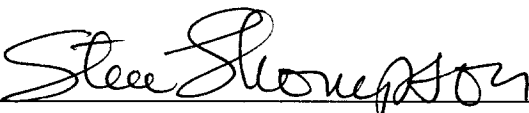


Recovery Plan for the
Pacific Coast Population of the
Western Snowy Plover
(*Charadrius alexandrinus nivosus*)

Volume 1: Recovery Plan

California/Nevada Operations Office
U.S. Fish and Wildlife Service
Sacramento, California

Approved:  _____

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significantly higher response level from adult piping plovers than did predators or nonpredatory species; chicks fed less and were brooded less when humans were within 160 meters (525 feet); and chick peck rate during feeding was lower when humans were present. They speculated that because chicks shifted from feeding and energy conservation activities to vigilance and cryptic predator avoidance behaviors, their energy reserves would be depleted, making them more susceptible to predators and inclement weather. They postulated that a decline in piping plover abundance in Nova Scotia could be caused by human disturbance altering chick behavior. Fewer chicks survived to 17 days in areas heavily disturbed by humans.

Schultz and Stock (1993) studied the effects of tourism on colonization, distribution, and hatching success of Kentish plovers (*Charadrius alexandrinus alexandrinus*), a Eurasian subspecies of the snowy plover, at the Wadden Sea in Germany. They measured disturbance intensity by counting and mapping tourists on 50 days from April to July, during times of peak human activity (1500 to 1600 hours) and in intervals of 30 minutes throughout other days. An index of person-hours per area per day was calculated. They found that Kentish plovers did not colonize heavily-disturbed areas and that resting and sunbathing people were apparently more disruptive than walking people because the latter generally followed the high-tide line. Clutch losses were lowest in areas with little disturbance and highest in areas with heavy disturbance. They indicated that hatching success in highly disturbed areas, even with optimal habitat, is as low as in poor habitat with a low level of disturbance.

ii. Dogs

Dogs on beaches can pose a serious threat to western snowy plovers during both the breeding and nonbreeding seasons. Unleashed pets, primarily dogs, sometimes chase western snowy plovers and destroy nests. Repeated disturbances by dogs can interrupt brooding, incubating, and foraging behavior of adult western snowy plovers and cause chicks to become separated from their parents. Pet owners frequently allow their dogs to run off-leash even on beaches where it is clearly signed that dogs are not permitted or are only permitted if on a leash. Enforcement of pet regulations on beaches by the managing agencies is often lax or nonexistent.

A number of examples of disruptive ways that dogs affect western snowy plovers have been noted at beaches in Monterey County (Marina State Beach), Santa Cruz County (Laguna, Scott Creek, and Seabright Beaches) and San Mateo County (Half Moon Bay and Pacifica Beaches) (D. George, pers. comm. 1997). Incubating birds have been flushed from nests by dogs, including nests located inside areas protected by symbolic fencing. Dogs also have displaced adults from nests with newly-hatched chicks. Roosting and feeding flocks, as well as individual birds, have been deliberately and persistently pursued by dogs. At Laguna Creek Beach, Zmudowski State Beach, and Salinas River State Beach, dogs partially or entirely destroyed western snowy plover nests which were in several cases, protected with symbolic fencing (D. George, pers. comm. 1997; Point Reyes Bird Observatory unpublished data; G. Page, pers. comm. 1998). Feral dogs are suspected to have disturbed western snowy plover nests and chicks on San Francisco Bay salt ponds (J. Albertson *in litt.* 1999).

Even when not deliberately chasing birds, dogs on a beach may disturb western snowy plovers and other shorebirds that are roosting or feeding. Page *et al.* (1977) found that western snowy plovers flushed more frequently and remained off their nests longer when a person was accompanied by a dog than when alone. They collected data during 156 hours of observation at 15 nests at Point Reyes, California, and found the following distances at which western snowy plovers flushed from their nests as a result of disturbance by people with dogs. Within 50 meters (164 feet), people with dogs caused flushing 100 percent of the time. At a distance of over 100 meters (328 feet), people with dogs caused flushing 52 percent of the time (Page *et al.* 1977). Fahy and Woodhouse (1995) found that joggers or walkers with off-leash dogs caused a significantly greater number of avoidance responses from western snowy plovers than other types of disturbances at Ocean Beach, Vandenberg Air Force Base, California. Lafferty's (2001) management model predicted that intense disturbances could be dramatically reduced by removing dogs.

