

**NESTING OF THE CALIFORNIA LEAST TERN AND
WESTERN SNOWY PLOVER AT
OCEANO DUNES STATE VEHICULAR RECREATION AREA,
SAN LUIS OBISPO COUNTY, CALIFORNIA
2015 SEASON**



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**Prepared by
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Attachments

- U.S. Department of Agriculture Wildlife Services. Oceano Dunes State Vehicular Recreation Area 2015 Predator Management Report
- Ventana Wildlife Society. Avian Predator Management Project: Trapping and Relocation of Problem Avian Predators at Oceano Dunes State Vehicular Area in 2015
- Necropsy examination report: one least tern juvenile
- Medical examination record: one snowy plover adult

SUMMARY

Staff of Oceano Dunes State Vehicular Recreation Area (Oceano Dunes SVRA, ODSVRA) and Point Blue Conservation Science (Point Blue) monitored breeding California least terns (*Sternula antillarum browni*) (least tern, tern) and western snowy plovers (*Charadrius nivosus nivosus*) (snowy plover, plover) at ODSVRA, San Luis Obispo County, California, in 2015.

There were an estimated 44-49 least tern breeding pairs, similar to the 47-48 pairs in 2014 and above the average of 40-43 pairs (range=23-66) for the 10-year period 2005-14. There were 54 known nesting attempts, all within the large seasonally fenced enclosure in the southern portion of the vehicle riding area. The nest hatching rate was 88.9% (48/54). Of the six nests that failed, one was abandoned pre-term (prior to the expected hatch date); one abandoned post-term; one abandoned, unknown if pre- or post-term; one depredated by raccoon; and two failed to unknown cause. Eighty-four chicks hatched and 69 were color-banded to individual. Sixty-nine of the 84 chicks (including 12 unbanded chicks) are known to have fledged (seen when 21 days old or older), for a chick fledging rate of 82.1% and an estimated 1.41-1.57 chicks fledged per pair. For the 10-year period 2006-15, average productivity was 1.21-1.28 chicks fledged per pair. Mortality was documented for two juveniles in the seasonal enclosure; one found as a carcass and one observed alive with serious injuries that would have prevented survival.

There was a minimum of 205 breeding snowy plovers (113 males and 92 females), compared to 226 in 2014. One hundred and twelve banded birds were documented as breeding, and the banding history was known for 105 of these birds. Of the known origin birds 87.6% (92/105) were banded as chicks and fledged from ODSVRA. There were 217 known nesting attempts, including 15 identified only by detection of brood (unknown nest location). Of the 202 nests from known locations, 182 (90.1%) were in the southern riding area seasonal enclosure (Southern Enclosure) and 20 (9.9%) in Oso Flaco. Of the 195 nests with known location and fate, 167 hatched for a nest hatching rate of 85.6%. Twenty-eight nests failed, attributed to the following causes: abandoned pre-term (12); abandoned post-term (1); abandoned unknown pre- or post-term (4); abandoned, suspected due to wind (1); unknown cause (3); raven (4); unidentified predator (1); and unidentified avian predator (2). Of the 494 hatching chicks, 331 were color-banded to brood (183 fledged) and the fate of the 163 unbanded chicks is believed known (94 fledged). A total of 277 chicks fledged (seen when 28 days old or older) for a fledging rate of 56.1%. One chick fledged per breeding male is the estimated number needed to prevent the population of snowy plovers from declining and productivity of 1.2 chicks fledged per male should provide for moderate population growth (assuming approximately 75% annual adult survival and 50% juvenile survival) (U.S. Fish and Wildlife Service 2007). In 2015, an estimated 2.45 juveniles fledged per male at ODSVRA and will promote population growth. For the 14-year period 2002-15, average productivity was 1.47 juveniles fledged per breeding male.

INTRODUCTION

Oceano Dunes SVRA, located in southern coastal San Luis Obispo County, California, is a popular park with high attendance and was visited by over 1.6 million people in 2014 for a variety of recreational opportunities, including driving vehicles on the beach and dunes.¹ In 2014, an estimated 317,949 street-legal vehicles and 154,943 off-highway vehicles were driven on the shoreline and dunes in the designated riding area of the park.²

Within ODSVRA there is extensive breeding habitat for two special-status ground-nesting birds, the state and federally endangered California least tern and the federally threatened Pacific coast population of the western snowy plover. Monitoring of the least tern and snowy plover at ODSVRA during the breeding season began in 1991 and 1992, respectively. Least terns are present at ODSVRA only during the breeding season, migrating to wintering areas well south of California. The snowy plover population at the park is comprised partly of birds present year-round and partly of migrant birds present only during the breeding or wintering season.

This report summarizes the results of the 2015 nesting season for least terns and snowy plovers at ODSVRA. Maps in figures and appendices use digital satellite photos taken in 2007 by DigitalGlobe © 2008, unless otherwise noted.

State park staff conducts monitoring activities at ODSVRA under U.S. Fish and Wildlife Service (USFWS) permit 10(a)(1)(A) TE-815214-7 and California Department of Fish and Wildlife (CDFW) Scientific Collecting Permits. Predator removal activities are conducted under USFWS Depredation Permit MB25976A-0. Point Blue conducts monitoring and banding activities under USFWS permit 10(a)(1)(A) TE-807078-15, Federal U.S. Geological Survey Bird Banding Laboratory Banding Permit 09316, CDFW Scientific Collecting Permit SC-006691, and a CDFW Memorandum of Understanding.

¹ ODSVRA 2014 Annual Attendance figures (source ODSVRA)

² ODSVRA 2014 Monthly Carrying Capacity Summaries (source ODSVRA)

SITE DESCRIPTION

ODSVRA is part of the 18-mile-long Guadalupe-Nipomo Dunes complex. The Oceano Dunes District, California Department of Parks and Recreation, manages approximately 4,900 acres with approximately 9.1 miles of ocean shoreline on the western edge. On the northern border of the park is the city of Pismo Beach. Located to the east of the park are Phillips 66 Refinery, the cities of Grover Beach and Oceano, and private lands that consist of dunes, coastal scrub, and agricultural fields. The southern border of the park abuts the Guadalupe-Nipomo Dunes National Wildlife Refuge (NWR). Inside the park, dunes that are open to vehicles extend inland in some areas for over one mile. Eight numbered marker posts, located approximately 0.5 miles apart, are located along the coastal strand of the riding area to orient park visitors and staff. Street-legal vehicles are allowed throughout the riding area. Off-highway vehicles, as well as overnight camping, are allowed along the beach and dunes south of marker post 2 (approximately one mile south of Pier Avenue). In the southern portion of ODSVRA is Oso Flaco Lake area (Oso Flaco) with a shoreline of approximately 1.7 miles. Pedestrians are allowed at Oso Flaco but it is closed to camping, equestrian, dog, and vehicle use. The beach at Oso Flaco west of the foredunes is narrower than in the riding area.

The following are descriptions of sites and terms as used in this report (Figure 1, Figure 2).

ODSVRA: All areas that are administered by the Oceano Dunes District, including the Oceano Dunes SVRA, Pismo State Beach, Pismo Dunes Natural Preserve (Dunes Preserve), Pismo Lake, and Oso Flaco Lake area. Management of the Dunes Preserve and Pismo State Beach was transferred to the Oceano Dunes District in December 2004. The Pismo Lake property was acquired from the California Department of Fish and Wildlife in 2007 and is currently closed to the public. ODSVRA provided tern and plover monitoring for the Dunes Preserve prior to 2004 and continues to do so. Pedestrian and equestrian use is permitted in the Dunes Preserve, but vehicles and dogs are not allowed.

Riding area: The area within ODSVRA that is open to recreational vehicles. This area changes in size based on seasonal restrictions. Street-legal vehicles are allowed along approximately 5.3 miles of beach, from the Grand Avenue park entrance south to the southern boundary of the riding area (approximately 0.4 miles south of marker post 8). Off-highway vehicles are only allowed south of marker post 2.

Open riding area: The area within ODSVRA open to recreational vehicle use during the nesting season.

Southern Enclosure: A single contiguous area within the southern portion of the riding area that is fenced and closed to entry during the breeding season to protect nesting terns and plovers. The adjoining shoreline is also part of the Southern Enclosure and is closed to public entry during the nesting season. From 2001 to 2004, the amount of seasonally protected nesting habitat in the riding area periodically increased in size. Subsequent to 2004 there has been no increase in size of this protected area. The area of the Southern Enclosure (including the area at and above the high tide line on the closed shoreline) for 2015 was approximately 297 acres, compared to a range of 271-301 acres (and an average of 288 acres) between 2004 and 2014. Although the basic configuration of the Southern Enclosure has remained consistent since 2004, changes in dune topography and public safety issues impact the placement of the east fence, resulting in small variations in acreage from year to year. Individually identified areas (Figure 2) within the Southern Enclosure include the following:

6 enclosure: The area from marker post 6 to marker post 7, (approximately 0.5 miles of shoreline and approximately 61 acres), first incorporated into the Southern Enclosure for a full season in 2004. Vegetation within the enclosure is overall very sparse with limited areas of vegetated hummocks.

7 enclosure: The area from marker post 7 to the south side of 7.5 revegetation area (approximately 0.4 miles of shoreline and approximately 62 acres). Habitat includes extensive areas of bare sand, limited areas of vegetated hummocks, limited areas of organic surface debris (shells, driftwood, dried algal wrack), and moderate to heavy vegetation in the small 7.5 revegetation area located within the 7 enclosure.

8 enclosure: The area from the south side of the 7.5 revegetation area to the North Oso Flaco fencing south of marker post 8 (approximately 0.5 miles of shoreline and approximately 83 acres). Habitat includes extensive areas of bare sand, limited areas of vegetated hummocks, and limited areas of organic surface debris (shells, driftwood, and algal wrack).

Boneyard enclosure: The area east of the North Oso Flaco dunes. Habitat is primarily bare sand and active sand dunes. This inland area does not have a shoreline component and is approximately 92 acres. A portion of the west side (12.5 acres) has been closed year-round since 2005 due to the presence of a cultural resource area. In September 2014, this area increased in size by 6 acres. Portions of this area have developed small vegetated hummocks. Straw bales, placed within the protected cultural area in 2004, to build up sand to cover and protect cultural resources, persist. The east fence is not maintained as predator fencing due to the rapidly shifting open sand dunes in the area. Instead, beginning in 2003, a two-inch by four-inch mesh interior fence (six-foot-tall predator fencing) has bisected Boneyard enclosure during the nesting season, resulting in 42 acres in the western portion (contiguous with 6, 7, and 8 enclosures) and 50 acres in the eastern portion.

Oso Flaco: The shoreline and dunes in ODSVRA located south of the riding area. The approximately 1.7 miles of beach length is narrow in width, and the dunes are typically heavily vegetated, relative to the riding area. The area is part of the Oso Flaco Lake area, open to pedestrian use but closed to vehicles. Beginning in 2006, an additional 0.4 miles of shoreline at the southern end of the park were included in the ODSVRA (a survey conducted by the Guadalupe-Nipomo Dunes NWR in 2005 determined this area was part of ODSVRA and not the NWR, as was previously thought). For purposes of discussion in this report, Oso Flaco is divided into North Oso Flaco and South Oso Flaco (Figure 2).

North Oso Flaco: The area extending south from 8 enclosure to the pedestrian boardwalk access trail to the Oso Flaco shoreline (approximately 0.5 miles of shoreline and approximately 68 acres). Beginning in 2002, the upper beach and dunes were closed to pedestrians during the nesting season with symbolic fencing. Since 2005, the North Oso Flaco area has been part of the seasonal enclosure and managed in a similar manner; predator fencing has replaced symbolic fencing and the shoreline has been closed to the public during the nesting season.

South Oso Flaco: Extends from the boardwalk to the ODSVRA southern boundary (approximately 1.2 miles shoreline length). Oso Flaco Lake drains through Oso Flaco Creek and the mouth of this creek is within the northern portion of South Oso Flaco. The shoreline is open to the public and symbolic fencing and signage have been used since 2002 to designate the seasonally closed upper beach and dune habitat. Snowy plover nests found in this area typically receive individual nest enclosures.

Pipeline revegetation area: Located adjacent to the east side of 8 enclosure. The area is heavily vegetated.

Arroyo Grande Creek: Seasonally flows into the Pacific Ocean approximately two miles north of the Southern Enclosure. The associated lagoon is variably located east of the area between marker post 1 and marker post 2. The upper creek area and lagoon are closed to vehicle use year-round to protect sensitive aquatic habitat. Pedestrian and equestrian entry is prohibited during the nesting season and permitted

during the nonbreeding season. Posts and signs delineate the closed area during the nonbreeding season; symbolic rope fence is added during the nesting season.

Carpenter Creek: Seasonally flows into the Pacific Ocean approximately 4.5 miles north of the Southern Exclosure. No vehicles are allowed in the area as it is approximately 0.4 miles north of the riding area. The area receives a high level of pedestrian use.

Pismo Creek lagoon: Seasonally flows into the Pacific Ocean approximately 4.8 miles north of the Southern Exclosure. Standing water persists all year, with low vegetated hummocks west of the lagoon and tall vegetated dunes and housing to the east. No vehicles are allowed in the area as it is approximately 0.75 miles north of the riding area. The area receives a high level of pedestrian use. Only a small portion of the lagoon is part of state park property.

MONITORING AND MANAGEMENT ACTIONS

MONITORING

Daily monitoring occurs from 1 March – 30 September. At a minimum, ODSVRA maintains three monitors during morning and early afternoon hours. As the season progresses, monitoring increases to include the late afternoon and early evening hours. Monitoring involves walking to assess or find new nests as well as scanning nests and broods from parked vehicles (a proven and effective blind). Monitoring occurs in a manner to minimize disturbance or adverse effects to adult birds, nests, and chicks.

Open riding area

Monitoring of the open riding area by vehicle occurs daily along defined transects, as any nests initiated or chicks in this area require immediate protection from recreational activities. Areas along transects with plover activity indicating potential nesting interest (scraping or copulating) are checked more thoroughly on foot and with increased frequency using binoculars or spotting scope. When staff finds chicks in the open riding area, the area is closed to vehicles and chicks are slowly directed back into the protected Southern Enclosure. Staff continues to monitor chicks to confirm they do not move back into the open riding area.

Breeding least terns and snowy plovers

Finding and monitoring nests: The least tern and snowy plover management program documents size of breeding populations and attempts to find, monitor, and determine all tern and plover nest and chick fates. Staff checks most nests daily and conducts regular nest searches using binoculars and spotting scopes from parked vehicles outside of the seasonal fencing. Additional nest searches are conducted on foot. Staff maps nest locations using a Global Positioning System (GPS). Egg-laying dates provide estimates for least tern and snowy plover clutch hatching dates; for nests found at full clutch, floating the eggs (snowy plovers only) provides an estimate.

Nest fates:

The following categorizes nest fates used in this report:

Hatch: Nest hatched at least one egg. Nesting attempts known only by detection of brood are referred to as “unknown location nests” and egg numbers from such nests are minimums derived from the number of chicks first observed.

Abandoned pre-term: Nest abandoned prior to the expected hatch date; causes may include, but are not limited to, disturbance or adult mortality.

Abandoned, suspected due to wind: Nest abandoned pre-term during periods of high wind, with eggs typically found almost or completely buried.

Beginning in 2010, the category of “abandoned, suspected due to wind” was added to nest fates. Prior to this, nests lost where wind may have been the cause were included in the broader category of “abandoned pre-term.” For the 2010 report, least tern nests in the abandoned pre-term category for the previous eight years were reviewed and a limited number were reassigned to the category of abandoned, suspected due to wind. Tables in this report include the reassigned tern nest fates for years prior to 2010.

Abandoned post-term: Nest abandoned after the expected hatch date, and includes nests with nonviable eggs.

Abandoned, unknown if pre- or post-term: Nest abandoned, but unknown if pre- or post-term.

Depredated: Nest lost to a predator. If possible, staff identifies the predator to species or group (mammalian, avian), or describes the nest as lost to an unidentified predator.

Flooded: Nest overwashed by tide, or flooded by a shifting creek or expanding lagoon.

Failed to unknown cause: Nests that disappeared before expected hatch date with cause of failure undetermined.

Unknown fate: Nests where eggs disappear around the estimated hatch date, but not enough evidence exists to determine whether they hatched or failed. To decrease disturbance to chicks, access to nests with nearby young tern and plover broods is limited, and may result in nests with unknown fate.

Banding chicks: In 2015, least tern chicks received a single size 1A blank aluminum band (covered with yellow over green vinyl tape) on the right leg, and a size 1A numbered aluminum federal band on the left leg. Color tape placed on the federal band creates color band combinations unique to each individual chick. Weighing chicks occurs immediately prior to banding, typically at one to three days old.

Banding of plover chicks was inconsistent prior to 2001. Since 2002, the goal has been to band all chicks to brood, with all chicks within one brood given the same color band combination. Since 2010, some ODSVRA band combinations on birds that may be alive have been reused due to the limited number of combinations available. Therefore, the age of adult plovers with certain ODSVRA band combinations is sometimes unknown. Some chicks are left unbanded in areas with nearby young tern and plover broods to reduce disturbance to chicks. The fates of unbanded chicks are tracked with intense monitoring of broods. In some instances the associated male or sibling chicks may be color banded.

Assignment of broods to nests: Most chicks are banded at the nest. Chicks found outside of the immediate nest area can often be assigned to a specific hatched nest as one or both of the parents are color banded. For some broods with unbanded adults the brood location and age of chicks allow nest determination. However, circumstances can occur with several nearby nests hatching at the same time (chicks confirmed from distance with spotting scope) and banding at the nests is not possible. The resulting broods, with chicks the same age, may appear on the same section of shore and it is not possible to assign each brood to a specific nest. Such broods are referred to as “unassigned broods.”

Chick monitoring: Chick observations are recorded during daily monitoring activities. In addition, focused searching for broods occurs multiple times each week from vehicle surveys on the shoreline of the Southern Enclosure and Oso Flaco. Staff records band combinations, chick numbers, adults present, location and direction of movement, and any interaction or aggression with nearby broods.

Fledging success: At ODSVRA, juvenile terns can be widely dispersed over a large area. Monitoring efforts directed specifically for terns are needed in estimating the number of juveniles produced as well as identifying threats to survival. Tern chicks surviving to 21 days or older are considered fledged (21 days after the hatch date, which counts as day zero). Tracking of juvenile terns occurs on park property (in the Southern Enclosure, at Oso Flaco Lake, Pismo Creek lagoon, and roosting areas such as south of Pier Avenue) and at nearby sites.

The fledgling tern counting method varies among years as follows: single day high counts for 1991-97, and 2000-01; a single day high count at Oso Flaco Lake for 1998; count method for 1999 unknown; and

three-week interval day count conducted from 2002-04 (chicks banded to site 2003-04). In 2005, chicks were color-banded to brood and from 2006-15 most chicks were color-banded to individual, resulting in more accurate documentation of fledge rate than previous methods. Earlier estimates prior to banding to individual may represent substantial undercounts or overcounts.

Plover chicks surviving to 28 days or older from the time of hatch are considered fledged (28 days after the hatch date, which counts as day zero). Prior to 2001, monitoring in Oso Flaco and Pismo Dunes Natural Preserve was intermittent, and fledgling information was not obtained.

Measures describing breeding success:

The following categorizes measures describing breeding success used in this report:

Hatch rate: Total number of hatching known location and fate nests divided by total number of nests with known location and fate.

Percentage chicks fledging: Total number of chicks fledging divided by total number of chicks (includes chicks fledged from unknown location nests).

Number of chicks fledging per nest: Total number of chicks fledging divided by total number of nests.

Productivity: Number of least tern fledglings per breeding pair (consistent with the annual statewide California least tern report produced by CDFW). Number of snowy plover fledglings per breeding male (consistent with USFWS Pacific coast western snowy plover recovery plan).

Banded adults: Documenting banded least terns and snowy plover adults can provide detailed information on history of birds including: origins, age, breeding status, and movement between sites. Staff attempts to record all band combinations of adult least terns and snowy plovers.

Number of breeding adults: For least terns the number of breeding pairs is represented as a range. The estimated minimum number of pairs is equal to the maximum number of concurrently active nests and broods. The estimated maximum number of pairs is equal to the minimum number of pairs plus one-half of the value of the minimum number of pairs subtracted from the total number of nests. (This assumes nests in addition to those accounted for by the minimum number of pairs are equally divided between renesting pairs and new pairs.):

$$\text{Max. no. pairs} = \text{min. no. pairs} + [(\text{total no. nests} - \text{min. no. pairs}) / 2]$$

Banding least tern chicks to brood in 2005, and to individual since 2006, provides for increased accuracy in counting the number of active broods on a given date. From 1991 to 2001, the estimated number of breeding pairs was not always reported or was based only on the number of concurrent nests. These reports were reviewed in 2005, looking at both nests and the limited brood information. For some years this resulted in identifying an increase in the minimum number of pairs and this revised information has been provided in annual reports since 2005.

Individually banded snowy plover adults provide the most accurate means to identify breeding population size but currently at ODSVRA too few adults are banded to rely solely on this method. A minimum number of breeding females is derived from the maximum number of nests active on the same day plus any additional nests hatching one day before or initiated one day after this date. A minimum number of breeding males is estimated from the highest same day count of active nests and broods (males typically raise the chicks; males with broods three weeks of age or older are not included if they could be

associated with a new nest) and number of nests initiated the day after the high count. Beginning in 2009, numbers of color-banded adults confirmed breeding are compiled, and any number of this group that could not be accounted for on the same day high count, including nests or broods with unknown adults, are added to the same day high count for the appropriate sex.

ODSVRA also participates in the annual U.S. Pacific coast snowy plover breeding season window survey coordinated by USFWS.

Least tern night roost: During the breeding season terns may assemble in a night roost. Monitors record the night roost location and total numbers of individuals present as the terns arrive at dusk. Night vision goggles are available and used for this task, but they have a limited range for distance viewing. There are occasions when terns are not seen, but are heard vocalizing as they arrive to roost after it is too dark to see. Counts are considered a minimum due to the inherent limited visibility of the night roost. It is typically too dark to distinguish between adults and juveniles.

Least tern use of freshwater lakes: Freshwater lakes can provide a source of prey fish in addition to the near-shore ocean. Periodically surveying nearby small freshwater lakes documents tern use and gives a better understanding of local food resources. An important component of this monitoring is to determine if lakes provide additional appropriately-sized fish to feed chicks (chicks require fish small enough that they can be swallowed whole). Observations of adults in flight provide information about the direction of foraging sources and, occasionally, fish size.

