The high variances in reproductive success would be expected to reduce the effective population size ( $N_e$ ), decreasing genetic diversity and increasing the potential for inbreeding depression (Colwell and Pearson 2011).

Hudgens et al. (2014) reported that even sites projected to be sink habitat based on their demographic rates, however, play an important role in maintaining and recovering Snowy Plovers if they represent substantial protected habitat; they also suggested that habitat restoration increased the metapopulation size regardless of where habitat was restored. The population viability analysis conducted by Hudgens et al. (2014) suggested that the West Coast population would not reach the recovery objective of 3,000 identified in the federal recovery plan (USFWS 2007), without additional habitat restoration. It also suggested that range-wide demographic objectives (e.g. 1 fledgling/male/year) may not be appropriate and consistently attainable for all recovery units, in part because productivity is affected by density, with populations at carrying capacity showing lower productivity (Hudgens et al. 2014).

**State recovery objectives.** According to the Washington State Recovery Plan for the Snowy Plover (Richardson 1995), the Snowy Plover will be considered for down listing to threatened when:

1) A minimum 4-year average of at least 25 breeding pairs.

**In 2014, the four-year average in Washington was about 22 breeding pairs (Table 2);**

Table 2. Number and 4-year average of breeding pairs and chicks fledged per adult male Snowy Plover in Washington, 2006-2014 (Pearson et al. 2009b, 2010, 2012, 2013, 2014b, 2015).

Year	No. chicks fledged/male	No. breeding pairs (95% CI)	4-year average of breeding pairs
2006	1.02 (range = 0.76–1.45) <sup>a</sup>	32 (26–39)	-
2007	0.91 (range = 0.77–1.13)	24 (19–28)	-
2008	0.46 (range = 0.36–0.64)	27 (19–35)	-
2009	0.71 (range = 0.5–0.96)	17–18 (13–22)	25 (19-31)
2010	0.57 (range = 0.53–0.62)	21–22 (20–23)	22.5 (18-27)
2011	1.59 (range = 1.4–1.66)	22 (11–33)	22 (16-28)
2012	0.68 (range = 0.46–0.94)	19	20 (11-20)
2013	1.04 (range = 0.92–1.18)	22–24	21 (13-20)
2014	1.88 (range = 1.67–2.13)	23–27	22 (14-21)

<sup>a</sup>2006 data does not include Leadbetter Point because of inadequate number of surveys.

2) *Average production of at least one fledged young per breeding pair per year.*

**Production clearly met this objective in 2011 and 2014, with approximately 1 fledgling/male in 2006 and 2013; it was not met in 2007-2010 and 2012;**

and,

3) *Two or more nesting areas with “secure” habitat.*

**There are 2-3 current nesting areas; one is secure and one is not secure (see habitat discussion below).**

***Federal recovery objectives.*** The primary recovery criteria for Recovery Unit 1 (Washington and Oregon) in the federal Recovery Plan for the Snowy Plover are to maintain 250 breeding adults for 10 years, and a 5-year average productivity of at least 1.0 fledged chick per adult male (U.S. Fish and Wildlife Service 2007). In 2014, estimates of breeding adults totaled 379 birds (41 in Washington; and 338 birds in Oregon– the highest since intensive monitoring began in 1990; Lauten et al. 2014, Pearson et al. 2015). The number of chicks fledged/male in Unit 1 was 1.71, and the 5-year average was 1.26 young/male. In Washington, the average chicks fledged /male was 1.15, but this was driven by 2011, an unusual year, and most years did not meet this objective. With predator management, this objective was met again in 2014. An additional criteria is that mechanisms are in place to assure long-term protection and management of habitat to maintain the subpopulation sizes and productivity (USFWS 2007).

***Wintering numbers.*** A total of 67 plovers were detected in January 2015 at Midway Beach and Leadbetter Point, during the Winter Window Survey in Washington, the highest count since the survey began in 2007. The number detected has ranged from 19 to 35 plovers from 2009 –2014 (Pearson et al. 2015). Many of the plovers observed were unbanded birds indicating that they are likely local birds, or hatch-year birds from Oregon (W. Ritchie, pers. comm.).