At wintering sites such as Ocean Beach in San Francisco, California, off-leash dogs have caused frequent disturbance and flushing of western snowy plovers and other shorebirds. Off-leash dogs chase wintering western snowy plovers at this beach and have been observed to regularly disturb and harass birds (P. Baye, U.S. Fish and

Wildlife Service, pers. comm. 1997). Observations by National Park Service volunteers suggest that unleashed pets represent the most significant recreational threat to wintering western snowy plovers and migratory shorebirds at Ocean Beach, because of the prolonged and repeated disturbance created when they chase birds (Hatch 1997). In 1995 and 1996, during 45 hour-long observations of wintering flocks of western snowy plovers at Ocean Beach, western snowy plovers responded by moving in 73 percent of 74 instances when dogs with or without people approached to within 15 meters (50 feet) (Golden Gate National Recreation Area unpublished data). When shorebirds are flushed, they must spend more energy on vigilance and avoidance behaviors at the expense of foraging and resting activity (Burger 1993, Hatch 1997). Disruption of foraging and roosting may result in decreased accumulation of energy reserves necessary for shorebirds to complete the migration cycle and successfully breed (Burger 1986, Pfister *et al.* 1992). Dog disturbance at wintering and staging sites, therefore, may adversely affect individual survivorship and fecundity, thereby affecting the species at the population level.

iii. Motorized Vehicles

Unrestricted use of motorized vehicles on beaches is a threat to western snowy plovers and their habitat. Motorized vehicles may affect remote stretches of beach where human disturbance would be slight if access were limited to pedestrians. The magnitude of this threat is variable, depending on level of use and type of terrain covered. Use of motor vehicles on coastal dunes may also be destructive to dune vegetation, especially sensitive native dune plants.

Driving vehicles in breeding habitat may cause destruction of eggs, chicks, and adults, abandonment of nests, and considerable stress and harassment to western snowy plover family groups (G. Page, pers. comm. 1997; J. Myers *in litt.* 1988; J. Price *in litt.* 1992; Stern *et al.* 1990; Casler *et al.* 1993; S. Richardson, pers. comm. 1998; Widrig 1980). In addition to recreational vehicles, vehicles used for military activities have also caused western snowy plover mortality (Powell *et al.* 1995, 1997; Persons 1994).

Driving motor vehicles at night seems to be particularly hazardous to western snowy plovers. Drivers of all-terrain vehicles at night have run over and killed

GOLDEN GATE NATIONAL RECREATION AREA

SNOWY PLOVER MANAGEMENT PLAN

OCEAN BEACH, SAN FRANCISCO

ADMINISTRATIVE DRAFT – DO NOT DISTRIBUTE

~~May 1998~~

SNOWY PLOVER NATURAL HISTORY

DESCRIPTION

The snowy plover is a cosmopolitan species comprised of at least five races that range over an area that includes portions of North and South America, Europe, Africa and Asia. Its North American habitat includes beaches, lagoons, salt evaporation ponds, barren or sparsely vegetated salt flats and braided river channels. The total U.S. population is estimated at 21,000 with declining numbers along the Pacific and Gulf coasts due to habitat degradation and increasing recreational use of beaches. It is the Pacific coast population of the snowy plover that is now designated as threatened by the USFWS (Page et al. 1995). The current nesting population along coastal Washington, Oregon and California is estimated to be around 1,900 adults (Page, pers. comm.).

The snowy plover is a small, pale-colored shorebird with dark patches on either side of the upper breast. It breeds on coastal beaches from southern Washington to southern Baja California and in the western interior around saline lakes and ponds. Both coastal and interior breeders winter along the Pacific coast. The mean life span of snowy plovers is about 3 years, but at least one individual was 15 years old when last seen (Page et al. 1995).

Between 20 and 85 snowy plovers currently inhabit Ocean Beach during the non-breeding season, from July through mid-May. There are no confirmed nesting records for snowy plovers on Ocean Beach, although they breed on nearby sand beaches north and south of GGNRA.

MONITORING PROGRAM

In accordance with NPS management policies and guidelines, and to provide data necessary for development of an appropriate management plan based upon an understanding of the number and distribution of snowy plovers on Ocean Beach and their interactions with human activity, GGNRA established a snowy plover monitoring program in cooperation with the Point Reyes Bird Observatory (PRBO) in late 1994.

Due to the heavy recreational use of beaches in or near urban areas, there was concern about the effects of various beach uses on the declining snowy plover population. Although studies have been completed on disturbances to shorebirds (Burger 1981; Burger 1986; Burger 1991; Burger 1993; Burger 1994; Burger and Gochfeld 1991; Gabrielsen and Smith 1995; Staine and Burger 1994), none of the research was specific to wintering snowy plovers, thus a monitoring program was put in place.