Wind speed monitoring

Beginning in 2011, ODSVRA monitors wind speed from a tower (S1 tower) located approximately 375 feet east of 6 enclosure, with anemometers at two, seven and ten meters high. In 2010-11, a portable anemometer with data logger (from WindLog Rainwise, Inc.) was placed in the breeding habitat. Before 2010, wind speeds were periodically measured by handheld weather gauges (Kestrel 2000 Weather Meter by Kestrel Meters).

Predator activity

Monitoring predator activities: Park staff and contractors (Ventana Wildlife Society, U.S. Department of Agriculture (USDA) Wildlife Services, and Point Blue) collect information on predator presence at ODSVRA from February through September. From direct observation of mammalian and avian predators or their sign (e.g., tracks, scats, regurgitated pellets, prey remains, depredated nests), monitors record species, type of sign, behavior, duration of observation, direction of travel, and characteristics that may identify an individual. Summarizing these observations by count of days detected, location of animal sighting or sign, and observation duration allows for comparison across years. For additional details, see section titled Predators and predator management on page 41.

Gull monitoring: Gulls may depredate snowy plover and least tern eggs, chicks, and juveniles. Gulls are of particular concern because they can be a subsidized predator attracted to food resources associated with human activity. Conducting daily and more detailed monthly surveys during the nesting season, in addition to general predator monitoring, documents flock locations and numbers within the park. Gull numbers are counted at the trash dumpster area daily and the full park is surveyed monthly.

Nonbreeding season monitoring of snowy plovers

Beginning in 2009, more consistent weekly surveys for snowy plovers occurs during the months of October through February. During these surveys staff divides the shoreline into the following five sections, listed from north to south:

- 1) approximately 0.5 miles north of Pismo Pier to Grand Avenue (pedestrian use only, no vehicle use allowed);

- 2) Grand Avenue south to marker post 2 (street-legal vehicles and day use only, no camping);
- 3) marker post 2 south to marker post 6 (street-legal vehicles, off-highway vehicles, and camping allowed year-round);
- 4) marker post 6 south to the southern shoreline riding area boundary (shore and portion of upper beach closed to public use during 1 March to 30 September and open to all activities during the rest of the year); and
- 5) Oso Flaco (southern shoreline riding area boundary to ODSVRA's southern boundary with pedestrian use only and portion of shore and upper beach closed to pedestrian use 1 March to 30 September).

ODSVRA also participates in the annual U.S. Pacific coast snowy plover winter window survey coordinated by USFWS.

Investigation of least tern and snowy plover carcasses

ODSVRA sends fresh carcasses of least terns or snowy plovers to an approved facility (CDFW Office of Spill Prevention and Response, Marine Wildlife Veterinary Care and Research Center, Santa Cruz, California) for necropsy. Fresh carcasses must be immediately refrigerated and then sent by overnight delivery service within one day to preserve the integrity of tissues to be tested to determine cause of death.

MANAGEMENT ACTIONS

ODSVRA manages for least terns and snowy plovers to optimize breeding success and reduce the potential for take. To reduce visitor disturbance to breeding birds, ODSVRA installs fence around seasonally closed areas to visitors and posts signage. Staff augments existing habitat with branches, woodchips, wrack (surf-cast kelp), plants and seed. An active predator management program reduces disturbance and depredation by mammalian and avian predators.

Informational signage and enforcement of regulations

Interpretive panels at access points and signs identifying closed areas serve to increase public awareness of threats to nesting terns and plovers. The public can access a low wattage radio station with a repeated recording of park information, including information about protection of sensitive species. State Park rangers enforce park regulations enacted to protect terns and plovers.

Seasonal closure and fencing

Every year from 1 March through 30 September, ODSVRA closes least tern and snowy plover breeding habitat to vehicle and pedestrian use with wire or symbolic fencing. The wire fencing of the seasonal enclosure (see details below), provides a higher level of protection when compared to symbolic fencing, composed of rope with signs, to keep visitors from entering sensitive areas. When nesting occurs outside of the seasonal enclosure, staff may choose an alternative wire enclosure type with consideration for the species, topography, proximity to recreational activities, predator threats, and duration of disturbance to the area during enclosure construction. The seasonal enclosure and large single nest enclosures are collectively referred to as seasonal fencing in this report.

ODSVRA uses the following enclosure types:

Seasonal enclosure (Southern Enclosure and North Oso Flaco) protected area: ODSVRA fences this approximately 350-acre area during the nesting season to limit vehicle and human trespass into protected nesting and brood-rearing habitat. Wire fencing five feet high (bottom eight inches buried) with two-inch by four-inch mesh discourages coyote (*Canis latrans*) entry. Beginning in 2006, an additional layer of fence material was attached to overlap the top of the fence, increasing fence height above the surface to approximately six feet as a further deterrent to coyotes. Staff attaches bird barrier spikes to the wood posts in an effort to discourage perching by avian predators. Tall posts with large stop signs extend into the intertidal area at marker post 6 and the south end of North Oso Flaco. Rope with additional signage extends between the shoreline posts to clearly designate a closed shoreline to visitors.

Symbolic fencing (South Oso Flaco): Symbolically fencing approximately 1.2 miles of nesting and brood-rearing habitat in South Oso Flaco identifies the closure area (lower shore remains open to public). Nests in this area typically receive some type of individual nest enclosure.

Large single nest enclosure: Staff installs a minimum 200-foot-diameter circular single nest enclosure with height of five feet (bottom eight inches buried) around any least tern or snowy plover nest found in the open riding area. Single nest enclosures of differing sizes may also be used to protect snowy plover nests in areas where vehicles are not permitted (Oso Flaco, Southern Enclosure shoreline, Arroyo Grande Creek area, and areas north of Grand Avenue).

10-foot by 10-foot enclosure, circular enclosure, and mini-enclosure: Staff selectively uses a small circular or one of two small square nest enclosures (made of two-inch by four-inch wire) around snowy plover nests inside or outside of seasonal fencing for protection from predators, including roosting gull flocks. Staff uses different enclosures based on a variety of factors including, but not limited to, weather, topography, predator threats, and proximity of young broods.

The 10-foot by 10-foot enclosure (used since 2003) and seven-foot-diameter circular enclosure (used since 2012) are built with five-foot-high sides and the bottom eight inches buried when outside of the seasonal enclosure protected area. A 1/2-inch by 1/2-inch mesh net top is added when avian predation is a concern.

Mini-exclosures (used since 2010) are three feet by three feet by three feet with a wire mesh top, staked into the ground, and buried four to eight inches when appropriate. Of the three types, mini-exclosures take the least amount of time and staff to install.

Bumpout: A nest in the Southern Exclosure located less than 100 feet from the east or north fence requires temporary additional fencing extending into the open riding area to allow an adequate buffer between recreational activities and the nest. This type of extended fence is termed “bumpout.” Staff extends bumpouts when recreational activities continue to cause disturbance to nesting birds. ODSVRA maintains a safe vehicle corridor adjacent to the east fence and any bumpouts. Nests on the shoreline that are close to the west fence may be enclosed by two-inch by four-inch mesh fencing extending from the Southern Exclosure fence; this type of single nest enclosure is also given the term bumpout.

Habitat enhancement

Following the nesting season, and for the five-month period October through February, camping, street-legal vehicles, and off-highway vehicles use portions of the Southern Exclosure. This recreational use results in large areas of flattened terrain and barren sand with very limited scattered natural debris and vegetation.

Each year, staff place material in 6, 7, and 8 exclosures to offer more areas of disruptive cover for terns and plovers, providing shelter from wind and blowing sand, reducing exposure to predators, and augmenting potential nesting substrate. Beginning in February or March, and prior to nest initiation, natural materials such as driftwood, woodchips, and wrack are added to the exclosures and shoreline areas, to enhance habitat features. No habitat enhancement occurs within 100 feet of the fence that borders the open riding area to discourage nesting near recreation that may cause disturbance to breeding birds.

Wrack and talitrids: Results from studies conducted by Drs. Jenny Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara, suggest that the seven-month seasonal closure (March through September) is not a sufficient period of time for invertebrates to effectively recover species diversity and abundance on the Southern Exclosure shoreline following five months of recreational vehicle use.

ODSVRA collects wrack in the open riding area and disperses it in the Southern Exclosure. Collection and distribution is done by hand and moved using a truck and trailer. In addition to providing cover, wrack on the shoreline provides a food resource supporting invertebrates, which in turn are prey for plover chicks, juveniles, and adults. Talitrids (commonly called beach hoppers) are collected from outside the vehicle use area north of Grand Avenue. Staff inoculates the wrack addition areas of the Southern Exclosure shoreline with talitrids in order to establish a breeding population, thus increasing the food resources available for plover chicks and juveniles during the breeding months.

Woodchips, branches and driftwood: Staff adds woodchips to supplement the existing assorted debris that snowy plovers often choose as nesting substrate. Woodchips are spread in patches of less than a quarter-acre in size in the 6, 7, and 8 exclosures in areas of barren sand and over thinning woodchip patches remaining from the previous year(s). OSDVRA heavy equipment assists in loading woodchips to be distributed.

Staff distributes cut branches and driftwood in patches from the mid-portion of 6 and 7 exclosures to the west fence and upper shoreline west of the exclosure. Staff collects the branches and driftwood from the exclosures at the end of each season and stores them for use in the following season.

Plants and seeds: Prior to expected rain, staff may broadcast seed and install container plants grown on-site, as available, in an effort to provide scattered plants in 6 and 7 exclosures. All seed for dispersal and container plants are collected from local foredune species. The seeding and planting is within 6 and 7 exclosures because these areas have the least amount of vegetative cover during the nesting season compared to other areas of the seasonal exclosure. Seed or plants are of foredune species such as sea rocket (*Cakile maritima*), beach bur (*Ambrosia chamissonis*), and sand verbena (*Abronia maritima*). Scattered plants, and the associated development of small hummocks, can benefit plovers and terns during the breeding season.

Predator management

In addition to preventative measures such as fencing, individual nest exclosures, and cover provided by habitat enhancement, ODSVRA park staff and contractors monitor predator activity to assess impacts on breeding terns and plovers (as discussed in Monitoring). Staff removes animal carcasses (which attract scavengers) in or adjacent to nesting and brood-rearing habitat and harass predators to flush them from sensitive areas. Hazing techniques used include firing a bird whistler and waving arms and making noise while approaching an avian predator on foot or by vehicle. A bird whistler is a handheld launcher that fires a projectile 250 to 300 feet and makes a loud “screech” sound, hazing predatory birds without harming them. The bird whistler can be fired from a vehicle, which can limit disturbance to plovers and terns when it would be disruptive to approach an avian predator on foot in the breeding habitat. When additional options for managing predators are needed, selective live-trapping and relocation of avian predators is conducted by Ventana Wildlife Society and selective live-trapping and relocation or lethal removal of mammalian and avian predators is conducted by USDA Wildlife Services. See section titled Predators and predator management on page 41 for additional information.

Figure 1. ODSVRA site map.

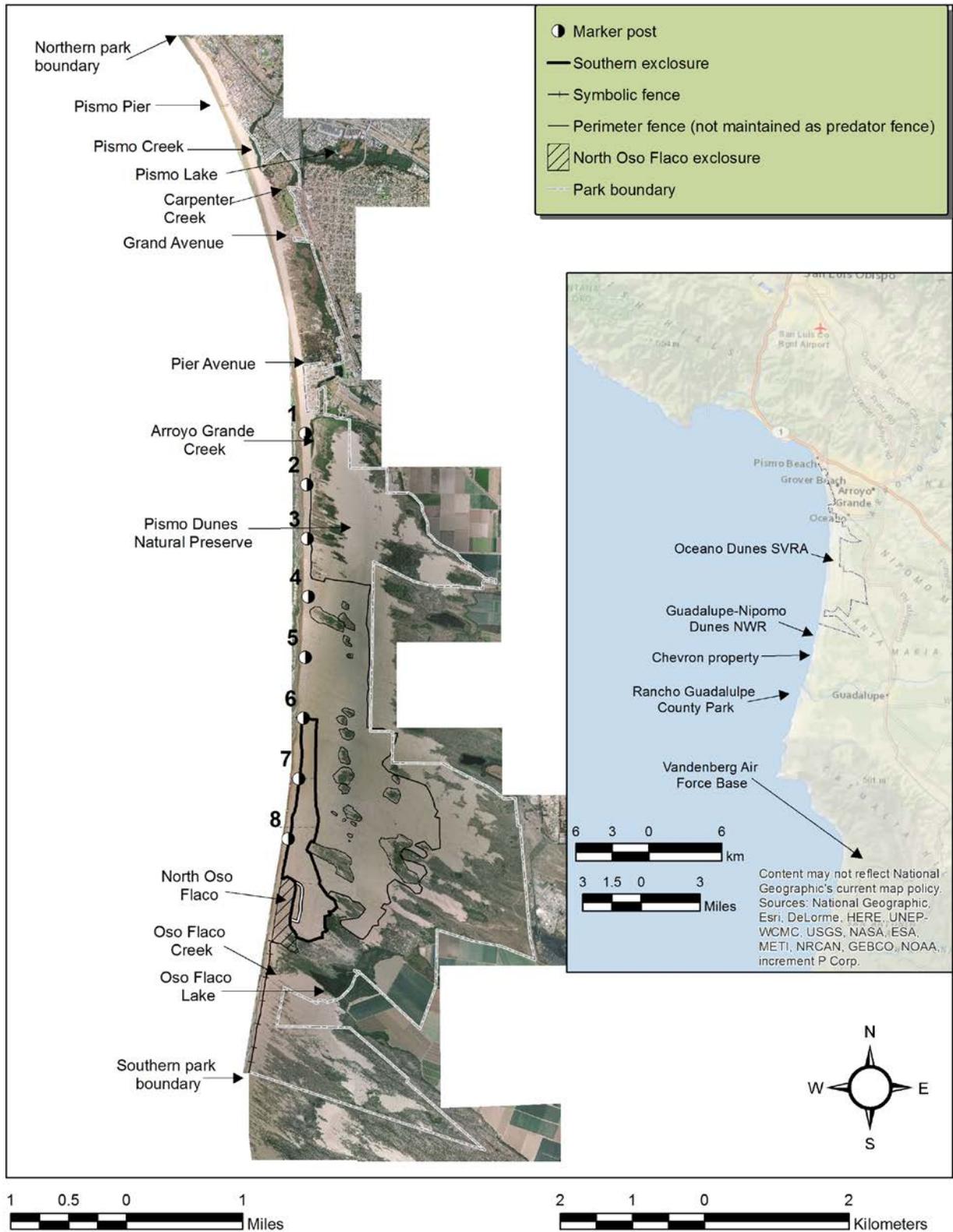
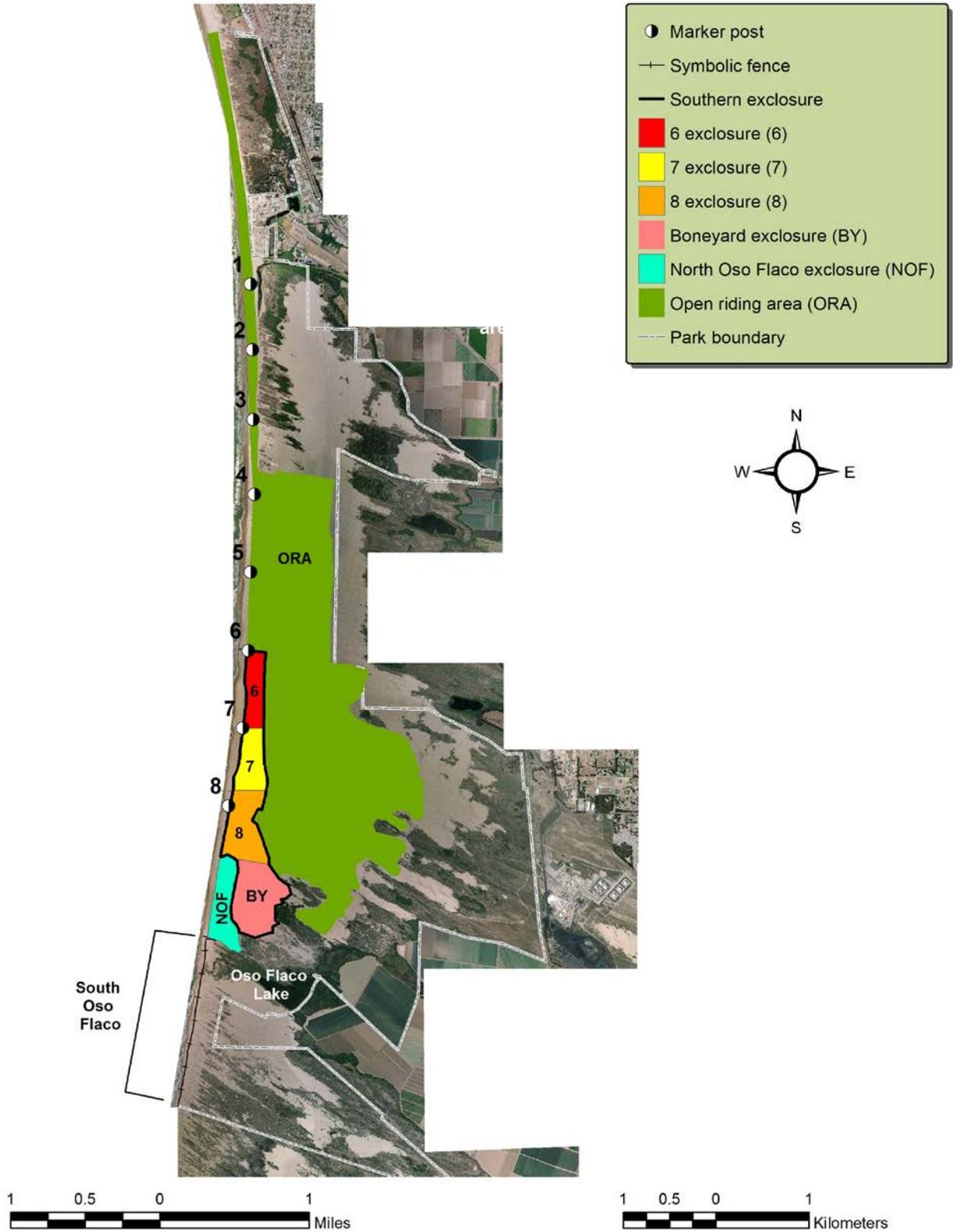


Figure 2. ODSVRA Southern Exclosure and Oso Flaco seasonally protected areas for breeding California least terns and snowy plovers in 2015.



RESULTS AND DISCUSSION

CALIFORNIA LEAST TERN

Number of breeding pairs

In 2015, least terns were first seen at ODSVRA on 28 April with three flying over the enclosure, and from this date onward terns were seen or heard daily. Terns were last seen on 17 August with two adults over 8 enclosure shoreline. During the previous 10 years, first sightings occurred between 8 April and 13 May (median=6 May) and last sightings occurred between 10 August and 25 September (median=31 August). There were an estimated 44-49 breeding pairs. This is similar to the 47-48 pairs in 2014 and above the average of 40-43 pairs (range=23-66) from 2005-14 (Table 1, Figure 3).

Number, clutch size, and distribution of nests

There were 54 nesting attempts documented, with the first nest initiated approximately 18 May and the last 12 July (Appendix A). During the ten-year period 2005-14, there were an average of 46 nests per year (range=23-66) with initiation dates for first nests ranging from 16 May to 8 June (median=4 June). In 2015, the maximum number of nests active at the same time was 44 on 7 June. Of the 45 nests with known complete clutch size seven had one egg, 37 had two eggs, and one had three eggs, with an average clutch size of 1.87 eggs. This compares to an average of 1.89 for 2005-14 (range=1.55-2.05), and a reported statewide average of 1.71 from 2007-14 (range=1.60-1.82) (Marschalek 2008-12; Frost 2013-15). Nests were located in 6 enclosure (38 nests), 7 enclosure (15 nests), and 8 enclosure (1 nest) (Figure 4).

Clutch hatching rate

All nests had a known fate and 88.9% (48/54) hatched. This compares to an average hatching rate of 83% (range=66-91%) during the period 2005-14 (Table 1). The hatching rate was 92.1% (35/38) in 6 enclosure, 80.0% (12/15) in 7 enclosure, and 100% (1/1) in 8 enclosure. Sixty-one chicks hatched from a minimum of 71 eggs in 6 enclosure, 21 chicks hatched from a minimum of 25 eggs in 7 enclosure, and two chicks hatched from a single two-egg nest in 8 enclosure. Causes of loss for six nests known to fail were abandoned pre-term (1); abandoned post-term (1); abandoned, unknown if pre- or post-term (1); depredated by raccoon (1); and failed, unknown cause (2) (Table 2).

Table 1. Nesting success of California least terns at ODSVRA from 1991-2015.

Percent nests hatched calculated using number of nests with known fate. Percent chicks fledged and juveniles fledged per nest may include fledges from unknown nest locations detected only by brood presence, but these are few. Chicks were banded to site in 2003 and 2004. In 2005, chicks were first banded to brood and from 2006-15, chicks were banded to individual.