### **Habitat status–nesting areas**

Most Snowy Plover nests have been on Willapa National Wildlife Refuge (NWR), state park, and Shoalwater Bay Tribe lands (Fig. 5). There is also some nesting on private land at Midway Beach, and possibly Graveyard Spit. An objective in the state recovery plan calls for at least two nesting areas on “secure” habitat. Leadbetter Point is in the NWR, but it is not clear if the other main site (Midway, also called Grayland) meets this definition due to mixed ownerships and disturbance issues. Despite seasonal postings intended to restrict human presence in the dune areas where Snowy Plovers nest, recreational disturbance at coastal sites continue, including by dogs off leash, vehicles, bicycles, horseback riders and clam diggers (Richardson 1995; C. Sundstrom, pers. comm.). In addition, the State Parks and Recreation commission recently approved the conditional use of wind-powered recreational vehicles on state park beaches.

Graveyard Spit is a 1.8 mi long sand spit east of Cape Shoalwater, across the mouth of Willapa Bay from Leadbetter Point in Pacific County. It is owned by the Shoalwater Bay Indian Tribe and private landowners (Richardson 1995). There is also a recent increase in disturbance there from beach walkers and ATV use from residential and commercial establishments on the nearby mainland.

These sandy coastal nesting areas are dynamic, and winter storms can change the area of sand available, or create or eliminate islands; for example, Leadbetter Point changes shape year to year. In addition, these coastal habitats are particularly vulnerable to climate change related factors such as sea level rise, beach erosion, and storm surges which may cause declines in important habitat. Future changes may affect the area of sandy habitat available, and affect human access and the level of disturbance.