DISTURBANCE

Ocean Beach has always been a popular location for recreational activities, including fishing, surfing, dog walking, kite flying, horseback riding, beach walking, bird watching, jogging, picnicking, campfires, and beach parties. ~~GNRA monitoring data indicates that unleashed pets represent the most significant recreational threat to wintering snowy plovers and migratory shorebirds on the beach because of the prolonged and repeated disturbance created when they chase birds.~~ Other human activities with the potential to adversely impact snowy plovers and their habitat on Ocean Beach include nighttime vehicle use directly in their path, prolonged vehicle and/or heavy equipment operation during the day, beach grooming, beach cleanup activities, and emergency operations.

VISITOR ACTIVITIES

Ocean Beach's location in the midst of San Francisco and the region's mild Mediterranean climate attract high levels of beach recreation year-round. The most common recreational activities on Ocean Beach include walking, jogging, dog walking, fishing, and surfing. Less common pursuits include kite flying, horseback riding, sunbathing, picnicking, group gatherings, and nighttime campfires. Visitation depends on several factors, including weather, time of day, day of the week, and season. Visitation on weekend afternoons averages four to eight times higher than on weekday mornings, and maximum weekend visitation (nearly 2,000 people encountered per hour) may be more than ten times greater than the weekday maximum. Local neighborhood beach use probably accounts for most weekday visitation, while weekend use includes visitors from a much larger geographic area.

Visitation is highest during the spring and summer months. Weather conditions account for wide day-to-day variability in recreational beach use. Beach walking, jogging, dog walking, fishing, and surfing are activities that occur at Ocean Beach regularly, even during cold, wet and windy weather. The greatest numbers of people are encountered north of Judah Street, with the fewest between Lawton and Vicente Streets (Hatch 1996). This pattern largely reflects the location of adjacent parking lots.

UNLEASHED PETS

Unleashed pets represent the greatest recreational threat to snowy plovers and migratory shorebirds on Ocean Beach because ~~dogs instinctively chase birds and, unlike all other activities that occur on the beach, the dogs that do chase birds specifically focus and direct their actions and attention toward snowy plovers and the other shorebirds that live on the beach.~~ Beaches are the natural habitat or home for these birds. Disturbance associated with dogs can be prolonged and difficult for birds to avoid without repeated escape maneuvers, often requiring flight and

increased energy expenditure, or fleeing entirely from the area. Dogs appear and behave similarly to natural shorebird predators like foxes and can elicit instinctive flight or fright reactions by birds (Gabrielsen and Smith 1995). In contrast, disturbance created by joggers and beach walkers is usually momentary as it does not target snowy plovers or shorebirds and usually can be alleviated by birds walking or running out of their direct path or by crouching and hiding.

While there is no published scientific research on disturbance to snowy plovers, several scientific papers have been published on disturbance to piping plovers which are closely related to snowy plovers and occupy similar habitats on the east and gulf coasts of the United States. Piping plovers were listed as a federally threatened species in 1986. Their decline is attributed to many of the same factors affecting the Pacific coast population of the snowy plover. A review of the scientific literature on shorebird disturbance indicates that repeated disturbances reduce foraging efficiency in piping plovers and other shorebirds, probably forcing them to increase the total time dedicated to feeding activities. Increased energy expenditure due to repeated disturbance during the breeding season is hypothesized to reduce foraging time, deplete fat reserves, and possibly result in decreased fitness (fewer offspring produced) in piping plovers, whose reproductive success is lower in areas with high human disturbance (Burger 1991; Burger 1994).

The GGNRA snowy plover monitoring program documented 381 dogs deliberately chasing gulls and shorebirds (from 1 to over 100 birds per incident), and 49 dogs chasing snowy plovers (between 1 and 34 birds per incident) between December 1994 and May 1996. This results in a conservative estimate of nearly 5,000 instances of dogs deliberately chasing birds (mostly migratory shorebirds) per year,¹ and more than 400 instances of dogs intentionally chasing snowy plovers in a wintering season.² An average of 3.25 plovers were chased per incident leading to a cumulative estimate of approximately 1,350 snowy plovers chased in a year. A significant amount of inadvertent snowy plover disturbance by dogs also occurs when dogs are chasing other birds or running loose on the beach.