Year	Estimated no. breeding pairs	No. nests (no. known fate)	No. hatched nests	Percent known fate nests hatched	No. chicks	Percent chicks fledged	No. juveniles	Juveniles fledged per nest	Estimated no. juveniles fledged per pair
1991	4-5	6 (6)	2	33	4	50	2	0.33	0.40-0.50
1992	3-4	4 (4)	1	25	2	50	1	0.25	0.25-0.33
1993	0	0	0	0	0	0	0	0	0
1994	2	2 (2)	0	0	0	0	0	0	0
1995	1	1 (1)	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0
1997	16-19	21 (10)	3	30	6	67	4	0.19	0.21-0.25
1998	33-37	40 (32)	26	81	40	60	24	0.60	0.65-0.73
1999	28-31	34 (30)	21	70	38	45	17	0.50	0.55-0.61
2000	4-5	5 (5)	4	80	8	50	4	0.80	0.80-1.00
2001	12-15	18 (18)	13	72	22	55	12	0.67	0.80-1.00
2002	20-21	22 (19)	15	79	27	37	10	0.45	0.48-0.50
2003	53-66	79 (77)	60	78	101	37	37	0.47	0.56-0.70
2004	47-55	63 (60)	44	73	69	36	25	0.40	0.45-0.53
2005	47-53	59 (59)	39	66	66	30	20	0.34	0.38-0.43
2006	31-35	38 (38)	28	74	45	80	36	0.95	1.03-1.16
2007	54-60	66 (66)	51	77	90	78	70	1.06	1.17-1.30
2008	55-56	56 (56)	50	89	99	71	70	1.25	1.25-1.27
2009	25-26	26 (26)	23	88	43	77	33	1.27	1.27-1.32
2010	23	23 (23)	20	87	35	83	29	1.26	1.26
2011	33-34	35 (35)	31	89	55	91	50	1.43	1.47-1.52
2012	41-44	46 (40)	33	83	52	81	42	0.91	0.95-1.02
2013	48-53	57 (52)	45	87	85	66	56	0.98	1.06-1.17
2014	47-48	49 (46)	42	91	76	76	58	1.18	1.21-1.23
2015	44-49	54 (54)	48	89	84	82	69	1.28	1.41-1.57

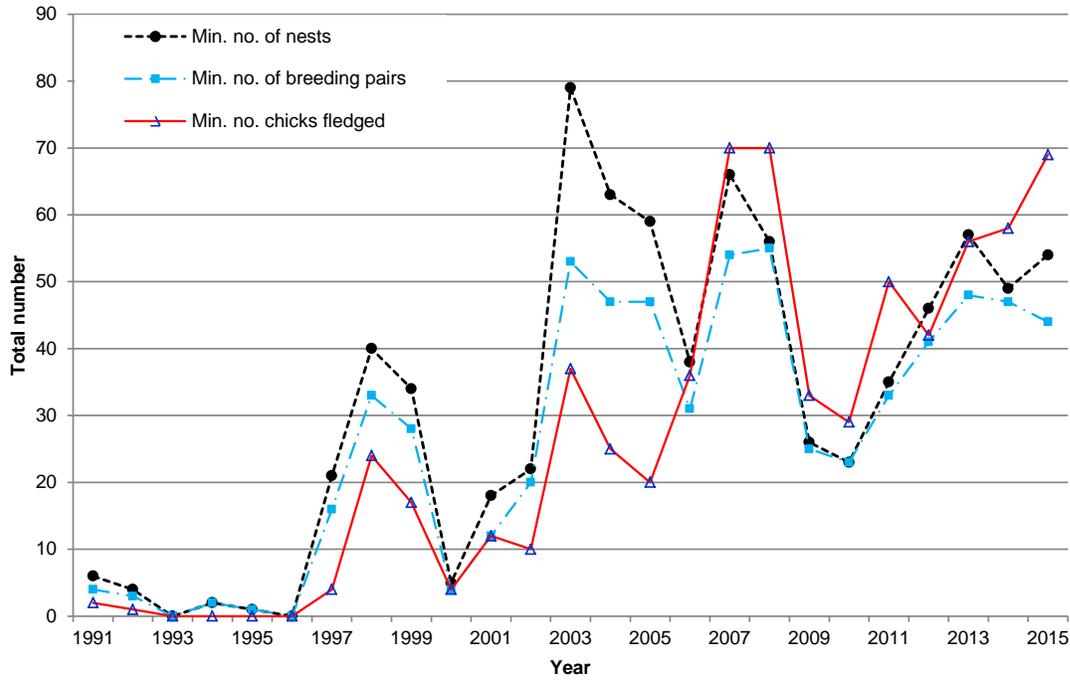


Figure 3. Number of California least tern nests, pairs, and fledglings at ODSVRA from 1991-2015.

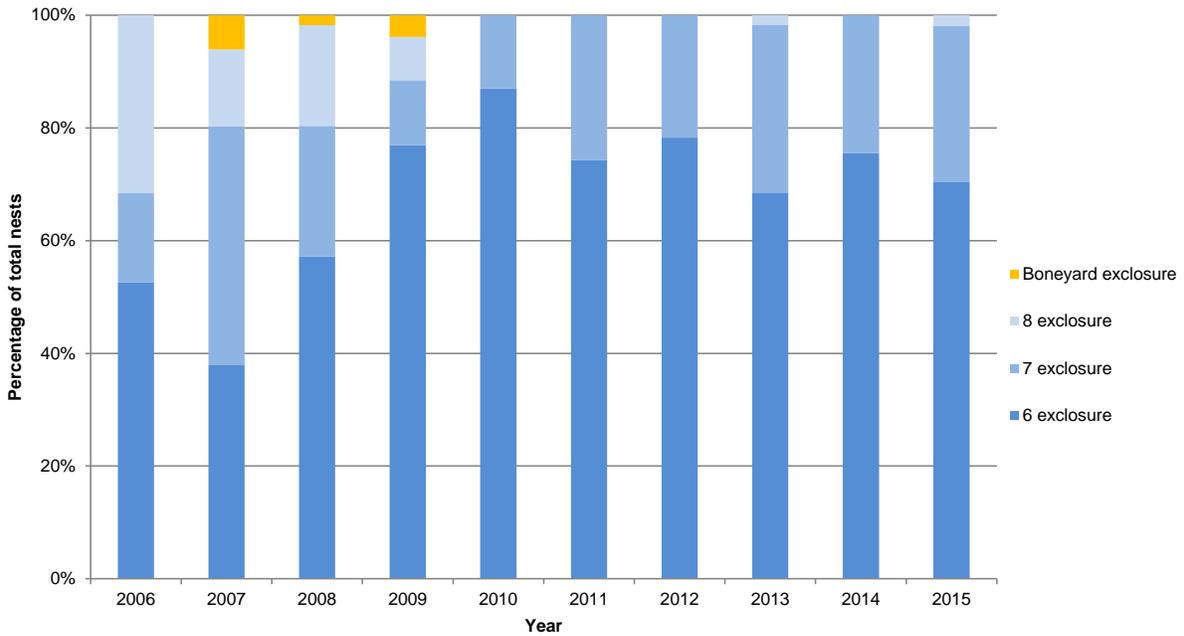


Figure 4. Distribution of least tern nests as a percent of total nests at ODSVRA from 2006-15. 6 enclosure was first incorporated into the Southern Enclosure for a full season in 2004.

Table 2. Causes of California least tern nest loss at ODSVRA from 2002-15.

Ab.=Abandoned

Year	Ab. pre-term	Ab. post-term	Ab., susp. wind	Ab., unknown if pre- or post-term	Failed, cause unknown	Coyote	Gull	Opossum	Raccoon	Unknown predator	Chick dies in egg at hatch	Total no. failed nests
2002	1	1				2						4
2003	6	3				1				2		12
2004	9	1				2				1		13
2005	7	3		4	4					1	1	20
2006	5	3		1						1		10
2007	1	4	4		6							15
2008	3	2					1					6
2009	1	1		1								3
2010		1			1			1				3
2011	2	2										4
2012	1	2		3	1							7
2013	2			2	1	1		1				7
2014	1	1		1	1							4
2015	1	1		1	2				1			6
Total 2002-15	40 (35.1%)	25 (21.9%)	4 (3.5%)	13 (11.4%)	16 (14.0%)	6 (5.3%)	1 (0.9%)	2 (1.8%)	1 (0.9%)	5 (4.4%)	1 (0.9%)	114

Chick fledging rate, juveniles produced per pair, and juvenile length of stay on-site

Sixty-nine of the 84 known hatching chicks were banded with a unique color combination. Sixty-nine of the 84 chicks were seen when 21 days old or older for a fledging rate of 82.1% (57 fledglings were banded and 12 were unbanded) (Appendix A). This fledging rate compares to an average of 78% (range=66-91%) during the previous nine years when most chicks were banded to individual. For two-chick broods, 59% (20/34) fledged both young. This compares to an average of 62% (range 43-86%) for 239 two-chick broods during the period 2006-14. In 2015, the estimated number of fledglings produced per pair ranged from 1.41-1.57. This is higher than the ten-year average of 1.11-1.17 for 2005-14 (range=0.38-1.52) and well above recent averages for all of California (Table 1). Estimated statewide fledgling rates for each year are reported as a range and averaged 0.26-0.38 fledglings per pair for the ten-year period 2005-14 (highest estimates in 2014 with range=0.37-0.68) (Marschalek 2007-13; Frost 2014).

From 2010-15, there have been six known occurrences of a least tern chick moving east of the enclosure into the open riding area (two in 2010, by the same chick on the same day; one in 2011; two in 2013; and one in 2015). These chicks were monitored and directed back into the enclosure. On 28 June 2015, one ten-day-old color-banded chick of the two-chick LT42 brood moved ten feet east of 7 enclosure and was picked up and placed back in the enclosure. This chick was documented to fledge (see Notes section).

Of the current or recent breeding sites in San Luis Obispo and Santa Barbara counties, only ODSVRA bands chicks. Marking least tern chicks with individual color band combinations has increased the ability to detect juveniles at ODSVRA and provides greater accuracy in documenting fledging rate than the three-week count method³. For the six-year period 2006-11, the three-week count method at ODSVRA consistently underestimated the minimum known number of juveniles produced each year, identifying an average of 49.0% (range=38.0-66.7%) of the known minimum number (see CDPR 2011 for greater

³ High counts of juveniles that are seen on dates at intervals of three weeks are added together (Marschalek 2007). This is based on the assumption that juveniles typically depart the colony with their parents within two to three weeks of fledging (at 21 days old) and that any juveniles seen are not from other sites.

details). ODSVRA relies on color band resighting data to derive a more accurate fledging rate and did not conduct three-week counts in 2012-15.

Color banding chicks to brood in 2005 and to individual since 2006 has also provided information on juvenile length of stay at ODSVRA. In 2015, 21.4% (12/56) of the color-banded juveniles tracked were documented remaining at ODSVRA for 21 days or longer post-fledging, with one juvenile documented on-site for 45 days post-fledging. Over the 11-year period 2005-15, 483 color-banded fledglings were tracked at ODSVRA with 33.1% remaining 21 days or longer (Table 3, Figure 5).

Table 3. Number of days that color-banded California least tern juveniles hatched at ODSVRA continued to be seen on-site after reaching fledge age (21 days old) during the 11-year period, 2005-15.

During this period, 483 color-banded fledglings (21 days old or older) were tracked at ODSVRA (sightings outside the park are not included). Numbers in parentheses are percentages of all banded fledglings for the year. One banded chick in 2015 (LT9) was known to fledge based only on found carcass and is excluded from table.

Year	0 - 6 days post-fledge	7 - 13 days post-fledge	14 - 20 days post-fledge	21 - 27 days post-fledge	28 - 34 days post-fledge
2005	0 (0%)	4 (20%)	2 (10%)	10 (50%)	4 (20%)
2006	4 (12%)	5 (15%)	9 (26%)	14 (41%)	2 (6%)
2007	12 (17%)	14 (20%)	17 (25%)	21 (30%)	5 (7%)
2008	14 (21%)	30 (44%)	15 (22%)	9 (13%)	0 (0%)
2009	3 (10%)	14 (48%)	8 (28%)	3 (10%)	1 (3%)
2010	3 (11%)	4 (14%)	12 (43%)	9 (32%)	0 (0%)
2011	2 (4%)	5 (10%)	9 (18%)	31 (63%)	2 (4%)
2012	4 (11%)	6 (17%)	14 (39%)	10 (28%)	2 (6%)
2013	6 (12%)	12 (23%)	24 (46%)	10 (19%)	0 (0%)
2014	2 (5%)	7 (17%)	18 (43%)	14 (33%)	1 (2%)
2015	13 (23%)	9 (16%)	22 (39%)	9 (16%)	3 (5%)
TOTAL 2005-15	63 (13%)	110 (23%)	150 (31%)	140 (29%)	20 (4%)

Mortality (other than eggs)

There was a minimum of two documented tern mortalities (other than eggs) at ODSVRA during the 2015 breeding season; one unbanded juvenile observed 22 July with a broken wing in 7 enclosure and on 7 enclosure shoreline and assumed to not survive, and the intact carcass of one juvenile (L:Y/G from LT9) found on 21 July inside 7 enclosure 50 feet east of the western fence (see Appendix G and Necropsy report).

Least tern use of nearby small freshwater lakes

During the chick-rearing period, adult least terns are noted foraging and carrying fish from the ocean, but may also be seen at the following nearby small freshwater lakes: Pismo Lake, Oso Flaco Lake, Dune Lakes, and Cypress Ridge Lake. Of the freshwater sources noted, Oso Flaco Lake and Pismo Lake are located on State Park property. Pismo Lake was not actively monitored by staff from 2010-15 and tern use of this lake is suspected to be minimal. Use of Oso Flaco Lake in 2015 appeared to be minimal compared with previous years. Oso Flaco Lake is more accessible to monitors and in 2015 there were eight surveys (lasting an average of 45 minutes) conducted between 7 July and 15 August with an average of 4 birds seen (high count of five on 25 July). This compares with an average of 12 birds and a single day high count of 30 birds in 2014 (eight surveys conducted). Over the season, no banded juveniles and a

minimum of two banded adults were documented at Oso Flaco Lake; one banded W/B:R/Y tern (fledged from ODSVRA in 2010), and the second banded Y/W/Y:- (missing band on right leg, one Y/W/Y:G/Y tern fledged from ODSVRA in 2007). The two banded adults were observed by a local birder and photos confirmed their band combinations. Adults were also seen feeding juveniles at Oso Flaco Lake and carrying fish northwest towards the Southern Exclosure. Terns were observed flying over Dune Lakes, but no detailed information is available because these lakes are only visible from a distance. There were many observations of adult terns carrying small fish flying into the exclosure from the east (the direction of Dune Lakes). In 2007, monitors first documented terns foraging at Cypress Ridge Lake, located approximately 3.2 miles east of the tern colony site. This lake had moderate levels of foraging documented in 2007-10, none in 2011, 2014, or 2015, and minimal use in 2012-13.

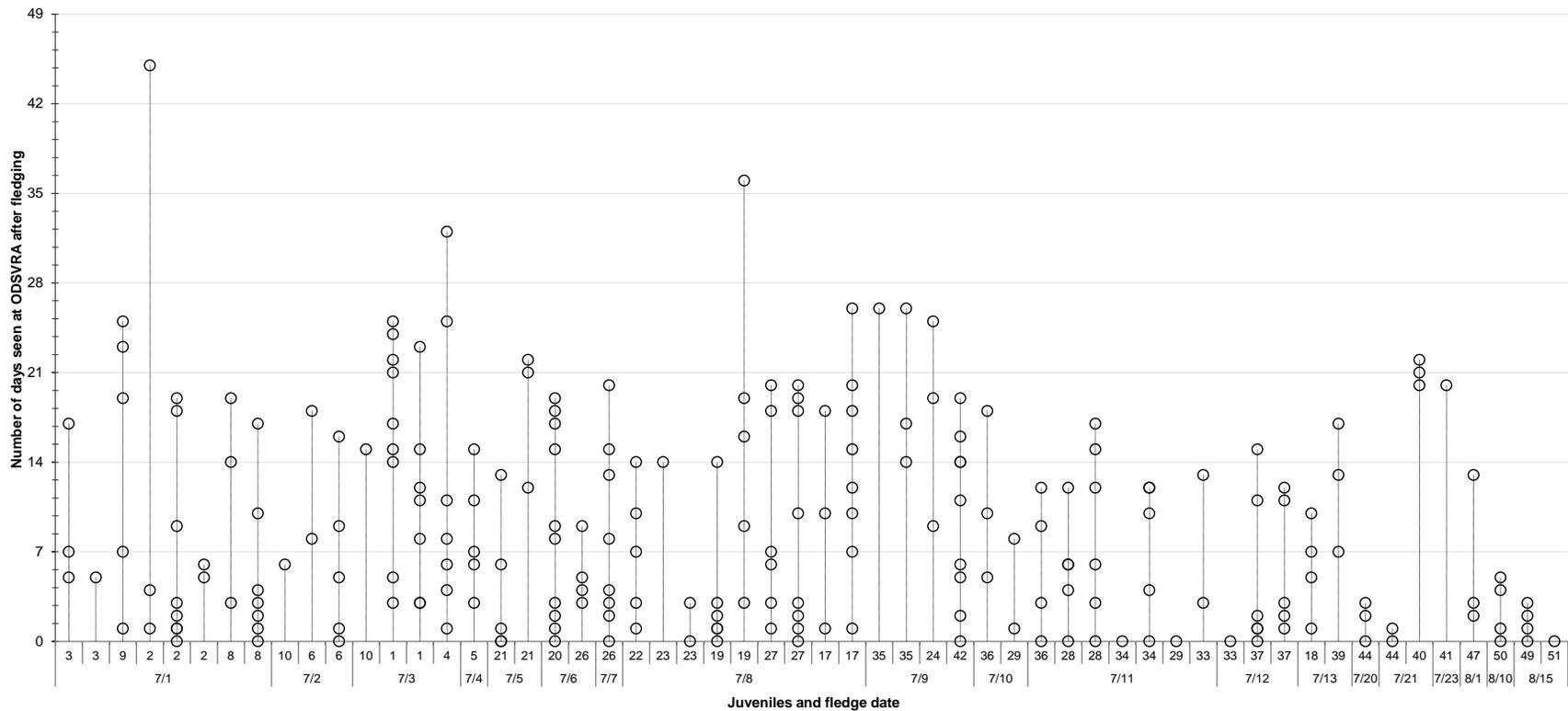


Figure 5. Number of days California least tern juveniles that hatched at ODSVRA in 2015 continued to be seen on-site after reaching fledge age (21 days old).

The horizontal axis provides the nest number from which each fledgling hatched and the date it fledged. All juveniles included in graph were color-banded to individual. One of the two LT9 fledglings (L:G/Y) was found dead on 21 July and is excluded from the figure because it was not observed alive since it was banded as a chick and it is not known how many days it survived past the fledge date.

Banded adult least terns at ODSVRA

Recording color combinations is more difficult for adult least terns than snowy plovers as the behavior of the terns provides fewer opportunities for observations. In 2015, there was a minimum of 39 banded adults documented at ODSVRA, based on observations with a spotting scope. Thirty-seven of these birds were identified as banded at this site as chicks (banding began in 2003). Origins of two banded birds could not be determined as they only had a federal aluminum band without tape. Breeding was documented for 15 of the 39 banded adults (13 banded as chicks at ODSVRA and two with undetermined origin) (Table D.1 in Appendix D). Over the last six years there has been one confirmed sighting of a banded tern from another site. This was an adult (S:A/O) seen 28 July to 11 August 2011 that was banded at the U.S. Navy North Island Maintenance and Training Facility in San Diego Bay.

Least terns typically first breed at three years old, with some breeding documented by two-year-old birds (Massey and Atwood 1981). A total of seven two-year-old banded terns have been documented as breeding at ODSVRA in 2012-14 (two in 2012, three in 2013, and two in 2014), and none were confirmed in 2015 (some band combinations were used in multiple years so age could not be confirmed). In 2005, a two-year-old tern banded as a chick at ODSVRA was documented breeding at Vandenberg Air Force Base, approximately 22 miles south of the park. The oldest confirmed breeding adult at ODSVRA in 2015 was a six-year-old tern (banded Y/O:W/B in 2009 at ODSVRA).

Terns banded at ODSVRA breeding at Vandenberg Air Force Base

In 2015, three terns that were banded as chicks at ODSVRA (B/R:B/W and P:B/W in 2012, and Y/R/Y:W/B in 2013) were documented breeding at Vandenberg Air Force Base.

Night roost

During the breeding season, adult least terns not engaged in incubation or chick care may assemble in a communal night roost and are often joined by fledglings later in the breeding season. Reduced exposure to disturbance from predators is likely an important factor in the selection of a night roost location. There can be a high degree of site fidelity, both within a breeding season and between years, with birds continuing to roost in the same location. Surveys of the night roost were conducted on 67 days between 6 May and 12 August in 2015. The night roost was initially located in the same area of northern 6 enclosure used since 2004, the year when 6 enclosure first became available as protected habitat for a complete season (Figure C.2 in Appendix C). In early July the roost location appeared to move to an area in mid-7 enclosure and was sometimes not visible or not located during surveys after this time. Counts at the night roost are minimums, as some or all birds would often arrive after it was too dark to count individuals. In 2015, there was a high count of 74 birds at the night roost on 16 May (Figure 6). This compares to an average night roost high count of 57 (range=35-95) from 2007-14. Both adults and juveniles were seen but it typically was too dark to distinguish plumage and age class.

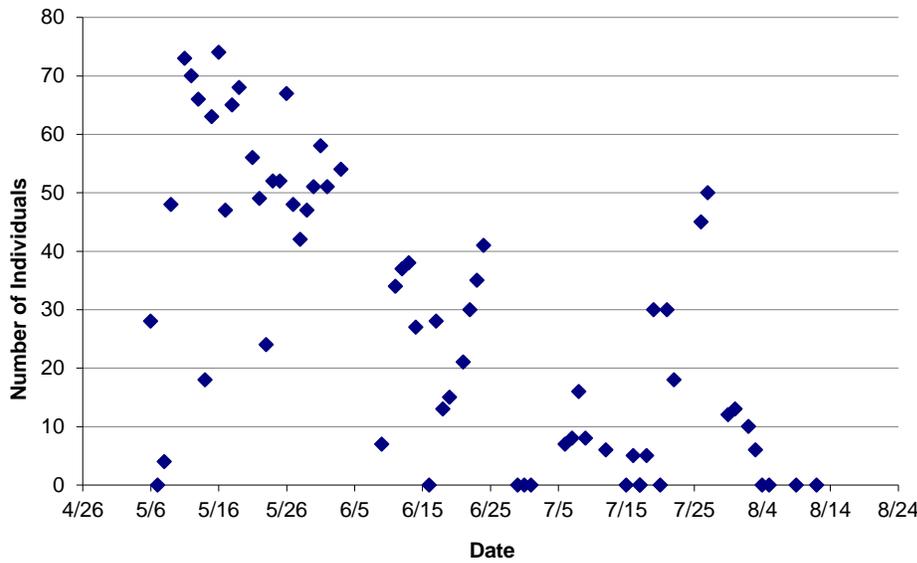


Figure 6. Number of California least terns counted at the ODSVRA night roost in 2015.

Importance of ODSVRA least tern breeding colony

The ODSVRA least tern breeding colony has benefited from the increased level of protection and management actions provided since 2002. The colony is important in meeting statewide recovery goals as loss of breeding habitat has resulted in a fragmented population distribution and a limited number of remaining breeding sites (USFWS 1985, 2006). On a regional level, there are very few active breeding sites along the central coast of California and none remain between ODSVRA and San Francisco Bay. Within San Luis Obispo and Santa Barbara counties, there are four least tern colony sites with annual or intermittent use, all sites have management providing protective measures and monitoring. ODSVRA is the only site in San Luis Obispo County. Rancho Guadalupe Dunes County Park (RGDCP), Vandenberg Air Force Base (VAFB), and Coal Oil Point Reserve (COPR) are in Santa Barbara County and approximately 7, 22, and 85 miles south of the ODSVRA colony, respectively. For this regional population, ODSVRA has become an important source of productivity. During the period 2004-15, ODSVRA produced a minimum of 558 juvenile terns while RGDCP, VAFB, and COPR combined produced an estimated 197 juveniles (Table 4, Table 5).