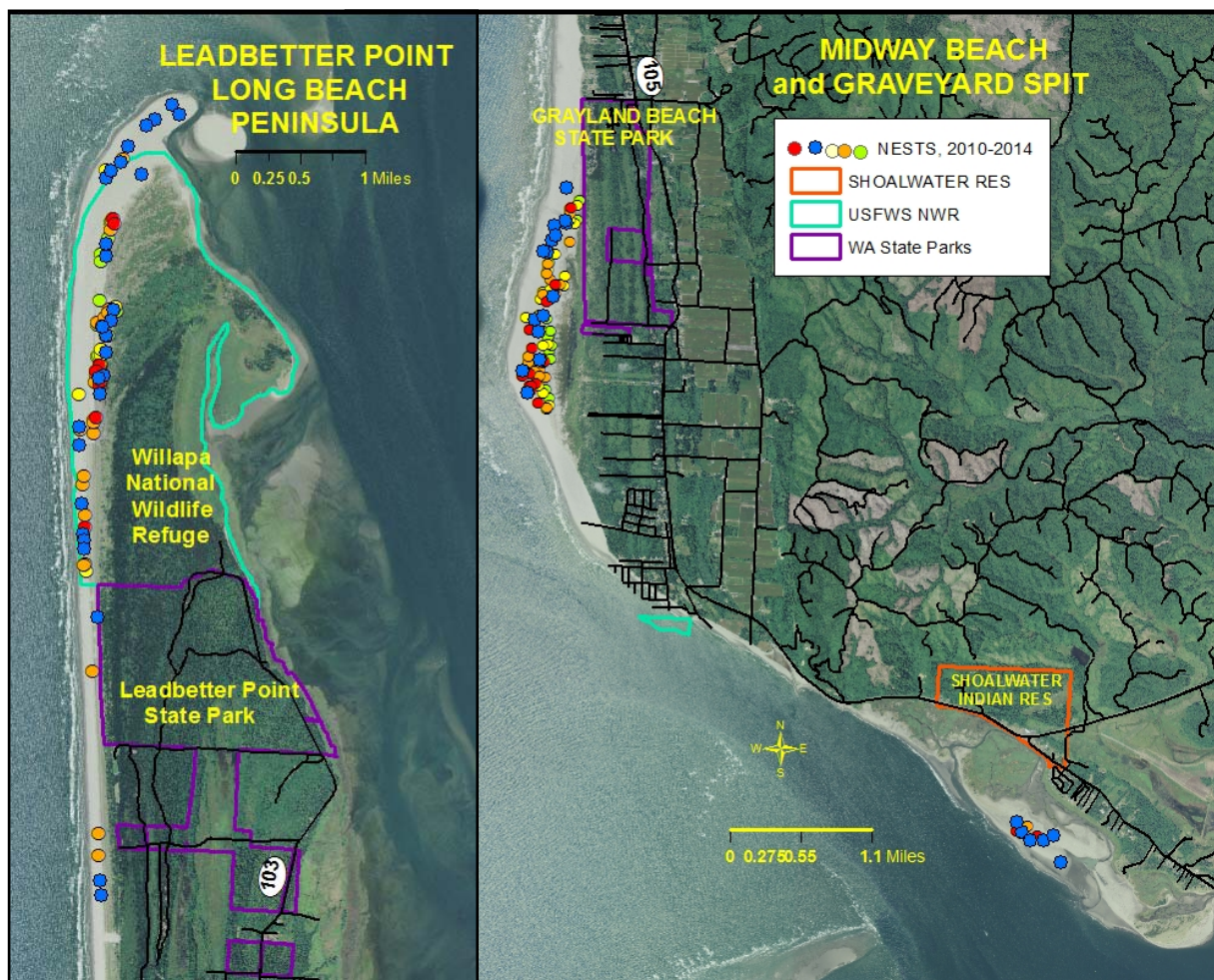


Figure 5. Public lands and Snowy Plover nest locations in Washington, 2010-2014.

## Factors Affecting Snowy Plovers in Washington

### Adequacy of Regulatory Mechanisms

**Federal protection.** The Pacific coast population of the Western Snowy Plover was listed as threatened under the U.S. Endangered Species Act by the U. S. Fish and Wildlife Service in 1993 (USFWS 1993). Critical Habitat was designated in 2005 and revised in 2012 (USFWS 2012). Critical habitat designation affects actions that have a federal nexus (federal entity funds, authorizes or carries out an action) occurring on designated lands.

**Critical habitat.** In 2012, the U.S. Fish and Wildlife Service designated approximately 24,527 acres of coastal habitat in Washington, Oregon and California as critical habitat for the Pacific Coast population of the Snowy Plover (USFWS 2012). The designation revises the Service’s 2005 critical habitat designation for the species. Designated critical habitat includes coastal beach-dune ecosystem habitat along the Pacific Coast essential to the survival and recovery of the plover. A total of 60 units were designated, with 4 of those units in Washington totaling 6,077 acres. These included Copalis Spit (WA1), Damon Point (WA2), Midway Beach and Shoalwater/Graveyard Spit (WA3), and Leadbetter Point and Gunpowder Sands (WA4).

Critical habitat identifies geographic areas containing features essential for the conservation of a threatened or endangered species, and which may require special management considerations or protection. Designation of critical habitat does not affect land ownership and has no impact on private landowners taking actions on their land that do not require federal funding or permits. It is used to notify federal agencies of areas that must be given special consideration when they are planning, implementing, or funding activities that may affect designated critical habitat.

***State, county, and city protections.*** The species was listed as endangered in Washington in 1981, and a state recovery plan was completed in 1995 (Richardson 1995). The Snowy Plover is protected from 'take' as an endangered species in state law (RCW 77.12.020, RCW 77.15.130). Protecting plovers from disturbance that can crush eggs, or lead to nest abandonment or predation is a complicated issue, which requires considerable attention. Actual nest locations change during and between nesting seasons and require monitoring to adapt signage, symbolic fencing, and enforcement presence to the situation. Also managing human activities requires cooperation between multiple agencies with different mandates.