From December 1994 through May 1996, the NPS snowy plover monitoring program documented that only 10 percent of dogs observed on Ocean Beach were leashed, 50 percent were classified as roaming, and another 6 percent were chasing birds. The remaining 34 percent were unleashed obedient dogs that remained within 6 to 10 feet of their owners.

Based on these results and the information gathered on the distribution of snowy plovers on Ocean Beach, the NPS, in consultation with the USFWS, agreed to begin enforcement of existing

¹ Estimate of numbers of dogs chasing birds in a year was determined by taking the total number of survey hours (~275 hours), assuming an annual average of 10 daylight hours of beach use per day, dividing 275 survey hours by 10 daylight hours per day = 27.5 days or approximately 4 weeks of daylight hours), multiplying the number of dogs observed chasing birds during the 275 survey hours (381) by 13 to get the estimated number of dogs chasing birds over 52 weeks in a year. $381 \times 13 = 4953$.

² Estimate of number of dogs chasing snowy plovers in a year was determined by totaling the number of hours of direct plover observation (~100 hours), assuming an annual average of 10 daylight hours of beach use per day (100 hours of observation equals approximately 1.5 weeks of daylight hours), dividing the number of dogs observed chasing plovers during 100 hours (19) by 1.5 to get number of dogs chasing plovers in one week (12.7), multiplying dogs chasing plovers in one week by 33 weeks to get number of dogs chasing plovers over 7.5 peak months of plover presence on Ocean Beach. $12.7 \times 33 = 419$. An average of 3.25 plovers were chased per incident or $419 \times 3.25 = 1362$ cumulative total snowy plovers chased.

NPS leash regulations on the 2-mile portion of Ocean Beach between Stairwell 21 and Sloat Boulevard. ~~More than 99 percent of snowy plover observations since December 1994 have been on this section of Ocean Beach.~~

The GGNRA General Superintendent approved a policy in July 1996 that identified "voice-control" areas in the park where obedient pets may be off leash. Voice-control areas on Ocean Beach are south of Sloat Boulevard and north of Stairwell 21 (near Fulton Street) (GGNRA 1996). Interpretive and regulatory snowy plover protection signs informing the public of this change in park policy were installed beginning in November 1996. A public meeting, brochures, maps, interpretive walks, ranger patrols, and media outreach were all used to inform the public about the presence and vulnerability of snowy plovers and the changes in enforcement of NPS leash regulations. Enforcement of the leash regulation in the Snowy Plover Management Area began on January 1, 1997. The USFWS April 22, 1997 letter to the San Francisco Board of Supervisors and accompanying "Justification for Enforcement of the National Park Service's Leash Law on Portions of Ocean Beach, San Francisco, California" are included in this document as Appendix B.

Analysis of snowy plover monitoring program data on degree of dog control between July 1997 and January 1998 documented an increase to 26 percent of dogs leashed in the Snowy Plover Management Area and 13 percent in the voice-control areas. Roaming dogs in the snowy plover area increased from 50 to 57 percent and increased to 72 percent in the voice-control areas. The percent of dogs chasing shorebirds remained at declined to less than 5 percent for the entire beach. Prior to enforcement of leash restrictions in the Snowy Plover Management Area, the highest numbers of dogs occurred between Stairwell 21 and Rivera Street, as well as just south of Sloat Boulevard. With the advent of leash restrictions between Stairwell 21 and Sloat Boulevard, there has been a significant shift in dog use to the north and south ends of the beach outside of the snowy plover area and to other "voice control" areas of the park (Hatch, Stenzel et al. 1997). Overall dog use on Ocean Beach has declined by almost 50 percent and to an even greater extent in the snowy plover area. See Section 4.2.1.2, Campfires, for discussion of potential nighttime impacts of unleashed pets.

The park's new policy to enforce leash restrictions in the area where snowy plovers occur should be ~~adequate to protect wintering snowy plovers on Ocean Beach. If significantly higher levels of compliance can be achieved, Degree of compliance appears to be somewhat variable.~~ The dramatic decline in numbers of dogs in the plover area is believed to have significantly reduced the level of disturbance associated with roaming dogs. Ranger patrols and public contact, both by resource protection and interpretive rangers, need to continue on a routine basis in order to gain increased compliance and ensure protection of snowy plovers. Additional interpretive and/or ~~resource protection staff resources may be necessary to ensure the success of snowy plover protection measures.~~

The NPS is committed to pursuing funding to accomplish interpretive initiatives to further snowy plover protection in the park. Potential avenues for public outreach include establishing a volunteer program for viewing snowy plovers and migratory shorebirds, conducting programs for neighborhood schools and community organizations, production of an educational and training