Table 4. California least tern reproductive success reported for current or recent breeding sites in San Luis Obispo and Santa Barbara counties from 2004-15.

Note that chicks are not banded at Rancho Guadalupe Dunes County Park (RGDCP), Vandenberg Air Force Base (VAFB), and Coal Oil Point Reserve (COPR). Sources: RGDCP (pers. comm. staff), VAFB (pers. comm. Dan Robinette for all years), and COPR (pers. comm. staff).

Year	Site	No. pairs (est. for ODSVRA)	No. nests	No. nests hatching	No. chicks	No. juveniles	No. juveniles per total no. nest	No. juveniles per pair (est. for ODSVRA)
2005	ODSVRA	47-53	59	39	66	20	0.34	0.38-0.43
	RGDCP	4	4	0	0	0	0.00	0.00
	VAFB	44	44	18	32	1	0.02	0.02
	COPR	0	0	0	0	0	0.00	0.00
2006	ODSVRA	31-35	38	28	45	36	0.95	1.04-1.16
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB ¹	2	2	0	0	0	0.00	0.00
	COPR	5	5	4	7	7	1.40	1.40
2007	ODSVRA	54-60	66	51	90	70	1.06	1.17-1.3
	RGDCP	1	1	1	1	1	1.00	1.00
	VAFB	18	18	13	20	16	0.89	0.89
	COPR	4	6	2	4	0	0.00	0.00
2008	ODSVRA	55-56	56	50	99	70	1.25	1.26-1.27
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	18	18	17	32-33	19	1.06	1.06
	COPR	1	1	0	0	0	0.00	0.00
2009	ODSVRA	25-26	26	23	43	33	1.27	1.29-1.32
	RGDCP	2-3	3	2	3	3	1.00	1.00-1.50
	VAFB	30	31	28	56	37	1.19	1.23
	COPR	0	0	0	0	0	0.00	0.00
2010	ODSVRA	23	23	20	35	29	1.26	1.26
	RGDCP	1	1	1	2	2	2.00	2.00
	VAFB	33	34	29	57	29	0.85	0.88
	COPR	0	0	0	0	0	0.00	0.00
2011	ODSVRA	33-34	35	31	55	50	1.43	1.47-1.52
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	32	32	19	36	4	0.13	0.13
	COPR	1	1	0	0	0	0.00	0.00
2012	ODSVRA	41-44	46	33	52	42	0.91	0.97-1.02
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	18	18	12	21	10	0.56	0.56
	COPR	0	0	0	0	0	0.00	0.00
2013	ODSVRA	48-53	57	45	85	56	0.98	1.07-1.17
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	15	15	15	25	19	1.27	1.27
	COPR	0	0	0	0	0	0.00	0.00
2014	ODSVRA	47-48	49	42	76	58	1.18	1.21-1.23
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	17	21	15	30	20	0.95	1.18
	COPR	0	0	0	0	0	0.00	0.00
2015	ODSVRA	44-49	54	48	84	69	1.28	1.41-1.57
	RGDCP	0	0	0	0	0	0.00	0.00
	VAFB	22	22	22	45	29	1.32	1.32
	COPR	0	0	0	0	0	0.00	0.00

¹ Minimum counts of adult terns at the VAFB colony site were 60 and 40 in 2004 and 2006, respectively, but nesting was limited.

Table 5. Number of reported breeding least tern pairs and juveniles produced at ODSVRA and the combined sites of Rancho Guadalupe Dunes County Park (RGDCP), Vandenberg Air Force Base (VAFB), and Coal Oil Point Reserve (COPR) from 2004-15.

During this period, almost all tern chicks were banded at ODSVRA and observation of color-banded individuals was an important means to document juvenile production. Banding does not occur at the other sites and other methods are used to estimate number of juveniles produced.

Year	ODSVRA		RGDCP, VAFB, and COPR combined	
	Est. no. breeding pairs	No. juveniles	No. breeding pairs	No. juveniles
2004	47-55	25	15	0
2005	47-53	20	48	1
2006	31-35	36	7	7
2007	54-60	70	23	17
2008	55-56	70	19	19
2009	25-26	33	32-33	40
2010	23	29	34	31
2011	33-34	50	33	4
2012	41-44	42	18	10
2013	48-53	56	15	19
2014	47-48	58	17	20
2015	44-49	69	22	29
Total juveniles produced		558		197

WESTERN SNOWY PLOVER

Number of breeding adults

In the absence of a population of individually banded snowy plover adults, which provides the most accurate means to identify breeding population size, ODSVRA uses a method that includes examining the single day high count of concurrent nests (for females) and concurrent nests and broods (for males) (see Monitoring and Management Actions section for additional information on determining number of breeding adults). In 2015, there was a minimum of 205 breeding adults (92 females and 113 males). This is a decrease of 9.3% from the minimum estimated number of 226 breeding adults in 2014 and compares to a range of 95-190 adults for 2008-13. The average minimum number of breeding adults for the last five years (2011-15) is 189, increasing to 198 for the last three years (Table 6, Figure 7).

Beginning in 2005, the USFWS has coordinated a rangewide window survey count of the U.S. Pacific coast breeding population of the snowy plover between the last week of May and first week of June. In 2015, the survey at ODSVRA counted 180 adult plovers (82 males, 80 females, and 18 of unknown sex), 88% of the minimum number documented by known breeding activity. In ten of the 11 years from 2005-15, the window survey count at ODSVRA was lower than the minimum number of breeding birds (54-88% of minimum number). It was higher (107%) than the minimum number in 2008 (Table 7) (CDPR 2012).

Table 6. Number of snowy plover breeding adults, breeding males, fledglings, and chicks fledging per breeding male for the 14-year period 2002-15.

Year	Min. no. breeding adults	Min. no. breeding males	No. fledglings	No. fledglings per breeding male ¹
2002	32	18	35	1.94
2003	84	52	107	2.06
2004	121	67	66	0.99
2005	116	65	82	1.26
2006	107	58	17	0.29
2007	79	47	66	1.40
2008	95	54	72	1.33
2009	114	66	81	1.23
2010	137	78	107	1.37
2011	160	94	152	1.62
2012	190	105	96	0.91
2013	163	92	187	2.03
2014	226	120	196	1.63
2015	205	113	277	2.45
Average for 14-year period 2002-15	131	74	110	1.47
Average for 5-year period 2011-15	189	105	182	1.73
Average for 3-year period 2013-15	198	108	220	2.04

¹Number of fledglings per breeding male will be overestimated if the number of breeding males is undercounted.

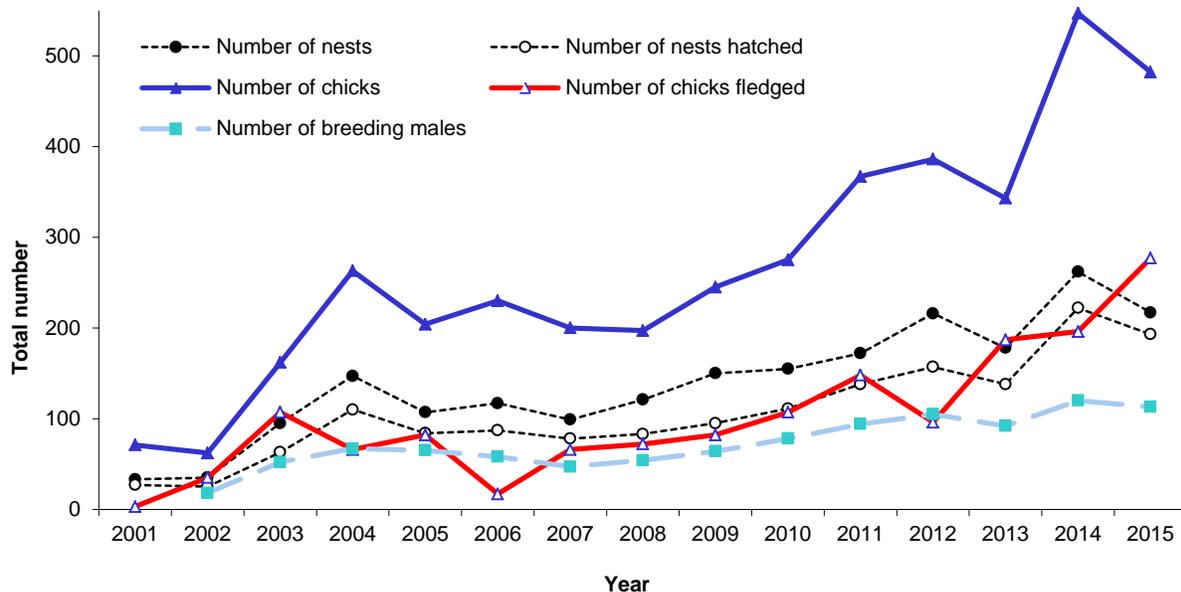


Figure 7. Number of snowy plover breeding males, nests, nests hatched, chicks, and chicks fledged at ODSVRA from 2001-15.

Prior to 2001, monitoring in Oso Flaco and Pismo Dunes Natural Preserve was intermittent and fledgling information was not obtained.

Table 7. Number of adult snowy plovers counted on USFWS breeding season window surveys versus calculated minimum number of breeding adults at ODSVRA from 2005-15.

Year	Calculated minimum number of breeding adults	Summer breeding window survey numbers	Breeding window numbers/ calculated minimum numbers
2005	116	92	79%
2006	107	87	81%
2007	79	60	76%
2008	95	102	107%
2009	114	98	86%
2010	137	74	54%
2011	160	112	70%
2012	190	145	76%
2013	163	94	58%
2014	226	180	80%
2015	205	180	88%

Number and distribution of nests

There were 217 known nesting attempts, including 15 identified only by detection of brood (unknown nest location), initiated between 17 March– 4 July. Of the 202 nests from known locations 182 (90.1%) were in the Southern Enclosure, 7 (3.5%) in North Oso Flaco, and 13 (6.4%) in South Oso Flaco. More specifically for the Southern Enclosure, there were 76 nests in 6 enclosure, 57 in 7 enclosure, 40 in 8 enclosure, and 9 in Boneyard enclosure (Appendix C). The maximum number of known location nests active at one time was 88 on 2 May, with the highest number in 6 enclosure (34 nests). (Table 8, Table 9, Table E.1 in Appendix E).

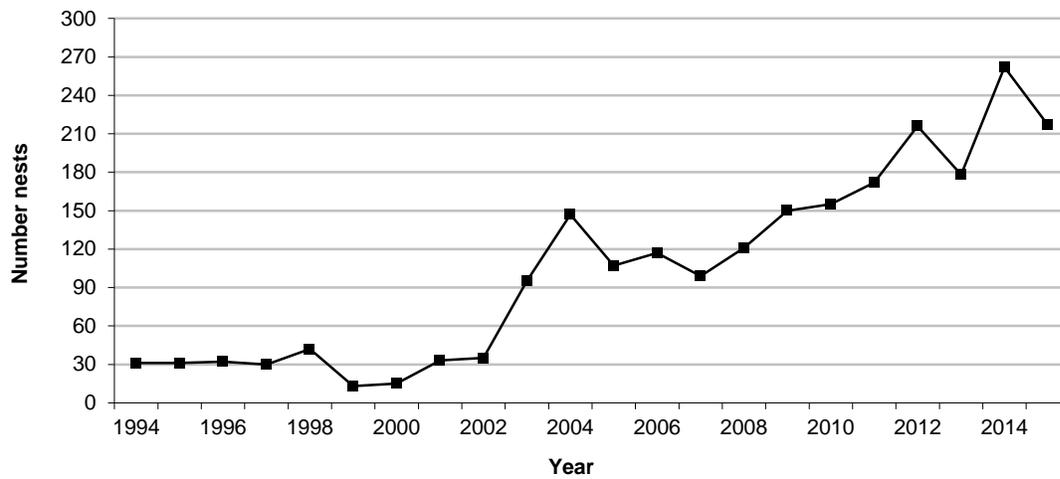


Figure 8. Number of snowy plover nests at ODSVRA from 1993-2015.

Table 8. Snowy plover nest distribution and success at ODSVRA in 2015.

Excludes 15 nests known only from detection of broods.

Location	No. nests (no. known location and fate)	No. eggs laid	No. nests hatching	Percent known location and fate nests hatching
6 enclosure	76 (74)	215	66	89.2
7 enclosure	57 (53)	159	48	90.6
8 enclosure	40 (39)	116	33	84.6
BY enclosure	9 (9)	27	6	66.7
TOTAL SOUTHERN ENCLOSURE	182 (175)	517	153	87.4
North Oso Flaco	7 (7)	20	5	71.4
South Oso Flaco	13 (13)	36	9	69.2
TOTAL OSO FLACO	20 (20)	56	14	70.0

Table 9. Nesting success of snowy plovers at ODSVRA from 2001-15.

Number of eggs from nests with unknown location is a minimum number derived from number of chicks seen. A more detailed table of nesting success for 2001-15 is included as Table E.1 in Appendix E. Percent hatching is calculated using known location hatched nests divided by total known location and fate nests. Number of fledglings per nest is number of known fate chicks fledged divided by total number of nests.

na=not available

Year	Total no. nests (no. known location and fate)	Min. no. eggs	Ave. clutch size (no. nests known location and complete clutch size)	No. nests hatching (no. known location)	Percent hatching	No. chicks (no. chicks with known fate)	No. known fate chicks fledged (percent fledged)	No. fledglings per nest
2001	33 (30)	na	na	26 (26)	86.7	71 (71)	3 (4.2)	0.09
2002	35 (35)	99	na	25 (25)	71.4	62 (62)	35 (56.5)	1.00
2003	95 (93)	254	na	63 (62)	67.7	162 (159)	108 (67.9)	1.14
2004	147 (140)	415	2.87 (141)	110 (105)	75.0	263 (263)	66 (25.1)	0.45
2005	107 (103)	290	2.86 (96)	84 (80)	77.7	204 (204)	82 (40.2)	0.77
2006	117 (114)	336	2.89 (115)	87 (87)	76.3	230 (230)	17 (7.4)	0.15
2007	99 (91)	290	2.93 (89)	78 (70)	76.9	200 (198)	66 (33.3)	0.67
2008	121 (119)	341	2.85 (116)	83 (81)	68.1	197 (197)	72 (36.5)	0.60
2009	150 (147)	418	2.85 (144)	95 (94)	63.9	245 (245)	81 (33.1)	0.54
2010	155 (150)	431	2.88 (146)	111 (109)	72.7	275 (275)	107 (38.9)	0.69
2011	172 (160)	487	2.88 (159)	138 (131)	81.9	365 (365)	152 (41.6)	0.88
2012	216 (203)	603	2.94 (200)	157 (152)	74.9	386 (386)	96 (24.9)	0.44
2013	178 (167)	502	2.93 (162)	138 (130)	77.8	343 (343)	200 (58.3)	1.12
2014	262 (239)	725	2.86 (243)	222 (206)	86.2	547 (547)	196 (35.8)	0.75
2015	217 (195)	612	2.92 (192)	182 (167)	85.6	494 (494)	277 (56.1)	1.28

Average clutch size, clutch loss and nest hatching rate

There were 217 identified nesting attempts, including 15 known only by brood, and of these 182 hatched (Table 9, Figure 8, Figure 9). For 192 nests with known complete clutch size (and excluding nesting attempts known only by brood) the average number of eggs was 2.92. This compares to an average of 2.89 eggs per clutch (range=2.85-2.94) for the 11-year period 2004-14. Excluding 22 nests (seven with unknown fate and 15 detected by brood only), the clutch hatching rate was 85.6% (167/195). This compares to an average of 74.7% (range=63.9-86.2 %) from 2002-14 (Table 9). The nest hatching rate in 2015 was higher in the Southern Enclosure (87.4%) than in Oso Flaco (70.0%), as has been the case in 12 of the previous 14 years. Twenty-eight nests were known to fail, with losses attributed to abandoned pre-term (12); abandoned unknown pre- or post-term (4); abandoned post-term (1); abandoned, suspected wind (1); cause unknown (3); raven (4); avian predator (2); and unidentified predator (1) (Table 10, Table 11, Table E.1 and Figure E.1 in Appendix E).

Table 10. Attributed causes of snowy plover nest loss at specific locations at ODSVRA in 2015.

Area	Abandoned pre-term	Abandoned post-term	Abandoned, suspected wind	Abandoned unknown pre- or post-term	Failed, cause unknown	Unidentified predator	Avian predator	Raven
Southern Enclosure								
6 enclosure	5	1	0	2	0	0	0	0
7 enclosure	3	0	1	1	0	0	0	0
8 enclosure	3	0	0	1	1	0	0	1
Boneyard enclosure	0	0	0	0	1	0	2	0
TOTAL SOUTHERN ENCLOSURE	11	1	1	4	2	0	2	1
Oso Flaco								
North Oso Flaco	0	0	0	0	0	1	0	1
South Oso Flaco	1	0	0	0	1	0	0	2
TOTAL OSO FLACO	1	0	0	0	1	1	0	3
ODSVRA TOTAL	12	1	1	4	3	1	2	4

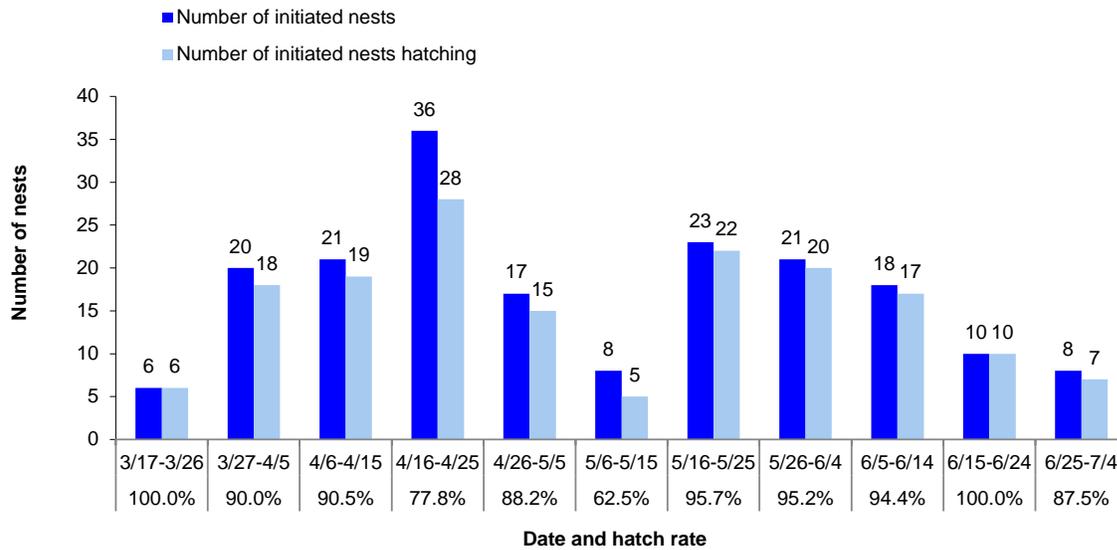


Figure 9. Number of known location and known fate snowy plover nests with known initiation date (n=188) initiated per 10-day period and number known to hatch at ODSVRA in 2015.

Table 11. Attributed causes of snowy plover nest loss in Southern Enclosure and Oso Flaco at ODSVRA from 2002-15.

The percentage of total loss for each cause is shown for the 14-year period 2002-15. Prior to 2010, nest abandonment suspected due to wind was included with nests abandoned pre-term; these causes of nest loss are shown separately for 2010-15. So. Excl. = Southern Enclosure.

Year	Area	Abandoned pre-term	Abandoned post-term	Abandoned, suspected wind	Abandoned unknown pre- or post-term	Failed, eggs removed by staff	Failed, cause unknown	Unidentified predator	Avian predator	Gull	Corvid	Raven	Northern harrier	Coyote	Raccoon	Skunk	Flooded	Total
2002	So. Excl.				6		1							1				8
	Oso Flaco				2													2
2003	So. Excl.	17	2					3				1						23
	Oso Flaco	2					1	1				4						8
2004	So. Excl.	12					7	2				2		1				24
	Oso Flaco	4					2	3									1	10
2005	So. Excl.	9	3				7											19
	Oso Flaco	2	1					1										4
2006	So. Excl.	5	4				2	1		3				4				19
	Oso Flaco				1			1		3							2	7
2007	So. Excl.	4	1				9					1						15
	Oso Flaco	2					2					1		1				6
2008	So. Excl.	10			3		7	4		1			1				1	27
	Oso Flaco	3			1			5									2	11
2009	So. Excl.	9				3	1	8	13	2			1				1	38
	Oso Flaco	4					2	2	4							1	1	14
2010	So. Excl.	3	2	11				4	6								2	28
	Oso Flaco	1		2					2						1	2	1	9
2011	So. Excl.	6	3	1	1		2	1	5		3							22
	Oso Flaco							2			2				1	2		7
2012	So. Excl.	11	1	6	3		3	3	5		3		5	1	1		1	43
	Oso Flaco	3	1	1														5
2013	So. Excl.	5	5	15			3	1										29
	Oso Flaco	3	2	2						1								8
2014	So. Excl.	13	1		4	2	2										1	23
	Oso Flaco	6		1				1						1			1	10
2015	So. Excl.	11	1	1	4		2		2			1						22
	Oso Flaco	1					1	1				3						6
2002-15 Total failed nests	So. Excl.	115	23	34	21	5	46	27	31	6	6	5	7	7	1	0	6	340
	Oso Flaco	31	4	6	4	0	8	17	6	4	2	8	0	2	2	5	8	107
2002-15 Grand Total So. Excl. and Oso Flaco		146	27	40	25	5	54	44	37	10	8	13	7	9	3	5	14	447
		32.7%	6.0%	8.9%	5.6%	1.1%	12.1%	9.8%	8.3%	2.2%	1.8%	2.9%	1.6%	2.0%	0.7%	1.1%	3.1%	

Chick fledging rate

Of the 494 snowy plover chicks hatched, 331 were banded and the fate of 163 unbanded chicks is believed known (94 fledged) (Appendix B). The primary reason chicks remained unbanded was their close proximity to young plover or tern broods and the need to avoid undue disturbance. In addition, a number of very young unbanded chicks were lost prior to any banding opportunity. Unbanded chicks were tracked by a combination of the following: chicks with a banded adult, with banded sibling(s), and a concentrated monitoring effort to locate all broods and determine number and size of chicks. In the absence of a high percentage of chicks being banded at ODSVRA, it would not be possible to obtain accurate chick survival and fledging rates. Between 14 May and 15 August, ten unbanded broods (23 chicks) were observed on the shore and were from hatched nests whose chicks were not banded while at the nest. Two of the ten broods were subsequently banded. Although these broods could not be assigned to a specific nest and enclosure, all chicks were tracked and fledglings are included in totals. The fledging rate for banded chicks was 55.3% (183/331) and 57.7% (94/163) for unbanded chicks. The fledging rate for all chicks combined was 56.1% (277/494). This compares to 35.8% in 2014 and an average rate of 38.6% (range=7.4-67.9%) for the 12-year period 2002-13 (Table 9, Table E.1 in Appendix E) (CDPR 2007-13).