***Shoreline Management Act.*** The ocean beaches are considered 'Shorelines of Statewide Significance' under Washington's Shoreline Management Act (SMA), and preferred uses, in order of priority, are to "recognize and protect the state wide interest over local interest; preserve the natural character of the shoreline; result in long term over short term benefit; protect the resources and ecology of the shoreline; increase public access to publicly owned shoreline areas; and increase recreational opportunities for the public in the shoreline area" (RCW 90.58.020). The SMA establishes a balance of authority between local and state government, with cities and counties as the primary regulators. The state Department of Ecology acts in a support and review capacity, providing technical assistance, and funding in the form of grants. Ecology is also required to review certain kinds of permits (*conditional use* and *variance permits*) for compliance with state law, and must review local shoreline master programs to ensure they also comply. Under SMA, each city and county with "shorelines of the state" must prepare and adopt a Shoreline Master Program that is based on state laws and rules but is tailored to the specific geographic, economic and environmental needs of the community. The local Shoreline Master Program is essentially a shoreline-specific combined comprehensive plan, zoning ordinance, and development permit system. Most shoreline master programs were originally written between 1974 and 1978. Ecology's adopted updated Guidelines in 2003, and Pacific and Grays Harbor counties are in the process of a comprehensive update of their shoreline programs to meet the requirements of the new Guidelines.

## **Habitat degradation, Predation, and Human Disturbance**

Three main factors are thought to limit recovery of Snowy Plovers via negative effects on breeding productivity: 1) predation of eggs, chicks, and adults; 2) encroachment of invasive vegetation such as European beach grass (*Ammophila arenaria* (L.) Link), which degrades breeding habitats; and 3) human activity, which causes direct mortality of eggs, chicks, and adults or indirectly affects the distribution of plovers (USFWS 2007). Cold weather also appears to negatively affect survival of Snowy Plovers in northern populations such as Washington more than southern populations (Hudgens et al. 2014). Severe winter weather apparently affects survival and shorter breeding seasons affects the average number of broods that can be produced per season.

Tall perennial beachgrasses can eliminate sparsely vegetated sand used for nesting by Snowy Plovers. Two species, European Beachgrass from Europe, and American Beachgrass (*Ammophila breviligulata* Fern.) from eastern North America (Seabloom and Wiedemann 1994), have become naturalized along the West Coast of North America and replaced much of the native vegetation that comprised foredune habitat

(Wiedemann 1987). Beachgrass control has been ongoing at Willapa National Wildlife Refuge to restore nesting areas for Snowy Plovers.

Habitat loss due to beach stabilization and development has eliminated many nesting areas. The number of nesting locations in California, Oregon and Washington has declined 68% from the number known historically. Factors affecting snowy plover habitat include development on beaches and interruptions of the dynamic erosion/accretion processes by jetties, the Columbia River dams (which trap sediment), and other structures.

Human activity on beaches, such as pedestrians, dog-walking, clam digging, horseback riding, and vehicular traffic, during the plover breeding season can cause nest failure directly through the destruction of eggs and chicks, or indirectly by flushing adults, and exposing eggs to predation by American Crows (*Corvus brachyrhynchos*) and Common Ravens (*Corvus corax*). Human related disturbance negatively affects hatching success (Warriner et al. 1986, Schulz and Stock 1993), and chick survival of Snowy Plovers by as much as 72% (Ruhlen et. al. 2003). Disturbances to wintering Snowy Plovers are 16 times higher at a public beach than at beaches with little or no public access (Lafferty 2001). Humans, dogs, crows and ravens, and other birds are the main sources of disturbance. In addition, Snowy Plover feeding rates declined in response to disturbance (Lafferty 2001).