In 10 of 13 years during the period 2003-15, the fledging rate of chicks hatching in the early season (prior to 20 June) has been higher, by an average of 21 percentage points, than chicks hatching in the late season (20 June or later). (See 2012 report for how early versus late season was determined.) In 2015, the late season had a higher chick fledging rate (67%) compared to the early season (51%). Noticeable was the very poor survival of the initial 11.3% of the total number of chicks produced, with only 9 of 56 chicks (16.1%) fledging. This was in sharp contrast to subsequent chick survival, with 268 of 438 (61.2%) chicks fledging (Figure 10, Figure 11, Figure 12).

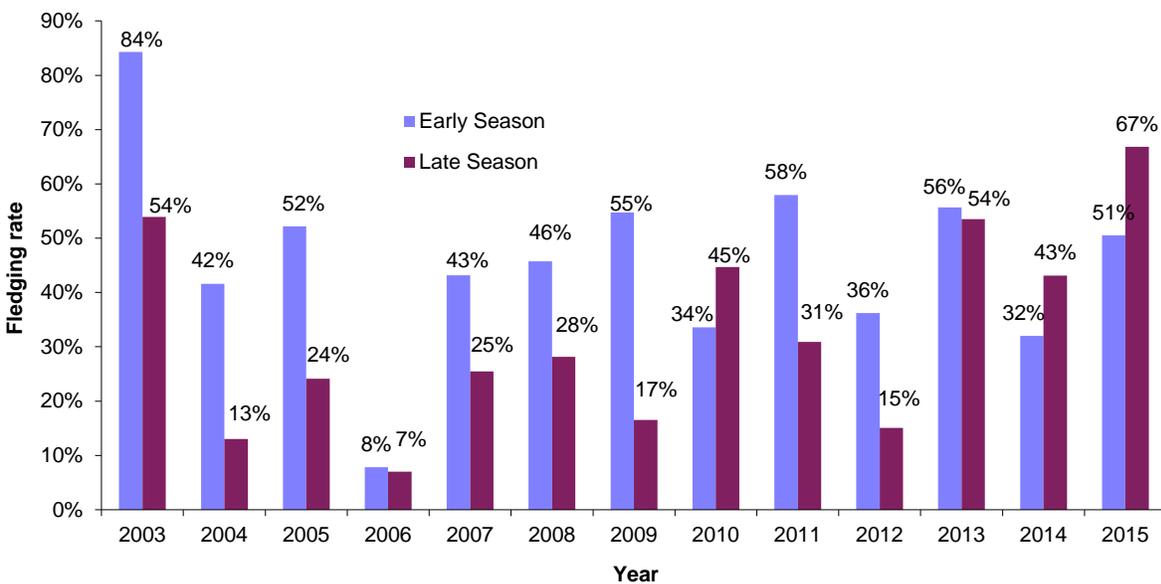


Figure 10. Fledging rate of chicks hatching in early season (prior to 20 June) and late season (20 June or later) at ODSVRA from 2003-15.

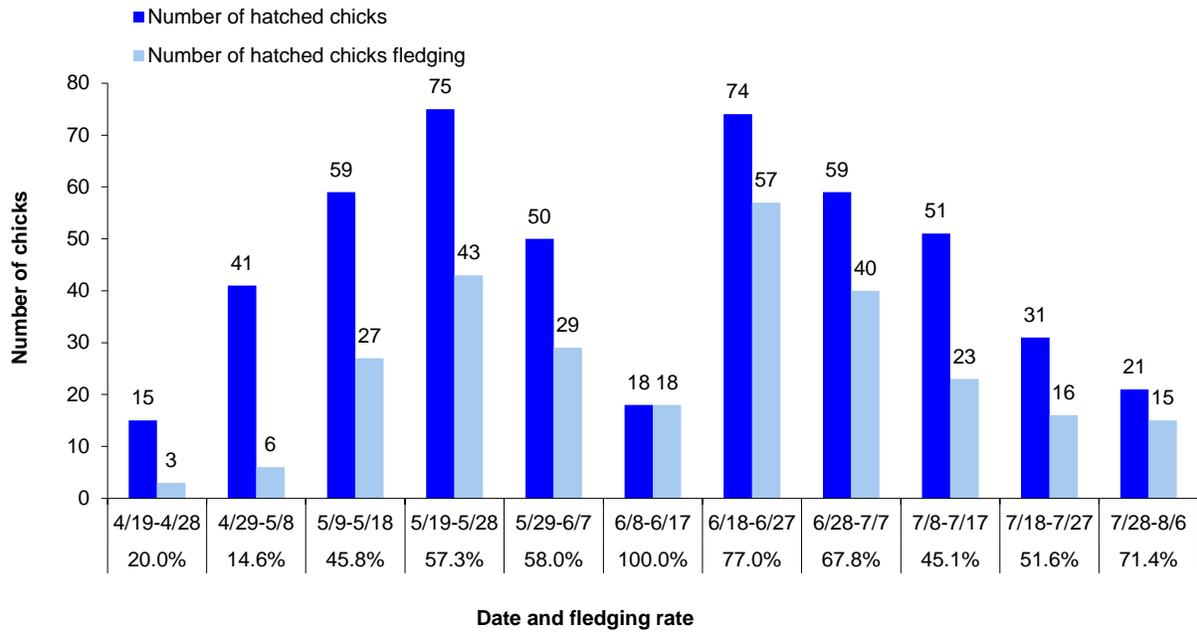


Figure 11. Number of snowy plover chicks hatching per 10-day period and number subsequently fledging at ODSVRA in 2015.

Includes all chicks with known fate (494). For broods that either originated from unknown location (39 chicks from 15 broods) or were not assigned to a specific nest (15 chicks from 7 broods) a hatch date was estimated based on chick size.

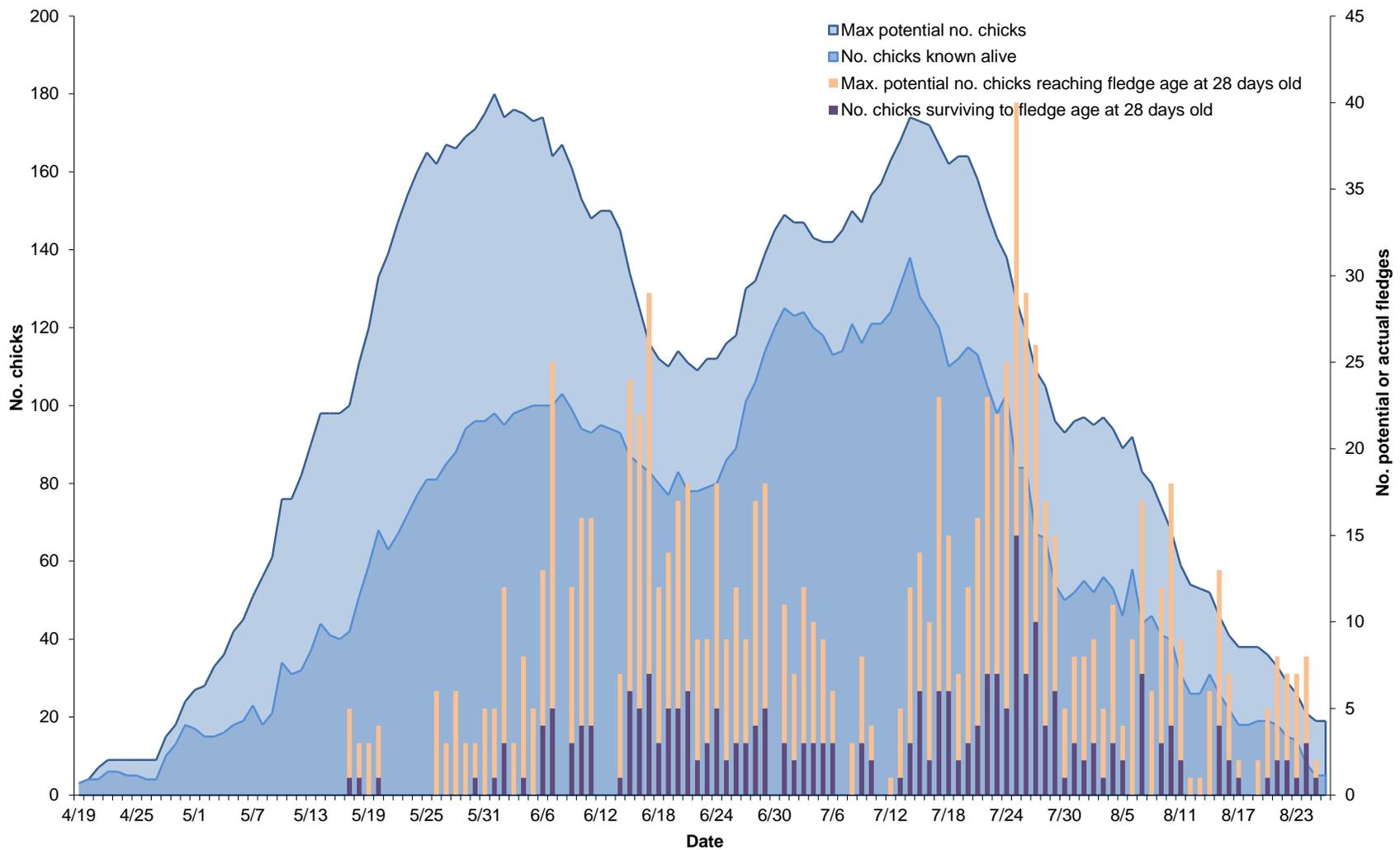


Figure 12. Chick survival and fledge rate from 19 April to 26 August at ODSVRA in 2015.

Of the total of 494 chicks hatching, 485 closely tracked chicks are represented in this figure. Number chicks known alive calculated using date of last sighting during regular surveys of all chicks. No.=number

Brood movement and age of chick loss

At ODSVRA most snowy plover broods are initially led from the nest by the parent(s) to the nearest shore to forage, and the close proximity of quality shoreline habitat for raising chicks can benefit productivity, as mortality rates are typically highest for very young chicks. In 2009-15, the majority (65-78%) of tracked broods were not known to move beyond the individual beach section (6, 7, and 8 enclosures, North Oso Flaco, and South Oso Flaco) nearest to where they hatched. (Note that the disproportionate loss of very young chicks increases the observed proportion of broods remaining in the area where hatched, as the entire brood may be lost before movement outside of that area occurs.) In 2015, 143 of 191 fledglings were from broods remaining in the same general shoreline area adjacent to where hatched (excluded are 86 fledglings from unbanded broods and broods not assigned to a specific nest that were greater than two days old when first seen and prior potential movement unknown).

Sites south of ODSVRA and within the contiguous dune complex also manage and monitor snowy plovers. In addition, park resource staff periodically monitored the adjoining Guadalupe-Nipomo Dunes NWR to search for ODSVRA broods. Only two banded broods from ODSVRA were seen being raised south of the park boundary, all on the adjoining Guadalupe-Nipomo Dunes NWR (two of four chicks fledged).

Of 344 carefully tracked chicks (327 banded and 17 unbanded chicks with banded siblings) from known location nests, 153 were believed lost. Chick loss in 2015 was highest for very young chicks (0-4 days of age), accounting for 64.7% of total loss (Figure 13). This is above the average of 47% loss (range=38%-54%) from 2009-14 (CDPR 2014). For 206 chicks reaching 16 days of age in 2015, the fledge rate was 93%. This is higher than the average of 77% for the previous six years (range=71-84%) and is equal to the results from a six-year (1977-82) study at Monterey Bay in Monterey County, California, that found at least 93% of the 124 chicks reaching 16 days of age fledged (Warriner et al. 1986).

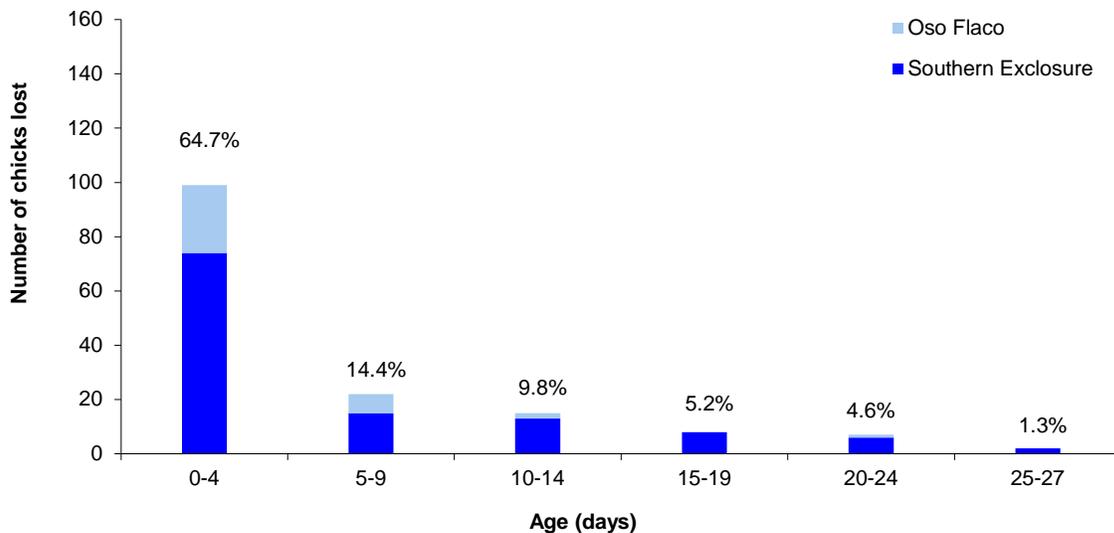


Figure 13. Loss of snowy plover chicks by age and location last seen in the Southern Enclosure and Oso Flaco at ODSVRA in 2015.

Number and percentage of total chicks lost shown for each age group. There were 344 chicks included in the analysis; 153 of these were lost. Data excludes broods that could not clearly be identified and tracked individually.

Productivity measured by number of fledglings produced per adult male

Based on a population viability analysis in the USFWS Pacific coast western snowy plover recovery plan, a rate of 1.0 fledglings produced per male is believed necessary to prevent population decline with 1.2 fledglings per male allowing for moderate population growth (assuming approximately 75% annual adult survival and 50% juvenile survival) (USFWS 2007). In 2015, the number of chicks fledging per male was 2.45, a high level of productivity which will promote population growth. During the 2002-15 period, average productivity was 1.47 fledglings per male and exceeded 1.2 fledglings per male in 11 of the 14 years (Table 6). (Note that if the number of breeding males is underestimated, the number of chicks fledged per male is an overestimate.)

Mortality (other than eggs)

There was a minimum of 18 documented snowy plover mortalities (other than eggs) at ODSVRA during the 2015 breeding season (1 March to 30 September). Five of these were the result of depredation of one chick and four adults. Predators involved were Western gull (*Larus occidentalis*) (one chick), merlin (*Falco columbarius*) (one adult), and peregrine falcon (*Falco peregrinus*) (three adults). Documented mortality other than predation included 10 chicks, two juveniles, and one adult. One of these chicks was killed by the aggressive behavior of an adult plover associated with a nearby shoreline nest. An additional four chicks from two broods were aggressively attacked by nearby adults and believed to not have survived the incident (for additional information see Predators and predator management section on page 41, Notes section, and the Mortality Table in Appendix G).

Protection of nests with enclosures and symbolic fencing

Of the 195 nests from known location and with known fate, 146 received some form of wire mesh fencing. Ninety-five percent (138/146) of these were within the large seasonal enclosure predator fencing installed at the beginning of the season in 6, 7, 8, and Boneyard enclosures and North Oso Flaco. These nests had an 88% hatch rate.

For the 6, 7, and 8 enclosures and North Oso Flaco, there were an additional 43 nests established on the shoreline outside of the seasonal fencing. This shoreline is closed to public use during the nesting season. Three nests (all in North Oso Flaco) were protected by individual circular enclosures and 100% hatched. Forty nests were protected only by a symbolic rope fencing with signs that provides no predator protection but is designed to prevent/reduce vehicle and pedestrian trespass. These nests did not receive individual wire fence protection due to a combination of the following factors: avoiding disturbance of nearby broods, nest abandonment concerns due to adult mortality, and a continuing high hatch rate without the use of wire fencing. Of these nests 83 % (33/40) hatched.

In South Oso Flaco there were 13 nests, all within seasonal symbolic rope fencing (visitor pedestrian use allowed outside of symbolic fencing). On two occasions a nest was found west of the symbolic fence and the fence was moved westward. One nest failed before a planned circular enclosure could be installed and seven nests did not receive any wire enclosure due to concerns of windblown sand potentially burying eggs and adult vulnerability to predators. Of these eight nests four hatched (50% hatch rate). Five nests received circular enclosures and 100% hatched (Table E.2 in Appendix E).

Banded snowy plovers breeding at ODSVRA in 2015

In California the closest site north of ODSVRA where banding occurs is Monterey Bay in Monterey County (most all chicks banded). To the south, banding has not occurred at the Guadalupe-Nipomo Dunes NWR for 13 years, but occurs annually at Vandenberg Air Force Base in Santa Barbara County (varying percentage of chicks banded), and at several sites in San Diego County. The great majority (87.6%, 92/105) of known origin banded birds breeding at ODSVRA in 2015 represent recruitment from chicks banded and fledged from ODSVRA. Ten breeding birds were banded as chicks from 2008 to 2014 at Vandenberg Air Force Base. Three were banded as chicks in Monterey County from 2013 and 2014 (one

each from Salinas River State Beach, Marina State Beach, and Reservation Road). An additional seven breeding birds were missing one or more bands and were from unknown locations. (Table D.3 in Appendix D).

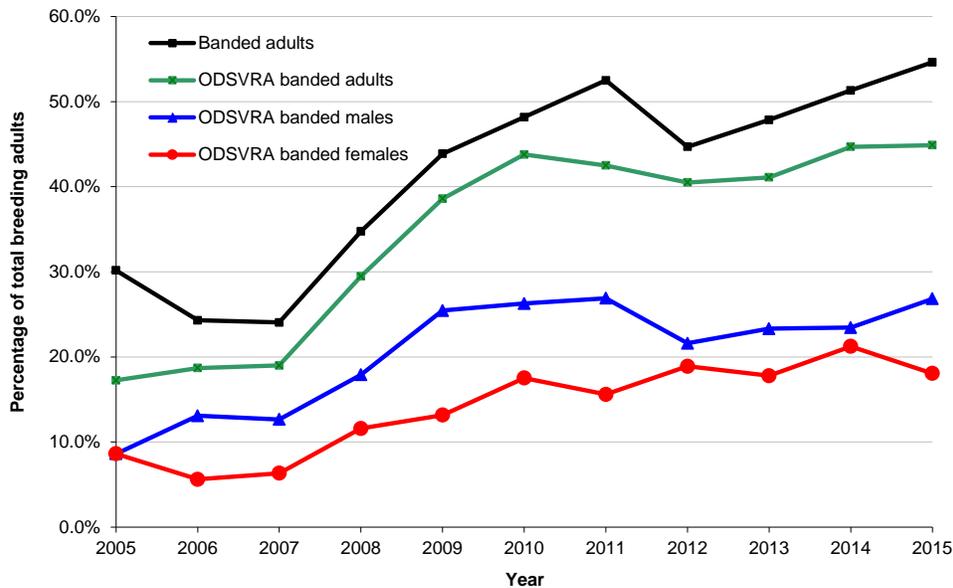


Figure 14. Percentages over the total calculated breeding population at ODSVRA of all verified banded adults and the sum of males and females originally banded at ODSVRA breeding from 2005-15.

All ODSVRA banded adults were banded on-site when chicks.

Snowy plover surveys at ODSVRA during the nonbreeding season

Surveys for wintering plovers (Pacific coast breeding birds joined by interior breeding birds) were conducted two to five times a month (see Monitoring and Management Actions for survey details). Between 1 October 2014 and 28 February 2015, single day wintering plover counts at ODSVRA ranged from 156 to 312 birds (single day high count on 8 December 2014). The shore was divided into five beach sections and the monthly average number of plovers (from two to five weekly surveys) was obtained for each section. Of the five sections, the beach north of Grand Avenue had no birds throughout the October to February period. Grand Avenue to marker post 2 had an average of 130 plovers (range of monthly averages=83-169) for the five-month period. The section from marker post 6 to the southern boundary of the open riding area, closed to public entry during the breeding season, had an initial high number of birds, averaging 144 in October and 101 in November. This declined to an average of 23 plovers (range=2-49) from December to February. In Oso Flaco the average monthly number of plovers ranged from 0-27 over the five-month period (Figure 15).

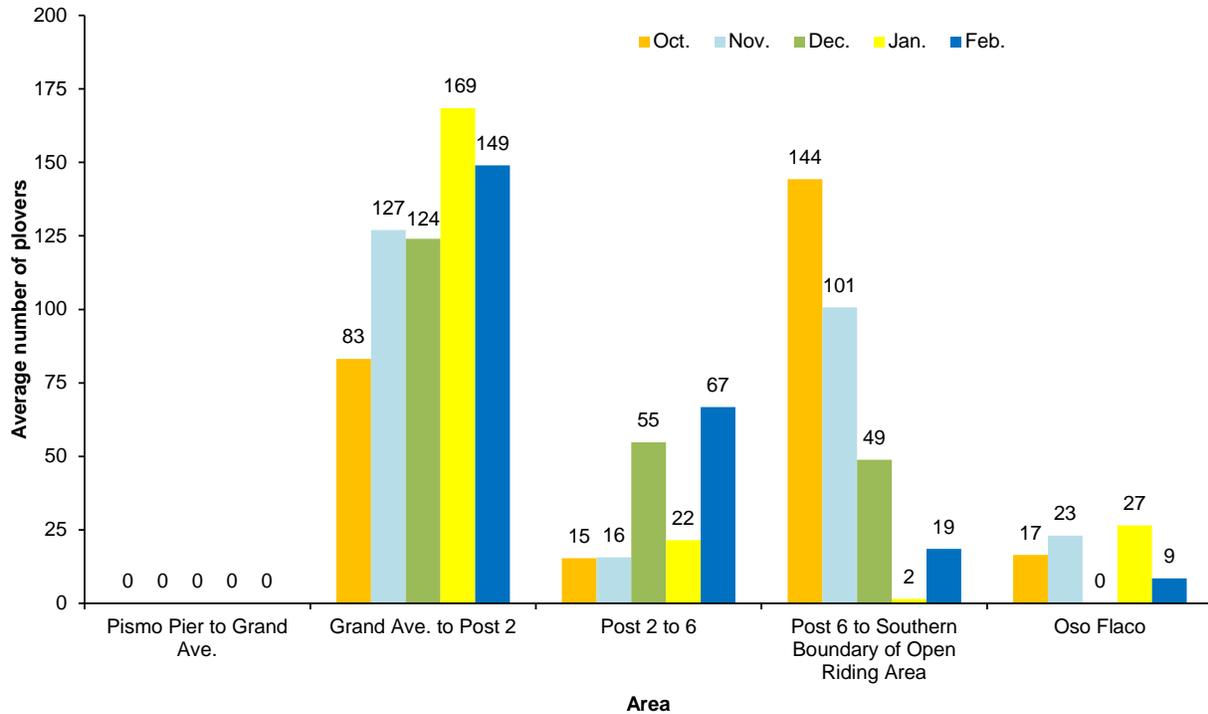


Figure 15. Monthly average number of snowy plovers observed during nonbreeding season surveys at ODSVRA from October 2014 to February 2015.

Surveys conducted two to five times a month.

Beginning in 2004, ODSVRA has participated in a snowy plover winter season window survey organized by USFWS and conducted in January throughout the U.S. Pacific coast. Plovers present during this time include birds from both the Pacific coast breeding population and interior breeding birds wintering on the coast. In 2015, the survey at ODSVRA counted 238 adult plovers. This compares to an average winter window count of 147 (range=62-261) during the 11-year period 2004-14 (Figure 16).

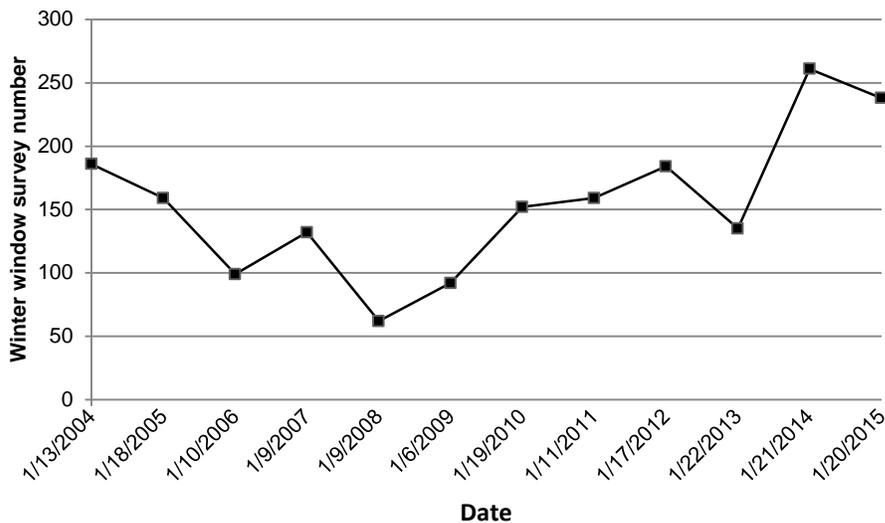


Figure 16. Number of snowy plovers counted on USFWS winter window surveys from 2004-15.

One hundred and thirty-seven banded snowy plovers were recorded during surveys from 1 October 2014 to 28 February 2015. These birds were banded at the following locations (all in California with one exception): 97 from ODSVRA; 25 from Vandenberg Air Force Base in Santa Barbara County; eight from the Monterey Bay area in Monterey County; one from Oregon; and six were missing one or more bands and were from unknown locations (Table D.2 in Appendix D).

FACTORS INFLUENCING LEAST TERN AND SNOWY PLOVER REPRODUCTIVE SUCCESS

The following is a discussion of some of the factors that influence reproductive success of terns and plovers at ODSVRA. The adequacy of any single factor alone is not sufficient to achieve and sustain recovery goals.

Size of protected habitat

Maintaining an adequate size of protected habitat at ODSVRA has been important in providing sufficient area for terns and plovers to roost, nest, and raise young. Protected breeding habitat of sufficient size allows nests and chicks to be dispersed which can reduce exposure and vulnerability to predators, as well as reduce adverse disturbance from human recreational activities. For plovers, it also improves opportunities for chicks to have access to adequate invertebrate food resources.

Quality of protected habitat

During the March through September least tern and snowy plover nesting season, habitat within the seasonal Southern Enclosure is protected and closed to public entry. Following the nesting season, and for the five-month period October through February, the area is open to public use, including camping, street-legal vehicles, and off-highway vehicles. This recreational use results in large areas of flattened terrain and barren sand with very limited scattered natural debris and vegetation. Snowy plovers often nest in areas of available limited patchy cover and to offer more areas of disruptive cover the park staff places material in the 6, 7, and 8 enclosures. Materials added include surf-cast kelp (wrack), branches, driftwood, and woodchips. See 2012 report for habitat enhancement analysis and results.

Predators and predator management

Predators and predation can be an important factor limiting least tern and snowy plover reproductive success (Page et al. 1995; Thompson et al. 1997). Predators may impact terns and plovers directly by depredating eggs, chicks, juveniles, or adults. Indirect predator impacts, such as disturbance, can increase time spent by adults in vigilance or avoidance behavior, and may limit incubating and brooding behavior. Presence of predators may result in a brood becoming scattered and the loss of any chick failing to reunite with the adult. Depredation of an adult tern or plover may result in egg abandonment or loss of dependent chicks.

Species known to be predators of terns and plovers were documented by both number of days detected, as well as number of occurrences (mammalian) and sightings (avian). Number of days detected describes the total number of days predator presence was documented in the nesting area (Southern Enclosure and Oso Flaco) during the nesting season. Additional information was collected in order to estimate the extent of predator activity, both temporally and spatially, in the protected area. Occurrences and sightings were used for mammalian and avian predators, respectively, to reflect the difference in manner of detection; almost all mammalian predators were detected by tracks whereas almost all avian predators were detected by direct observation (with the notable exception of nocturnal owls). Both occurrences and sightings are used to better describe the extent of predator activity on a single day by categorizing presence separately for the different areas of the Southern Enclosure (6, 7, 8, and Boneyard enclosures) and Oso Flaco (North and South). In addition, observations of an individual remaining in one area longer than one hour are counted as multiple sightings (one sighting per hour or portion thereof) in order to account for possible additional impacts. Information was more limited for mammalian predators and does not include details such as number of individuals, behavior, or duration of presence. The date range for all observations discussed is from 1 March to 10 September. (Note that the number of recorded occurrences or sightings for the first two weeks of March may be biased lower, with less time during this period spent on predator surveys and more time spent on habitat enhancement and fencing projects.)

Selective live-trapping and relocation of avian predators was conducted by Ventana Wildlife Society and lethal removal of both mammalian and avian predators was conducted by USDA Wildlife Services. Predator monitoring efforts by these contractors were conducted from February to September. Five coyotes and one common raven (*Corvus corax*) were removed lethally. One northern harrier (*Circus cyaneus*) and one peregrine falcon were live-trapped and relocated (Table F.2 in Appendix F).

Documented Predation

Predation can occur quickly, leaving little or no evidence, and it is likely that only a small percentage of events are documented during a season. There are many hours each day (including almost all night hours) when monitoring staff and/or predator management specialists are not present to observe predation. Even when monitors are present, there are limitations in the ability to detect predators, such as diurnal avian predators, that can travel quickly over large distances. Despite limited documentation of predation events and detection bias, predators of particular concern identified during the 2015 season included peregrine falcon, northern harrier, gull spp., raven, and coyote.

For least terns and snowy plovers known clutch loss to predation in 2015 included one tern nest to raccoon (*Procyon lotor*) and seven plover nests: four to common raven, two to unidentified avian predator, and one to unidentified predator. From 2002-15, 2.3% (15/651) of all tern nests with known fate were known to be lost to predators (nine mammalian, one avian, and five unidentified predator). During this same 14-year period, 6.9% (136/1957) of plover nests with known location and fate were documented lost to predation (17 mammalian, 75 avian, and 44 unidentified predator).

Five documented predation events, other than eggs, in 2015 included: four adult plovers (one by merlin and three by peregrine falcon); and one plover chick (Western gull) (Appendix G). This compares to ten documented losses in 2014: two juvenile or adult terns (peregrine falcon), six plover chicks [three by peregrine falcon and three by California gull (*Larus californicus*)], one adult plover (unidentified avian predator), and one plover of unknown age (California gull).

Mammalian Predators

Mammals removed under predator management actions were limited to five coyotes. All other mammalian predator species noted on-site were not known or suspected of having significant impacts on terns or plovers in 2015.

Opossum

Opossum (*Didelphis virginiana*) tracks were documented on four days in the Southern Exclosure and Oso Flaco in 2015 and averaged 11 days per season (range=3-25) from 2007-14 (Figure 17). From 2002-15, known nest loss to opossum was limited to two tern nests, occurring in 2010 and 2013.

Skunk

Skunk (*Mephitis mephitis*) tracks were documented on 17 days in the Southern Exclosure and Oso Flaco and averaged 25 days per season (range=2-57) from 2007-14 (Figure 17). From 2002-15, known nest loss to skunk was limited to five plover nests in Oso Flaco, occurring from 2009-11.

Raccoon

Raccoon tracks were documented on 56 days throughout the Southern Exclosure and Oso Flaco. Tracks and scat indicated that raccoons commonly traveled across the exclosure to forage in the intertidal zone on prey that included mole crabs (*Emerita analoga*). Documented raccoon activity averaged 109 days (range=45-145) for 2007-14 (Figure 17). From 2002-15, known nest loss to raccoons was limited to one tern nest in 6 exclosure in 2015 and two plover nests in Oso Flaco, occurring in 2010 and 2011.

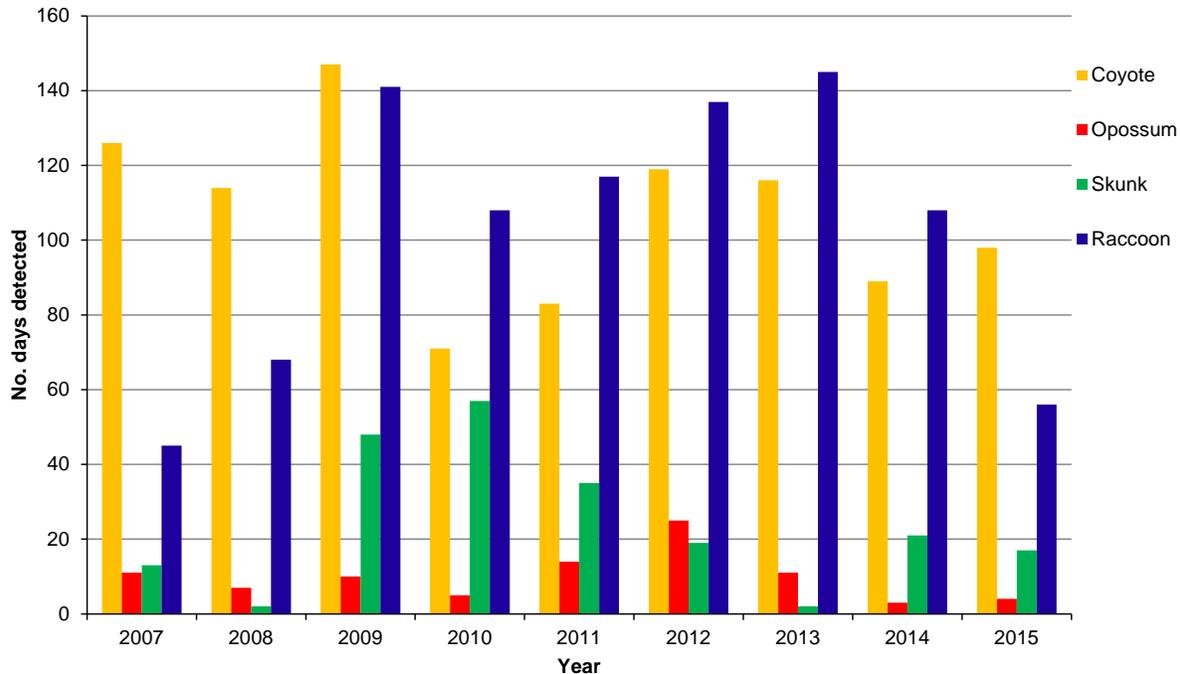


Figure 17. Number of days coyote, opossum, skunk, and raccoon were detected in the Southern Exclosure and Oso Flaco at ODSVRA from 2007-15.

Coyote

Live sightings of coyotes have rarely been documented inside the exclosure or along the shoreline during daytime hours. The lack of diurnal sightings, as well as timing of observed fresh tracks relative to windblown sand and tides, indicate that coyote activity is primarily nocturnal in these areas.

Five coyotes were removed in an effort to reduce the threat of predation and disturbance due to coyote presence documented within sensitive shoreline chick-rearing habitat. This compares to an average of seven removed per year from 2007-14 (range=4-11). As part of monitoring at ODSVRA, coyote scat encountered by monitoring staff and contractors was checked in the field for plastic or aluminum bands used for banding least terns and snowy plovers. No bands were found in coyote scat in 2013-15. Four coyote scats found in 2012 contained a total of 11 bands (representing a minimum of one plover chick, two unknown age plovers, and one unknown age tern) (CDPR 2012, 2013, 2014).

In the combined Southern Exclosure and Oso Flaco areas, coyote presence was recorded on 99 days (this includes 48 days inside the predator fenced portion of the Southern Exclosure and North Oso Flaco). For comparison, coyote presence was documented an average of 104 days (range=71-147) during the previous six-year period from 2009-14. There was a total of 213 recorded coyote occurrences in distinct areas in 2015. This compares to an average of 202 (range=99-307) for the previous six years. One hundred and thirty-six occurrences were recorded on the Southern Exclosure and North Oso Flaco shoreline this season, compared with an average of 112 (range =37-193) for the last six years (Table 12, Appendix F.1). It should be noted that predator tracks are documented opportunistically and counts represent a minimum level of activity. In addition, shoreline accessibility may vary between years making direct comparison difficult.

From 2002-15, documented coyote depredation of nests has been limited to nine plover nests and six tern nests, occurring in 2002 (1 plover, 2 tern), 2003 (1 tern), 2004 (1 plover, 2 tern), 2006 (4 plover), 2007 (1 plover), 2012 (1 plover), 2013 (1 tern), 2014 (1 plover).

Table 12. Coyote occurrence in the Southern Enclosure and Oso Flaco at ODSVRA from 2009-15.
Date range is from 1 March to 10 September (a 194-day period).

Year	Inside Southern Enclosure and North Oso Flaco predator fencing	6, 7, 8 enclosure shoreline	North Oso Flaco shoreline	South Oso Flaco	Total no. occurrences (Total no. days detected)
2009	19	99	94	95	307 (147)
2010	5	24	23	47	99 (71)
2011	10	17	20	55	102 (83)
2012	92	100	47	35	274 (119)
2013	49	55	38	60	202 (116)
2014	28	115	38	42	223 (89)
2015	48	104	32	29	213 (99)

Avian Predators

One northern harrier and one peregrine falcon were live-trapped and relocated and one raven was lethally removed. The peregrine falcon was banded and confirmed returning within 98 days on 14 August after being relocated approximately 467 miles to the north on 8 May. The northern harrier was also banded and relocated approximately 295 miles to the north. One raven was lethally removed in response to documented nest loss and frequent sightings of ravens at our site and adjacent sites. Efforts were also made to trap a merlin and red-tailed hawk until concerns of threats diminished. Avian predators perched in sensitive areas within the Southern Enclosure and Oso Flaco were hazed when possible (see Management Actions section for more detail).

Merlin

From 12 March - 8 April, a minimum of two merlins were documented on 16 days (31 sightings) actively hunting shorebirds in the Southern Enclosure and Oso Flaco (Table 13). On several occasions, merlins hunting or perching in the nesting area were hazed by monitors and on 12 March an adult male merlin was observed eating an adult plover banded GG:WW on 7 enclosure shoreline. For five of the eight days from 12 March - 19 March a merlin was sighted flying over and hunting the shoreline of the 6, 7, and 8 enclosures. For four of these five days, an adult male merlin was confirmed. In response, efforts were made to attempt trapping problem merlins. Subsequently, merlin sightings declined in frequency and identifying an individual was difficult. For this reason, and the understanding that merlins began migrating out of the area, trapping attempts were discontinued and replaced with hazing techniques combined with extended monitor coverage on the shoreline. No merlins were seen after 8 April through the end of the season. For the eight-year period from 2007-14, recorded merlin activity averaged six days (range=0-11) with most activity occurring in March and April. During this period merlins were documented taking adult plovers once each year from 2004-06 at ODSVRA, and an adult female merlin was observed eating a small shorebird that may have been a plover in 2011. In 2014, their presence coincided with several plover nests being abandoned pre-term with adult mortality suspected as the cause.

American kestrel

There were 38 documented sightings of American kestrels (*Falco sparverius*) in the Southern Enclosure and Oso Flaco on 18 days. Kestrels were observed perch-hunting primarily in North and South Oso Flaco and perched on 6 and 7 enclosure fences on eight days. On these days kestrels were hazed out of sensitive areas. For the eight-year period from 2007-14, recorded kestrel activity averaged 14 days (range=6-28).

Owl

The majority of owl “sightings” are from detection of tracks with very few visual sightings. The level of owl activity, as evidenced by tracks, is difficult to estimate during daytime monitoring as there is limited entry into the nesting and chick-rearing areas to look for tracks. The tracks may extend only a short distance and can be quickly covered by windblown sand. In addition, accessibility to areas where tracks have often been noted previously (e.g., North Oso Flaco, 8 enclosure, 7.5 revegetation area) may vary between years making direct comparison difficult. Most owl tracks documented at ODSVRA are likely from great horned owls (*Bubo virginianus*) but may also be from barn owls (*Tyto alba*). Burrowing owls (*Athene cunicularia*) have also been seen at ODSVRA in previous years but would not be confused with other species and have typically migrated out of the area before the tern and plover breeding season.

Owl presence was detected on five days with five separate sightings this season occurring in Boneyard and 7 enclosures (Table 13, Figure 18). In the eight-year period from 2007-14, owl activity was documented on an average of 32 days (range=10-53).

Red-tailed hawk

Red-tailed hawks (*Buteo jamaicensis*) were primarily observed perching in the North and South Oso Flaco foredunes and in the 7.5 revegetation area. Red-tailed hawks have not been known to depredate plover or tern nests, chicks, or adults at ODSVRA but are a known predator from observations at other sites and their sustained presence represents a disturbance factor to broods and incubating adults nearby. On several occasions, red-tailed hawks perched in the nesting area were hazed by monitors. Red-tailed hawk presence was documented on 65 days (143 sightings) (Table 13, Figure 18). From 2007-14, activity was recorded on an average of 39 days (range=7-74). Based on concurrent sightings and age, there was a minimum of four individuals (two adults, one juvenile and one immature) observed in or adjacent to the nesting area. One adult identified by plumage characteristics, observed frequently perch hunting within the North and South Oso Flaco foredunes and 7.5 revegetation area, was hazed out of these sensitive areas from 12 April to 22 May. Due to the continued presence of this bird within sensitive areas, trapping efforts were attempted but ceased after sightings became less frequent and priorities switched to monitoring the increased raven activity around 22 May.

Northern harrier

Northern harriers have been documented as nest predators at ODSVRA in past years. In 2015, there were 39 sightings of northern harriers on 26 days. In the eight-year period from 2007-14, activity was recorded on an average of 43 days (range=25-60) (Figure 18, Table 13). Based on age and sex, there was a minimum of three individuals (one adult male, one sub-adult female and one juvenile female) observed during this season. From 14 April to 23 April a sub-adult female harrier was observed almost daily hunting for extended periods of time in 8 enclosure, North Oso Flaco and South Oso Flaco. The bird was also observed consuming a large avian prey item inside 8 enclosure on 22 April. On 23 April, one sub-adult female was trapped at the south end of North Oso Flaco and relocated approximately 295 miles away to Sutter Buttes near Yuba City, north of Sacramento.

Table 13. Sightings of merlin, American kestrel, large owl spp., red-tailed hawk, northern harrier, and peregrine falcon in specific areas of the Southern Enclosure and Oso Flaco at ODSVRA in 2015.

Date range is from 1 March to 10 September (194-day period).

Location	Merlin	American kestrel	Large owl spp.	Red-tailed hawk	Northern harrier	Peregrine falcon	Total
6 enclosure	13	8	0	9	4	41	75
7 enclosure	10	6	2	20	2	31	71
8 enclosure	4	7	0	23	7	28	69
Boneyard enclosure	3	4	3	15	0	15	40
North Oso Flaco	1	5	0	58	10	19	93
South Oso Flaco	0	9	0	18	16	29	72
TOTAL	31	39	5	143	39	163	420

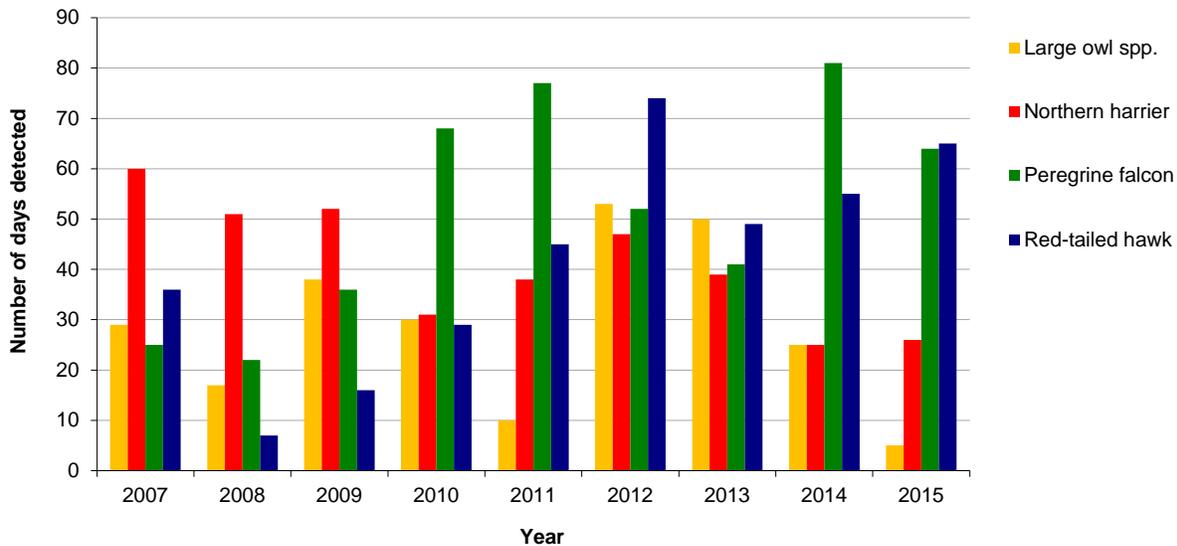


Figure 18. Number of days large owl spp., northern harrier, peregrine falcon and red-tailed hawk were detected in the Southern Enclosure and Oso Flaco at ODSVRA in 2007-15.