Although Washington code (WAC 352-37-030) prohibits driving on dry sand areas of the beach where nesting occurs, this is difficult to monitor and enforce, and violations occur. Where not prohibited, vehicle traffic is allowed on the wet, packed sand portion of beaches. Once the eggs hatch, chicks often forage on the wet sand where foraging may be interrupted by human activity, and there is more potential for collisions with vehicles. High levels of traffic, such as on Midway Beach during razor clam season, can result in a high loss of nests. Razor clam season days are popular and require continued management, outreach and enforcement attention to minimize conflicts with nesting plovers. Eggs and chicks may also experience high predation rates from the high populations of ravens and crows associated with human associated food sources, as well as occasional predation by Northern Harriers (*Circus cyaneus*) and Great Horned Owls (*Bubo virginianus*). Peregrine Falcons (*Falcon peregrinus*) take chicks and adults.

## MANAGEMENT ACTIVITIES

**Monitoring.** Monitoring is needed to assess progress toward the state and federal recovery goals and to inform recovery actions. Monitoring is also necessary to evaluate the impact of conservation actions on Snowy Plover populations such as the use of wire nest enclosures to exclude potential predators and the effectiveness of habitat restoration efforts. Washington Department of Fish and Wildlife (WDFW) coordinates its surveys with Willapa NWR, the Shoalwater Bay Tribe, and Oregon Department of Fish and Wildlife. This coordinated effort was initiated in 2006, although state-specific monitoring was initiated much earlier. Surveys are conducted annually to determine the number of Snowy Plover adults and to estimate fledging success at sites in Washington. The Breeding Window Survey occurs annually in late May-June along the entire U.S. Pacific coastline where Snowy Plovers are known to nest. The specific dates for a particular year are selected by the USFWS and all participants follow the methods of Elliot-Smith and Haig (2006a). The Winter Window Survey occurs annually in January along the entire U.S. Pacific coastline where Snowy Plovers nest or historically nested. All sites are surveyed using the same protocol (Elliot-Smith and Haig 2006b), during a specific week and the USFWS selects the dates for any given year.

**Predator management.** Nest predation, particularly where corvids benefit from human presence, is an important factor limiting Snowy Plover population growth. Predator management has been a component

of plover conservation in most recovery regions. Wire nest enclosures were used for several years to protect nests from predators (since 1992 in Oregon; 2006 in Washington); they succeeded in improving nest success, but have been associated with increased predation on adults and chicks, are costly to maintain, and may not increase fledging success (Hardy and Colwell 2008, Dinsmore et al. 2014, Pearson et al. 2014). No enclosures were used in 2014. In 2013, an Integrated Predator Damage Management Program was initiated at Willapa NWR to identify predators and minimize nest predation, through a contract with USDA-APHIS. The only observed nest predators were crows and ravens. Communication between plover biologists and wildlife specialists helped focus activities on locations and individual predators that were apparently causing the most plover depredations. Management activities included observing predator activities in plover nesting sites and then conducting targeted dispersal or lethal removal as appropriate. The success of the predator management program will be determined by comparing nest and fledging success and post-hatching survival rates before and after predator removal activities. The high nest success in 2013 and 2014 (Fig. 6) was likely a result of active predator management, but further study is needed. Productivity in Oregon, as measured by fledging success, brood success, number of fledglings/male, and overall number of fledglings produced, have all improved since active predator management was implemented in 2004 (Lauten et al. 2014).

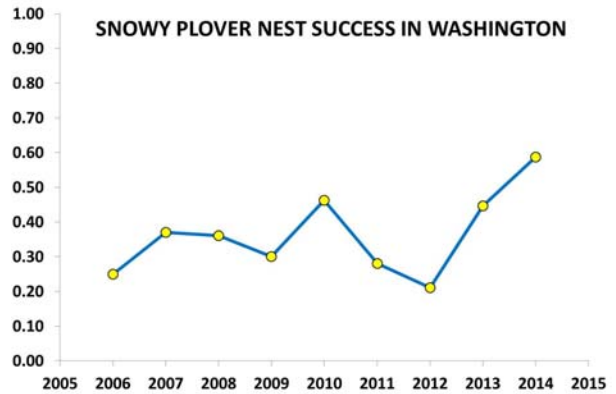


Figure 6. Snowy Plover nest success in Washington, 2006-2015 (predator management began in 2013).