Date range is from 1 March to 10 September (194-day period).

Peregrine falcon

On 28 April, a sub-adult male peregrine falcon with plumage characteristics and head markings allowing it to be identified to individual was observed eating an adult plover in 8 enclosure. This peregrine was also observed frequently hunting and catching prey on the shoreline of 6 and 7 enclosures from 3 - 21 April. The falcon was determined to be enough of a threat to the breeding plovers and terns to trap and it was caught on 4 May. On 8 May, the peregrine was banded with a USGS metal band on the right leg and a black visual identification tag (VID) band (50AB) on the left leg before being relocated approximately 467 miles north to the Fort Jones area east of Mount Shasta. On 14 August, this individual was confirmed to have returned to Oceano Dunes SVRA. On 28 August, the “50AB” banded bird caught and ate a banded plover on the 6 enclosure shoreline. The bird was hazed out of the area after eating its prey. Attempts were not made to trap this bird again because the majority of plover and all tern broods had fledged (Appendix G).

Peregrines were commonly observed actively hunting, perching, and consuming prey in the Southern Enclosure and Oso Flaco. Peregrines hunting on the enclosure shoreline, even when not focused on plovers and terns, can cause disturbance that limits foraging time for plover chicks while increasing the risk of broods being separated or moved. Peregrines perched in the nesting area for an extended period of time were hazed by monitors on 24 days in 2015 (sometimes requiring repeated efforts before the bird left the nesting area). Hazing peregrines out of sensitive areas provided a temporary solution but did not appear to deter individual falcons from returning to ODSVRA. In addition to the two documented predation events by the 50AB sub-adult male, one juvenile male peregrine was observed catching and eating a small prey item on 8 enclosure shoreline on 18 August that was later identified as an adult plover based on feather remains collected at the prey site.

In 2015, there were 163 sightings of peregrine falcon on 64 days (Table 13). This represents a 55.0% decrease in sightings from the previous year (362 sightings on 81 days) and an increase of 5.8% above the average of 154 (range=38-362) sightings from 2008-14 (Table 14). The average number of days peregrines were recorded during the period 2008-14 was 54 (range=22-81). There was a minimum of six individual peregrine falcons identified at ODSVRA this season; one adult male, one unbanded adult female, one adult female (VID band “17D”), one sub-adult male (VID band “50AB”), one unbanded immature, and one juvenile. The adult female with VID band “17D” was banded as a nestling in 2013 in southern California and was seen at ODSVRA last year with sub-adult plumage.

Table 14. Sightings of peregrine falcon in specific areas of the Southern Enclosure and Oso Flaco at ODSVRA from 2008-15.

Date range is from 1 March to 10 September (a 194-day period).

Location	2008	2009	2010	2011	2012	2013	2014	2015
6 enclosure	11	13	37	39	41	28	75	41
7 enclosure	11	13	29	45	37	23	85	31
8 enclosure	5	13	25	40	31	19	67	28
Boneyard enclosure	6	6	11	32	9	2	11	15
North Oso Flaco	4	9	24	37	27	14	69	19
South Oso Flaco	1	20	18	12	11	14	55	29
Total no. sightings	38	74	144	205	156	100	362	163
No. days detected	22	36	68	77	52	41	81	64
No. peregrines trapped	0	1	3	0	1	0	1	1

Corvids (American crow and common raven)

American crows (*Corvus brachyrhynchos*) and common ravens are efficient predators at many tern and plover nesting sites and can have pronounced impacts over a short period of time. American crow sightings were limited to two sightings over two days. There were 23 sightings of common raven over six days and ravens were hazed from sensitive areas on two days. Raven sightings were typically of two birds flying together. During the eight-year period 2007-14, crows were seen annually on an average of six days (range=0-10) and ravens on six days (range=2-14) (Table F.1 in Appendix F). In 2015, four plover nests were documented lost to raven on 22 May. Sites within the Guadalupe-Nipomo Dunes complex to the south also experienced raven impacts. The Chevron (Guadalupe Restoration Project) site reported a minimum of eight plover nests documented lost to raven and the Rancho Guadalupe Dunes County Park documented ravens eating newly hatched plover chicks from 18 – 27 May. Ravens were considered to be a serious threat and one raven was lethally removed on 1 June from Rancho Guadalupe Dunes County Park by the ODSVRA USDA Wildlife Services contractor. Raven sightings decreased after this removal and no other losses to raven were identified at ODSVRA and the Chevron site. One raven continued to be seen at Rancho Guadalupe Dunes County Park after 1 June.

Gulls

On 5 June, a first winter western gull repeatedly picked up and dropped a small plover chick before flying with it to the waterline where it dipped the chick in the water. It is suspected that the chick was then eaten by the gull. An agitated adult plover was seen running around the gull and other adult plovers were observed alert and displaying in front of gulls foraging higher on the beach. This event represents a minimum number of one plover chick lost to gulls this season. Additionally, a sub-adult California gull was observed scavenging a likely dead plover chick with green bands near the waterline in the northern section of 6 enclosure shoreline (suspected SP88 chick, attacked by SP32 adult plover earlier this same day and assumed dead). There were no adult plovers observed reacting to this California gull (Notes section, Table G.3 in Appendix G).

Gulls can pose a significant threat to snowy plover breeding success at ODSVRA, especially individual gulls that key in on adults with broods. Such gulls can become “specialists” searching for and preying on chicks over a wide area. Depredation events can happen quickly and easily go undetected. In nine of the 12 years from 2004-15, gulls have been documented taking plover chicks. Between 2011-14 gulls took a minimum of 21 plover chicks, juveniles or adults. In 2011, three gulls took a minimum of six chicks, three juveniles, one juvenile or adult, and five plovers of unknown age over a four-day period from 28 July to 31 July. In 2012, a gull pellet found on 6 enclosure shoreline contained nine bands, representing a minimum of three unknown-age plovers taken by gulls; none of these predation events were observed. In 2013, no plovers were known depredated by gulls. In 2014, two gulls took a minimum of two plover chicks and one juvenile or adult.

Gulls are present year-round at ODSVRA with numbers fluctuating throughout the year. To document seasonal changes as well as long-term trends, daily surveys at specific locations and monthly surveys of the shoreline of the entire park are completed from March through September (see Monitoring and Management Actions section for more detail). In 2015, there was a maximum count of 3,225 on 2 July for the entire park. For the past seven years from 2009 to 2015, counts for the entire park have been much lower in the months from March to May, increasing in June, highest in July and August, and decreasing in six of seven years in September (Figure 19).

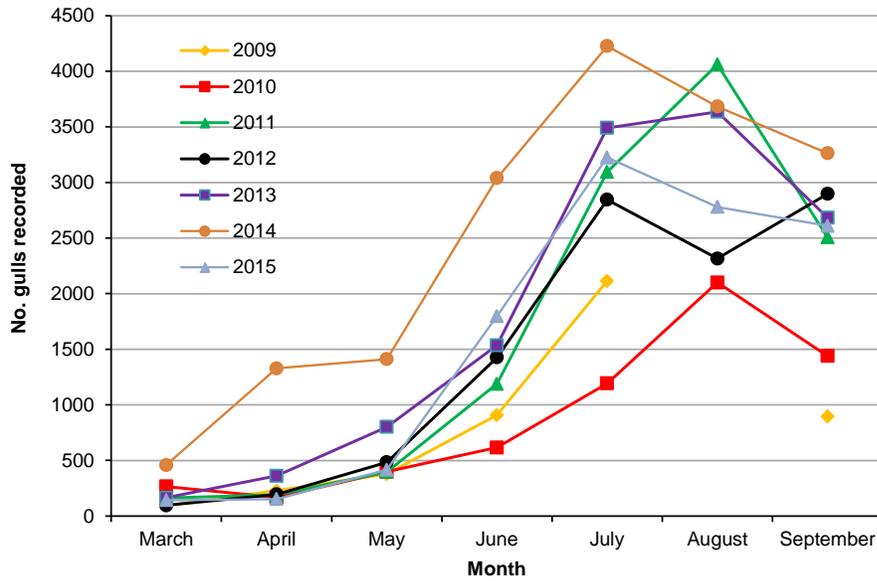


Figure 19. Monthly gull count along entire ODSVRA shoreline for March to September in 2009-15. Information not available for August 2009. Monthly surveys were conducted between 6 am and 1 pm. From 2009 to 2014, average monthly counts were calculated using weekly counts. Weekly survey data were only included if the entire park’s shoreline was covered. In 2015, a single survey was conducted each month.

RECOMMENDATIONS

Continue monitoring

Monitoring is critical for effective protection of nesting terns and plovers. As problems and threats arise for adult birds, nests, and chicks, timely information from monitoring can help guide appropriate management actions and evaluate their effectiveness. Monitoring efforts at ODSVRA should have adequate funding, resources, and flexibility to address anticipated problems (e.g., nesting failure, causes of chick loss, predator pressure) as well as unanticipated problems. Specific recommendations for monitoring are the following:

Continue banding least tern and snowy plover chicks

Continue banding least tern and snowy plover chicks to better understand chick behavior and factors promoting or threatening survival of chicks (e.g., feeding rates for tern chicks, foraging activity and movements of plover chicks, age and location of disappearance of different cohorts of chicks). Banding also provides a means to document fledging success. Without this information, the seasonal productivity of terns and plovers at ODSVRA would be unknown and management effectiveness could not be assessed. Additionally, bands provide an opportunity to gain insight into predator impacts on chicks and fledglings. Over time, banding of tern and plover chicks will provide information on natal site fidelity of terns and plovers fledged at ODSVRA, as well as migration to other sites.

Continue banding least tern chicks to individual

Beginning in 2006, least tern chicks were banded to allow individual chicks to be identified. This was done, in part, by placing one or two different colors of tape on the federal band, creating a unique combination for each chick. Banding to individual provides the opportunity to gain additional information that otherwise may not be obtainable, including:

- 1) providing the most accurate means to count the number of juveniles produced;
- 2) identifying if different areas within the colony are having different fledging success during a season;
- 3) identifying if broods hatching more than one chick are fledging more than one chick;
- 4) tracking individual chick and juvenile movement within the ODSVRA colony;
- 5) providing information on the length of stay of individual juveniles at the colony site after fledging;
- 6) tracking recruitment of juveniles into ODSVRA's breeding population; and
- 7) tracking movement of individuals to other colonies in California.

Banding to individual provides valuable information to assist in developing and assessing site management actions directed toward the recovery of the least tern.

Continue option to band adult snowy plovers

The occurrence of abandoned plover nests can raise concern about possible mortality of adult plovers. If elevated adult mortality rates occur or are suspected, it could prove beneficial to band certain adults. This would allow monitors to verify if mortality was taking place and possibly identify the causes.

Continue to provide adequate-sized bumpouts and single nest enclosures to better protect least tern and snowy plover nests in or close to the open riding area

Least tern and snowy plover nests inside the Southern Enclosure and located close to the north or east fence receive temporary additional fencing to create a buffer from recreational activities in the open riding area. These bumpouts connect to the fence adjacent to the nests and extend into the open riding area. Prior to 2010, only nests found within 75 feet of the Southern Enclosure fence were given a bumpout. Beginning in 2010, nests found within 100 feet of the Southern Enclosure fence bordering the open riding area received bumpouts. Nests inside the enclosure and more than 100 feet from the fence may also receive a bumpout if repeated disturbance from the open riding area is observed. Prior to 2012,

nests found in the open riding area initially received an 82-foot-radius circular single nest enclosure as per the previously existing protocol. It is our experience that these earlier identified minimums (75 feet and 82 feet) are not sufficient to adequately reduce disturbance from recreational activity and, in response to birds flushing from their nests, additional fence installation was often necessary to increase the size of the buffer.

In 2015, three least tern nest and six snowy plover nests were given bumpouts to increase the distance from the nest to the open riding area fence to a minimum of 100 feet. All three least tern nests (LT16, LT19, and LT20) hatched a total of four chicks and three chicks fledged. Five of the plover nests (SP8, SP24, SP49, SP75, and SP113) hatched a total of 12 chicks and six chicks fledged. One plover nest (SP59) was abandoned pre-term (see Appendix A and Appendix B).

For 2016, it is recommended to continue to install bumpouts for nests close to the Southern Enclosure fence to create a buffer of at least 100 feet between the nest and the open riding area. Nests in the open riding area should receive a single nest enclosure with a minimum radius of 100 feet. Nests will be monitored closely to assess the adequacy of protective fencing in reducing disturbance. If necessary, bumpouts or single nest enclosures may increase in size if disturbance to incubating birds is observed as a result of recreational activity. ODSVRA will continue to maintain a safe vehicle corridor adjacent to the north and east fence, any bumpouts, and single nest enclosures.

Continue to position a large section of the shoreline enclosure fence further east (inland) to provide a wider functional shoreline habitat

The shoreline west of the enclosure west fence is important snowy plover habitat for rearing chicks. Prior to 2011, the management practice has been to place the west fence as low as possible on the shoreline. This was to maximize the amount of nesting and potential brooding area inside the seasonal fence protected from coyotes. In 2011, two small experimental shoreline fence sections, located in 6 and 7 enclosures, were placed up to 100 feet further to the east and these areas appeared to have a broader and more functional shoreline when evaluated at the end of the season. In 2012-15, the shoreline fence was moved 100 feet east for the southern half of 6 enclosure and for the majority of 7 enclosure (except for the 7.5 revegetation area) (Appendix C). The Southern Enclosure is seasonally open to off-highway vehicles during five months of the year between October and February. As a result of recreational activity during this time, the shoreline of the 6, 7, and 8 enclosures has almost no cover or topographic relief at the beginning of the breeding season and park staff distributes wood and wrack to provide some cover above and below the drift line. The shoreline is further altered with the installation of the west fence as it results in substantial deposition of fine windblown sand on the leeward (east) side of the fence. A fence set low on the shore can result in a very narrow swath of shore with cover (west of the fence) bordered by limited cover over the majority of a strip of habitat (approximately 100 to 180 feet wide) immediately east of the fence, with deposited sand burying existing or introduced cover.

Moving the west fence 100 feet eastward improved shoreline habitat characteristics for chick-rearing by allowing for a wider area of shore with cover and wrack. There was more topography and cover created by increased debris, woodchips, and wrack as well as greater foraging opportunities with the increased area of habitat enhancement. There continued to be broad areas of mobile sand with little cover east of the west fence.

Adjusting the fence eastward allows for the following benefits to the overall management goals for snowy plover productivity:

- 1) allow access from the shoreline for monitoring staff to maintain a wider swath of shore with habitat enhancement materials (including wrack) throughout the breeding season;
- 2) reduced chance of high tides and surf washing up and removing a low-set fence and habitat enhancement material;

- 3) provide better conditions for pioneering plants to grow in a wider area between the high tide line and the west fence (windblown sand deposited leeward of the fence can adversely impact seedling survival);
- 4) may increase foraging opportunities for plovers;
- 5) may reduce vulnerability to predators by providing more space and cover for chicks; and
- 6) may reduce bouts of aggression between adults with broods by decreasing brood density and, therefore, may decrease the chance of chicks becoming separated from their brood or attacked by adults with other broods.

It is recommended for 2016 to repeat the shoreline configuration as was present in 2015, with a large portion of the 6 and 7 enclosure shoreline fence approximately 100 feet to the east of the typical shoreline fence location. The northern section of 6 enclosure would not be moved east to avoid potential impacts to nests on the shoreline from trespassers and to reduce the possibility of pushing nesting activity further to the east side and closer to the riding area in this narrow portion of north 6 enclosure. The shoreline fence should continue to be installed last (after all other fencing is installed) and as close to 1 March as possible to lessen the chance of storm-driven high surf damaging the fence.

Continue to enhance habitat in the Southern Enclosure by distributing natural materials, seed, and plants and increase efficiency with the help of maintenance staff and heavy equipment

Natural materials such as driftwood, woodchips, and wrack (surf-cast kelp) should be distributed in large amounts within the enclosures (including the shoreline) to enhance habitat features. Since 2002, wrack has been gathered by hand and placed in the enclosure. Approximately 180 cubic yards of wrack were distributed on the enclosure shoreline during the 2015 season as habitat enhancement. Greater efficiencies may be possible for this wrack distribution. Since 2008, OSDVRA monitoring staff has received assistance from available heavy equipment operators from park maintenance staff in loading woodchips to be distributed in the enclosure. A method using heavy equipment has not been found to collect and distribute large amounts of wrack from the open riding to the seasonal shoreline enclosure. Attempts in the past resulted in more sand than wrack being collected with the equipment compared to hand collection. In 2016, it is recommended that methods to better use heavy equipment for wrack collection should be further explored. The goal would be to have heavy equipment available throughout the season to assist in loading large piles of wrack collected from the open riding area, to then be placed in the seasonal enclosure to be distributed by permitted staff. This would increase staff efficiency and allow larger amounts of wrack to be dispersed on the shoreline, helping to maintain larger populations of invertebrate prey over a broader area for snowy plover chicks, fledglings, and adults. Broader distribution of wrack also provides shelter from wind and cover from predators. The use of heavy equipment needs to be balanced with other operational needs in the park.

Wrack and woodchip additions could also occur during the winter or prior to 1 March if materials and staff levels allow. Prior to the 2014 season during the winter months, a limited amount of wrack was placed in a few large piles as well as spread thinly in a few areas (600-1,000 square feet). These wrack areas persisted to the end of the season helping to create temporary hummocks within the enclosure and, in most cases, provided a favorable area for plants to grow. Wrack was not dispersed during the winter prior to 2015. As time permits, it is recommended to place large wrack piles in the winter or at the beginning of the season in the area where the seasonal enclosure will be located.

The addition of quick-growing annual dune vegetation should continue to be evaluated as a habitat enhancement option. Planting in early spring, with sufficient late rains, may allow enough time for plant growth to provide topographic features that could benefit plovers and terns. Seeding of areas in the Southern Enclosure with sea rocket, beach bur, and other on-site available seed is recommended as an option in 2016. Planting of sea rocket or other appropriate available container stock (grown on-site) in test plots with areas of added materials (e.g., woody debris, wrack) should also continue to be evaluated in

2016. The seeding and planting would occur as soon as possible after the fence is installed on 1 March. Seeding or planting may be attempted prior to the fence installation in order to take advantage of rain events and moist sand. The goal of this planting is to provide areas of scattered vegetation for cover and to encourage the development of small hummocks.

Continue to study the benefits of wrack addition to the Southern Exclosure shoreline and inoculation with wrack-associated invertebrates as a possible means to restore invertebrate species and biomass (these invertebrates are part of the prey base for snowy plover chicks, juveniles, and adults)

In 2007, a study was initiated by Drs. Jenifer Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara (UCSB), examining the responses of invertebrate numbers and diversity in areas where wrack was added to the Southern Exclosure shoreline throughout the breeding season. Preliminary findings from the five-year study (2007-11) indicated that the seven-month seasonal closure (March-September) is not a sufficient period of time for invertebrates to effectively and naturally recover species diversity and abundance on the Southern Exclosure shoreline following five months of recreational use. In 2012, invertebrate sampling (by Dr. Dugan) was more limited, with one series of transects at the beginning of the season and repeated once at the end of the season. In 2013-15, park staff, following the same methodology, performed one series of invertebrate sampling at the end of the season and a beginning season sampling survey was done in 2015. The survey was comprised of 10 transects in the Southern Exclosure and three transects in North Oso Flaco (as a control). Samples were sent to Dr. Dugan at UCSB for analysis and findings added to the data set.

From 2012-15, park staff has inoculated wrack added to the shoreline with invertebrates following protocols developed by UCSB. If funding levels allow, experimental examination of wrack and invertebrate manipulation on the Southern Exclosure shore should continue in the 2016 season with the goal of identifying potential means to enhance the diversity and abundance of invertebrate species that are natural prey for plovers. Park staff should continue the end of season sampling, add a beginning of season sampling, and should continue to explore further ways to assess shoreline ecosystem health and responses to management actions.

Continue to look for an appropriate design to cover trash dumpsters

The predator management strategy at ODSVRA includes methods to discourage attracting predators to the site. The large trash dumpsters (22 feet long, 20 cubic yard capacity) located near marker post 2 attract a large number of gulls landing on and foraging in the dumpsters. Four to six dumpsters are present during the busy summer months. In 2012, an experimental cover was designed for one dumpster with fence material enclosed in an approximate 12-foot-high metal frame with heavy 7.5-inch-wide plastic strips hanging from the front of the frame. This design was intended to prohibit gulls from landing on the trash, allowed park visitors to easily discard their trash without lifting a lid, and allowed maintenance staff to lift the cover off and compact the trash with heavy equipment which is necessary before the dumpster can be pulled out and replaced each week. The cover was removed after periods of high winds quickly destroyed the plastic strips, making the cover ineffective. A dumpster cover design that could fit the needs of ODSVRA was not discovered and no covers were used in 2013-15. Daily surveys at the dumpster area resulted with the month of June having the highest daily average number of gulls (46) as well as the maximum number of gulls present at one time (392 on 26 June) (see section titled Predators and predator management on page 41 for more details). It is recommended for 2016 to cover the trash dumpsters in the marker post 2 area with lids designed to exclude gulls and meet the needs of the ODSVRA staff and visitors.

Continue to maintain option to salvage and rescue eggs, chicks, juveniles, and adults under very limited circumstances

In some circumstances the abandonment of least tern or snowy plover eggs and chicks can be directly attributed to human disturbance. The option to salvage such eggs and chicks to be raised in captivity by an approved facility and released in the wild is useful. Beginning in 2003, a limited number of abandoned but likely viable snowy plover eggs or chicks from ODSVRA were brought into captivity. Chicks were raised in a manner that they did not imprint on humans and were released into the wild when fledged. All fledglings were color-banded to individual to facilitate collecting information on movements, survival, and future reproductive success. Captive care should only be used selectively and not as a substitute for responding to the primary causes of elevated egg or chick abandonment rates. In 2015 there were no eggs or chicks brought into captive care from ODSVRA.