**Habitat restoration.** Hudgens et al. (2014) stated that restoration sites that promote dispersal to relatively isolated populations in Washington and northern California may stabilize these populations. A habitat Restoration Area (HRA) at Leadbetter Point which is mostly cleared of non-native beachgrass using mechanical and chemical methods, has increased in size annually since Willapa NWR began work in 2001. The HRA now totals about 400 acres.

**Management of human disturbance.** Several management actions to limit human disturbance of nesting Snowy Plovers have been conducted in Washington since their listing in 1995. More detail is provided in Pearson et al. (2015). These actions include:

- Closure of nesting beaches above the wet sand using symbolic fencing (rope) and signs.
- Midway Beach Road access cuts through the plover nesting area with the highest use; it has been closed to vehicle use since 2009. During 2013 – 2015, a foot trail was established on the Midway Beach Road right-of-way, with rope to allow access, but minimize disturbance. This trail was closed in 2015, when plover nests were found on or adjacent to the trail.
- Since 2012 WDFW, State Parks, and USFWS have coordinated enforcement activities during clam tides which reduced the amount of human activity in active nesting areas. USFWS and WDFW provided funding for two portable toilets that were placed on Willapa NWR beaches during the busiest razor clam weekend days during the nesting season to discourage people from traversing the dunes.
- In spring 2015, WDFW produced an educational brochure focused on alleviating potential conflicts during razor clam seasons (Fig. 7). Willapa NWR distributed a “Share the Beach” brochure informing the public about Snowy Plover conservation and habitat restoration at Leadbetter Point.
- At Leadbetter Point, the beach is closed to vehicle traffic north of Oysterville Road from 15 April to the day after Labor Day, except driving is allowed on the wet sand during razor clam openings.

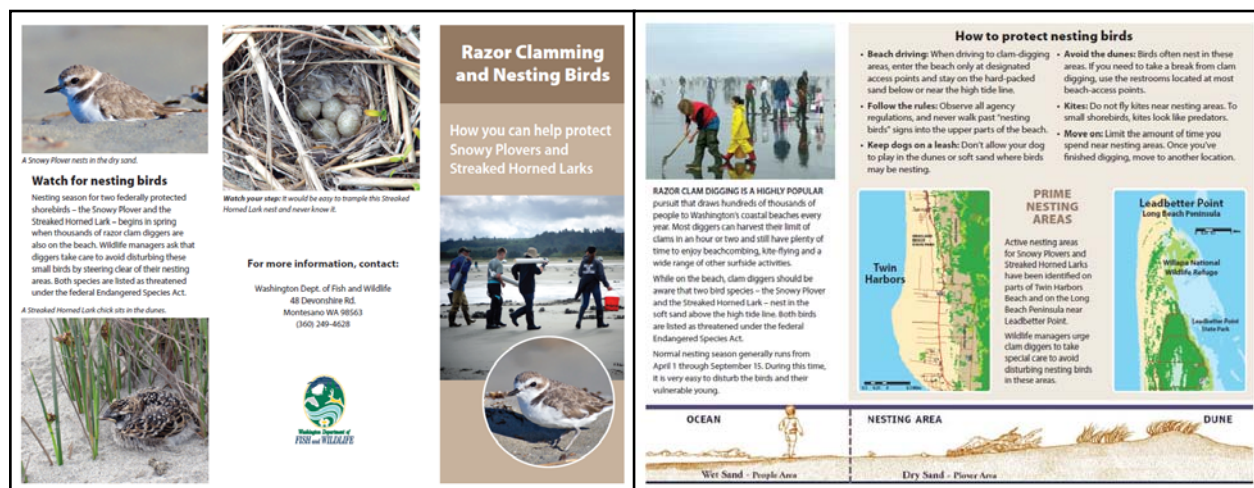


Figure 7. Brochure created for distribution during razor clam tides.

**Research.** Pearson et al. (2014a) described the influence of habitat characteristics, proximity of other Snowy Plover nests, and nest exclosures on nest survival in Washington (<http://wdfw.wa.gov/publications/01672/>). In collaboration with The Oregon Biodiversity Information Center and Steve Dinsmore, WDFW personnel completed a manuscript that examines chick survival in Oregon and Washington for the 28 days post-hatching (submitted for peer-review). This information may play a critical role in evaluating the effectiveness of predator management on chick survival.

## CONCLUSIONS AND RECOMMENDATION

While there appears to be some improvement in both the number of pairs and nesting success, Snowy Plovers have not met recovery goals and the population remains at less than 25 pairs. Demographic modeling conducted before predator management was implemented indicated that the Washington sites were dependent upon immigration from populations further south for their existence. The main issues affecting plover recovery include habitat limitation, predation, human-related disturbance, and probably mortalities during winter. Management of ravens and crows at Washington nesting beaches began in 2013; habitat restoration and management of human disturbance has been ongoing. Without these efforts, the Snowy Plover would likely slowly decline to extinction in Washington. Modeling indicated that habitat restoration may help stabilize small populations like Washington and northern California, and that even these small populations contribute to reaching range-wide recovery objectives for the metapopulation. It is recommended that the species remain state-listed as endangered.

As the benefits of predator management become evident, the state recovery plan should be revised to clarify the objectives. For example, a minimum time period could be specified during which objectives (1) (*A minimum 4-year average of at least 25 breeding pairs*), and (2) (*Average production of at least one fledged young per breeding pair per year*) be met before down-listing is proposed. Also, defining “secure habitat” (objective 3), would help to identify actions needed and in determining when the objective is met.

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# WASHINGTON STATE STATUS REPORTS, PERIODIC STATUS REVIEWS, RECOVERY PLANS, AND CONSERVATION PLANS

## Status Reports

2015 Tufted Puffin  
2007 Bald Eagle  
2005 Mazama Pocket Gopher,  
Streaked Horned Lark, and  
Taylor's Checkerspot  
2005 Aleutian Canada Goose  
2004 Killer Whale  
2002 Peregrine Falcon  
2000 Common Loon  
1999 Northern Leopard Frog  
1999 Olympic Mudminnow  
1999 Mardon Skipper  
1999 Lynx Update  
1998 Fisher  
1998 Margined Sculpin  
1998 Pygmy Whitefish  
1998 Sharp-tailed Grouse  
1998 Sage-grouse  
1997 Aleutian Canada Goose  
1997 Gray Whale  
1997 Olive Ridley Sea Turtle  
1997 Oregon Spotted Frog  
1993 Larch Mountain Salamander  
1993 Lynx  
1993 Marbled Murrelet  
1993 Oregon Silverspot Butterfly  
1993 Pygmy Rabbit  
1993 Steller Sea Lion  
1993 Western Gray Squirrel  
1993 Western Pond Turtle

## Periodic Status Reviews

2015 Steller Sea Lion

## Recovery Plans

2012 Columbian Sharp-tailed Grouse  
2011 Gray Wolf  
2011 Pygmy Rabbit: Addendum  
2007 Western Gray Squirrel  
2006 Fisher  
2004 Sea Otter  
2004 Greater Sage-Grouse  
2003 Pygmy Rabbit: Addendum  
2002 Sandhill Crane  
2001 Pygmy Rabbit: Addendum  
2001 Lynx  
1999 Western Pond Turtle  
1996 Ferruginous Hawk  
1995 Pygmy Rabbit  
1995 Upland Sandpiper  
1995 Snowy Plover

## Conservation Plans

2013 Bats

Status reports and plans are available on the WDFW website at:  
<http://wdfw.wa.gov/publications/search.php>