Ongoing management actions that will continue in 2016

The following are part of our ongoing management actions and monitoring procedures for which a specific recommendation is no longer necessary (see Monitoring and Management Actions section for more detail). Background information and justifications for these management actions have been discussed in detail in previous annual reports.

- Oso Flaco area protection will continue at the same monitoring and management level as set in 2005 (Site Description).
- The Arroyo Grande Creek protected area will be clearly delineated as a closed area around the Arroyo Grande Creek and lagoon by using posts and signs as practiced since 2006 (Site Description).
- Night vision equipment will continue to be used for monitoring the least tern night roost. The equipment has been used for monitoring since 2007.
- Continue monitoring least tern juveniles, night roost, and foraging activity at nearby freshwater lakes.
- Continue use of motion detector cameras for nest monitoring and train and permit additional monitoring staff as needed.
- Continue to use an anemometer with data logger from a wind tower to record daily wind speeds and direction.
- Continue option to use tern chick shelters.
- Continue option to use least tern chick fencing on the east side of the enclosure and a method to maintain the tern chick fencing will continue to be explored.
- Predator monitoring and management actions that have been in place since 2003 and 2004 will continue.
- Continue daily gull surveys as they were done in 2014 (gulls were counted at the trash dumpster area at marker post 2) and the full park monthly surveys will continue as they have been done since 2008.
- The Southern Enclosure protected area will include the use of increased fence height as practiced since 2006 and use of aprons as used since 2007 to improve the effectiveness of the perimeter fence in protecting the breeding terns and plovers.
- The Southern Enclosure and North Oso Flaco shoreline will continue to be protected, this includes maintaining the posts and rope at marker post 6 and Oso Flaco boardwalk intertidal zones to minimize trespass, which has been part of the management actions in these locations since 2008.
- Continue use of 10-foot by 10-foot single nest enclosures with net tops, circular enclosures with net tops, and mini-enclosures as needed to protect nests from avian predators. These small enclosures are not without risks to incubating adults and we will continue to closely monitor and evaluate their use.
- Surveys for plovers will continue during the nonbreeding season. These surveys have been conducted since the winter of 2009-10.
- Continue to document impacts and, when possible, reduce disturbance caused by low-flying aircraft over the Southern Enclosure and Oso Flaco.
- Continue to work to address water quality issues at Oso Flaco Lake.
- Efforts to retain skilled monitors will continue at ODSVRA.

NOTES

Least tern chick in open riding area

On 28 June, one 10-day-old chick of the two-chick LT42 brood moved 10 feet east of 7 enclosure and was picked up and placed back in the enclosure. A monitor was inside the enclosure for banding purposes prior to the chick being seen moving out of the enclosure. This banded chick (B/O:Y/G) was documented to fledge on 9 July.

Snowy plover chicks in open riding area

Nine snowy plover chicks from five different broods were observed in the open riding area. Four broods were observed immediately north of the 6 enclosure shoreline and in all cases but one, staff, contractors, and trespassers were not present in the enclosure prior to or during the time the chicks were in the open riding area and no disturbance factor was apparent. A disturbance caused by a person trespassing on the 6 enclosure shoreline did occur prior to one observation of one chick in the open riding area. The fifth brood observed in the open riding area was west of the Arroyo Grande Creek area. All broods that showed a tendency to move close to or north of marker post 6 were closely monitored for extended periods of time by staff or contractors.

Snowy plover brood near Arroyo Grande Creek

On 2 June, two approximately one-day-old unbanded chicks were found in the open riding area west of the Arroyo Grande Creek area (seasonally closed to public using symbolic fencing), approximately 2.6 miles north of the Southern Enclosure. They were attended by a male banded GG:VG and were likely from an unknown nest located in this area and assigned as SP134. From 2001-2014, there have been six snowy plover nests found near the Arroyo Grande Creek lagoon; three each found during the 2001 and 2010 seasons. During this same period, one plover nest was found in 2003 at Dunes Preserve.

The SP134 brood was continuously monitored on 2 June from 1:15 pm until nightfall and was observed being brooded by the male within the Arroyo Grande Creek closed area. The following morning, at 6:07 am, the SP134 adult and chicks were found in the open riding area west of the Arroyo Grande Creek closed area and the brood was moved south to the Southern Enclosure through a coordinated effort by park staff. Vehicle and pedestrian traffic was controlled from all directions by monitoring staff and park rangers to keep the area around the brood undisturbed. Additional monitors were positioned in vehicles at various distances from the brood to track their movement, and to monitor and flush gulls or other potential predators in the area. Two monitors were on foot northwest and northeast of the brood to slowly and carefully encourage movement of the brood south. The chicks were allowed time to be brooded by the adult and forage as needed and became more mobile as the weather warmed. Both chicks and adult crossed onto the 6 enclosure shoreline by 10:50 am.

The SP134 brood was monitored after entering the enclosure and the chicks were observed being attacked by adult plovers with two different broods located on the northern 6 enclosure shoreline (SP32 and SP86). The chicks were last observed at 11:00 am on 6 enclosure shoreline after being aggressively attacked by the SP86 adult; the chicks were observed to be pecked, picked up, and shaken repeatedly by the adult. The area was searched for an extended period, but the SP134 brood was not relocated on this date or on following days. An adult male banded GG:VG was found with three approximately one-day-old chicks from an unknown nest location (SP216) on 9 July and is possibly the same adult that was associated with the SP134 brood.

Snowy plover chicks moving north of 6 enclosure shoreline

On 29 May, one large banded chick was seen briefly by a monitor in the open riding area approximately 100 feet north of marker post 6. The chick appeared to be close to fledge age, but color band combination was not confirmed. Staff controlled traffic in a large area surrounding the location that the chick was last seen, and the area was carefully scanned using the vehicles as blinds. After no chicks (or adults) were

seen in the open riding area for 30 minutes, monitors carefully walked the entire area while other monitors continued to watch from vehicles. No chicks were found in the open riding area after a thorough search. Just prior to the chick sighting in the open riding area, a person on foot was seen trespassing on the 6 enclosure shoreline approximately 1,500 feet south of marker post 6 and was contacted and escorted off the shoreline.

Between 4 to 27 June, banded chicks from SP88 nest were observed on the shoreline in the open riding area just north of 6 enclosure on 10 different days when three to 25 days old. On each occasion chicks involved were directed back into the enclosure and monitored closely. On 5 June, one chick was aggressively attacked by a nearby adult from SP32 brood. The chick was not moving after the attack and assumed dead. Two chicks reached 28 days of age but were obviously smaller in size and less developed than normal 28-day-old chicks/fledglings. The young birds continued to be closely monitored and were observed in the open riding area on four additional occasions from 30 June to 9 July. There were multiple sightings of a banded juvenile from SP88 in other areas of the park away from the 6 enclosure area from 20 July to 2 October. One juvenile was seen in Morro Bay, approximately 22 miles north of park, on 3 September.

On 23 June at 10:22 am, one chick from SP111 nest and two attending adults were observed 50 feet north of marker post 6 and were directed back into the enclosure and monitored for an extended period of time. One chick from this brood was last seen on this same day at 2:32 pm.

Two chicks from SP167 nest were observed in the open riding area on three occasions: 23 July, 3 August, and 7 August when the chicks were 10 to 25 days old. The two chicks were raised near the open riding area and reached 28 days of age on 10 August, but were obviously smaller in size and less developed than normal 28-day-old chicks/fledglings. The brood continued to be closely monitored and one of the young (31 days old but not flight-capable) was in the open riding area on 13 August. Two fledglings were last seen 16 August and one fledgling was last seen on the 6 enclosure shore near the open riding area on 27 August.

Injured least tern sighting

On 22 July, a live unbanded juvenile least tern was observed with a likely broken left wing (wing twisted and outer portion of wing pointed forward) and drooping right wing in 7 enclosure. The tern was monitored for an extended time and did not appear to be flight-capable. The tern was searched for on subsequent days but was not relocated. Although a carcass was not recovered it is assumed that this bird did not survive.

Injured snowy plover sightings

During the 2015 season, there were four adults, four to five juveniles, and three chicks observed with injuries. All but one were observed or found within the seasonal enclosure.

Injured adult sightings

Between 7 to 15 March, an unbanded female snowy plover was observed on three separate occasions limping with a right leg injury. The plover was seen in the open riding area between mid-ramps and marker post 2. The plover was not putting any weight on the leg and the right foot appeared to be swollen with a toe protruding at an odd angle.

On 16 May, the unbanded female snowy plover associated with the SP87 nest was observed within the seasonal enclosure with a right leg injury. It was viewed from a distance using a spotting scope and there appeared to be dried blood on the flank of the right side. The right leg was tucked up into the body feathers and the plover was hopping and standing on the left leg. The plover continued to be seen at the

SP87 nest and the leg condition improved over time. The three eggs were noted to be stained with what was likely dried blood on 25 May and the nest hatched three chicks on 31 May.

An unbanded male plover associated with the SP93 brood was observed south of marker post 6 with a left leg injury. The plover was seen limping on three days from 25 to 27 June. The leg had no visible swelling.

On 4 August, an injured unbanded adult female snowy plover being held by a park visitor was given to a resource staff member near marker post 3. The visitor reported that the bird was found on the shoreline in a roosting position and did not attempt to walk or fly when approached. There were no obvious exterior injuries. The plover was transported to Pacific Wildlife Care in Morro Bay on the same day and was examined by veterinarian Dr. Shannon M. Riggs. Dr. Riggs determined that the bird had sustained trauma to the right side of the head and the right eye. Further examination confirmed that vision to the right eye was significantly impaired to absent and vision was possibly limited in the left eye. The left wing had lost most of its flight feathers, yet appeared otherwise uninjured. The plover was cared for and medically treated at Pacific Wildlife Care for an extended period. Dr. Riggs determined that loss of vision would decrease the bird's ability to survive successfully in the wild and should not be released (medical record attached). The plover was transferred to Monterey Bay Aquarium on 30 September where they will attempt to use it to help foster plover chicks.

Injured juvenile sightings

Between 26 to 31 July, a 35- to 40-day-old unbanded snowy plover fledgling from SP144 nest was observed on 7 enclosure shoreline with an injury to the right leg. The leg hung loosely and was dragged on the sand. On 29 and 30 July, the fledgling was seen in the same shoreline location, hopping exclusively on its left leg, dragging the injured right leg on the ground, and appeared unable to fly. The injured plover was last seen on 31 July.

On 28 and 31 July, a 32- to 35-day-old fledgling snowy plover banded PG:WG from SP158 nest was observed in 8 enclosure with an injury to its right wing and likely not flight-capable. The juvenile was walking and foraging normally, but with its right wing tip drooping to the ground.

On 6 August, an unbanded juvenile snowy plover was observed limping and holding up its right leg on 6 and 7 enclosure shoreline. On 20 August, an unbanded juvenile snowy plover was observed with a moderate limp, possibly to the right leg, on the 8 enclosure shoreline. These two sightings may represent one or two different birds.

On 9 August, a juvenile snowy plover banded PV:YW from SP127 nest was observed foraging with a broken left wing on 8 enclosure shoreline.

Chick injury sightings

On 13 May, a five-day-old snowy plover chick, banded VV:GW from SP31 nest, was observed on 6 enclosure shoreline limping and putting very little weight on the right leg. There was no swelling or other evidence to suggest the bands were involved in the leg injury. The chick was last seen on 14 May with extremely limited mobility.

On 11 and 12 July, a 22- to 23-day old unbanded chick from SP156 brood was observed on 6 enclosure shoreline limping with a right leg injury. The leg hung loosely and the right foot appeared swollen. Subsequently, the chick was not seen with an injury and it fledged on 17 July.

On 22 July, one approximately two-day old chick from an unknown nest (assigned to SP217) had noticeable swelling on right side when observed closely as the brood was banded on the 8 enclosure

shoreline. This chick was not banded and appeared and behaved normally when observed with binoculars and scope in field. The chick was last seen with the brood 12 August when approximately 23 days old.

Snowy plover chicks aggressively attacked by adult plovers

Aggression among adults with nests or broods was frequently noted. There were 98 observations of aggressive fighting recorded 1 May to 12 August in the following locations: 6 enclosure (60 observations), 7 enclosure (16 observations), 8 enclosure (14 observations), and North Oso Flaco enclosure (8 observations). The majority of aggression was observed on the shoreline, was usually brief, chicks were not observed to be harmed, and fighting was between the adults. Chicks were noted to be chased, attacked, or pecked at during 17 observations but were not known to be harmed. There were three additional fighting incidents on the 6 enclosure shoreline observed to have severe impacts on chicks, with more details below.

As noted previously, the SP134 two-chick brood that moved onto the enclosure shoreline from the Arroyo Grande Creek area on 3 June was aggressively attacked by adults on the 6 enclosure shoreline. The two chicks were not resighted after the attack or during subsequent monitoring.

On 5 June, one four-day-old GA:VY chick from the three-chick SP88 brood was attacked by nearby SP32 adult on the northern 6 enclosure shoreline. The GA:VY chick was not attended by an adult and the SP32 adult continued to attack the chick for several minutes. The chick was observed motionless and assumed dead after the attack as this brood was only seen with two chicks after the incident. Later in the day and in the same location, a sub-adult California gull was seen picking up and dropping a plover chick, unknown if dead or alive, before carrying it away. The chick was banded but combination not determined (a green band was noted). This may have been the GA:VY chick suspected killed earlier by an adult plover.

On 6 July, an adult male (unknown if banded or unbanded) was observed aggressively attacking two SP152 chicks banded PG:RB near their nest location in 6 enclosure. The chicks were banded at the SP152 nest location approximately three hours prior the observed attack. After attacking the two chicks, the aggressive male incubates the remaining egg at SP152. A female, banded NO:WY, also incubates the egg at SP152. Over the following 75 minutes, the male continued to alternate between the hatching egg at the nest and aggressively attacking the two banded chicks. The male was observed pecking, shaking, picking up and tossing the two chicks. The female was observed fighting with the male on one occasion. Neither of the adults brooded the two chicks during this time. The following morning on 7 July, three chicks (two banded and one unbanded) were near the SP152 nest with the NO:WY female, with one banded chick having limited mobility. This was the last observation of the banded chicks and no male was seen in the area interacting with the chicks or female. On 9 July, one unbanded chick was seen with the banded female on 7 enclosure shoreline. The NO:WY female continued to attend the unbanded chick until it fledged and they were last seen 23 August on 8 enclosure shoreline.

Least tern carcass found

On 21 July, a dead juvenile least tern, banded L:Y/G from LT9, was found in 7 enclosure approximately 50 feet east of the western fence. The carcass was located on a sandy surface among scattered sea rocket plants, positioned with ventral surface of body to the ground with the wings folded. The carcass was not fresh. The body cavity was open and maggots were present. Necropsy results indicated the cause of death was undetermined because the carcass was too decomposed; however, gunshot trauma and other trauma that would have resulted in bone fractures were ruled out as causes of death (see attached necropsy report).

Snowy plover carcasses collected or observed

A total of seven carcasses were collected; one adult, one juvenile, one large chick or young fledgling, and four chicks. Carcass remains were taken to the Santa Barbara Museum of Natural History. In addition, one chick carcass was observed but not recovered due to proximity of young plover broods.

Carcasses of one snowy plover juvenile and one large chick or young fledgling in the riding area

On 7 October at about 9:00 am, park maintenance staff found a dead snowy plover a few feet from the western 8 enclosure fence in the riding area. Maintenance staff were in the process of removing the fence and moved the plover to a location 11 feet west of the fence. The juvenile plover carcass, banded VG:PB from SP36 brood, did not appear to have been driven over, lacked eyes, and was full of maggots, but was otherwise intact. It fledged from ODSVRA on 9 June and was last alive seen on 8 enclosure shoreline 1 October.

On 7 October at 2:25 pm, a dead snowy plover was found by park maintenance staff about three feet west of the 6 enclosure fence line in the riding area. The unbanded large chick or young fledgling plover carcass was not in tire tracks, slightly buried, and very dry and desiccated. The last unbanded chick fledged on 30 August and on 10 September the area was thoroughly walked and the carcass was not found, which indicates it was likely buried and became unburied with recent winds.

Carcasses or remains of one adult and five chicks found within the Southern Enclosure

On 12 September, the intact desiccated carcass of an unbanded adult snowy plover was collected from 7 enclosure.

On 12 June, the carcass of an unbanded chick was observed on 6 enclosure shoreline near two unbanded SP107 chicks and the associated RR:- adult male but could not be recovered due to proximity of young plover broods.

Four additional desiccated carcasses of snowy plover chicks (two banded and two unbanded) were found on 8 and 10 September within the Southern Enclosure. Chick carcasses were collected from the 6 enclosure shoreline (2), 7 enclosure (1), and 8 enclosure shoreline (1). By location of carcasses, these chicks are different than the carcass noted on 12 June on the 6 enclosure shoreline but not collected. See Appendix G for additional details regarding the chick carcasses.

Least tern band found on ground near the nesting enclosure

On 7 July, a single metal band covered in orange tape was found on the sand surface in southwestern Pipeline revegetation area adjacent to 8 enclosure. The aluminum band had been subjected to enough pressure to result in a deformation of the band at the seam (pushed inward). This USGS 1A band numbered 1841-98476 was used at ODSVRA in 2009 on 10 July to band a one-day-old California least tern chick from LT2 nest (located within the predator fencing of 8 enclosure) with the color combination of O:W/B. Both banded chicks hatching from this nest were last seen on 11 July when two days old.

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APPENDICES

Appendix A. California least tern nests at ODSVRA in 2015.

Least tern chicks were banded with yellow over green vinyl tape on a size 1A blank aluminum band on the right leg and a size 1A numbered aluminum federal band on the left. Color tape was placed on the federal band to create combinations unique to individual. (For a description of color band letter codes see Appendix B.) Chicks were weighed immediately prior to banding, typically at one to three days old. Fifteen chicks from ten hatching nests were not banded. A total of 12 unbanded fledglings were seen concurrently in 6 and 7 exclosures on 15 July. Information on adult pair is provided where known. Sex of adults is typically not known. Contents of several non-hatching eggs were examined post-season at the Santa Barbara Museum of Natural History.

Location: 6 = 6 exclosure, 7 = 7 exclosure, 8 = 8 exclosure

U = unbanded

unk = unknown

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledge)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
1	6	-:W/A W/B:(?)	19 May	Hatch	12 Jun	2	2 (2)	Y/W:Y/G (6.7) W/G:Y/G (6.5)	Y/W:Y/G W/G:Y/G	
2	6		19 May	Hatch	10 Jun	3	3 (3)	W:Y/G (5.4) K:Y/G (5.3) A/W:Y/G (5.5)	W:Y/G K:Y/G A/W:Y/G	
3	6		18 May	Hatch	10 Jun	2	2 (2)	A:Y/G (6.1) O:Y/G (6.6)	A:Y/G O:Y/G	
4	6	W:- female U male	20 May	Hatch	12 Jun	2	2 (1)	B/W:Y/G (7.0) R/W:Y/G (6.5)	B/W:Y/G	
5	6	U Banded	23 May	Hatch	13 Jun	2	1 (1)	W/A:Y/G (7.6)	W/A:Y/G	Unknown fate for second egg.
6	6	-:G/O S:-	21 May	Hatch	11 Jun	2	2 (2)	G/W:Y/G (7.8) O/W:Y/G (6.9)	G/W:Y/G O/W:Y/G	
7	6	-:G/B	19 May	Hatch	9 Jun	2	2 (0)	Y:Y/G (7.1) G:Y/G (7.2)		Both chicks last seen at one day old on 10 June.
8	6		20 May	Hatch	10 Jun	2	2 (2)	N:Y/G (5.8) R:Y/G (5.7)	N:Y/G R:Y/G	
9	6		20 May	Hatch	10 Jun	2	2 (2)	L:Y/G (6.9) B:Y/G (6.3)	L:Y/G B:Y/G	On 21 July, the carcass of the fledgling-size L:Y/G tern was recovered in 7 exclosure. This bird was last seen when banded on 10 June at nest. (see Necropsy report)
10	6	U	21 May	Hatch	11 Jun	2	2 (2)	P:Y/G (6.9) V:Y/G (5.9)	P:Y/G V:Y/G	

Appendix A. California least tern nests at ODSVRA in 2015 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledge)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
11	7		23 May	Failed, unknown cause	1 Jun	2	0			Nest found at two eggs on 24 May and seen incubating from 24 May through 31 May. Nest not incubated after 31 May and no eggs were found post-season. Nest was in a location where it would not have been incubated without detection for a long enough period to suspect hatch.
12	6		20 May	Failed, unknown cause	24 May	1	0			Nest incubated on 20 May and 23 May. Unable to confirm incubation 24 May through 27 May and no eggs were found at nest on 27 May. Nest was in a location where it would not have been incubated without detection for a long enough period to suspect hatch.
13	6	W/(B?):W/A	20 May	Hatch	13 Jun	1	1 (unk)	U		One unbanded chick last seen on 16 June at three days old.
14	6		20 May	Hatch	13 Jun	2	2 (unk)	U U		Two unbanded chicks suspected to be this brood were last seen on 24 June at 11 days old.
15	6		19 May	Hatch	13 Jun	2	2 (unk)	U U		Two unbanded chicks last seen on 15 June at two days old.
16	6	U Banded	24 May	Hatch	15 Jun	2	1 (unk)	U		On 25 May, nest found at two eggs located 90 feet west of east fence and received a bumpout on 26 May to increase distance of nest from open riding area to over 100 feet. One chick and one egg last seen at nest site on 15 June at hatch. On 16 June raccoon tracks at nest site and nest bowl empty.
17	7	B:W/B -:S	24 May	Hatch	17 Jun	2	2 (2)	Y/G:Y/G (5.1) A/O:Y/G (5.9)	Y/G:Y/G A/O:Y/G	
18	6		28 May	Hatch	22 Jun	1	1 (1)	A/R:Y/G (5.9)	A/R:Y/G	
19	6	U	25 May	Hatch	16 Jun	2	2 (2)	G/Y:Y/G (6.8) R/Y:Y/G (6.0)	G/Y:Y/G R/Y:Y/G	On 26 May, nest found at two eggs located 68 feet west of east fence and received a bumpout on 27 May to increase distance of nest from open riding area to over 100 feet.

Appendix A. California least tern nests at ODSVRA in 2015 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledge)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
20	6	U Y/O:W/B	25 May	Hatch	15 Jun	2	1 (1)	W/B:Y/G (7.3)	W/B:Y/G	On 26 May, nest found at two eggs located 35 feet west of east fence and received a bumpout on 27 May to increase distance of nest from open riding area to over 100 feet. On 2 September, one cracked egg was collected at nest site. Egg contents revealed no sign of fertilization.
21	6	V:B/W U	24 May	Hatch	14 Jun	2	2 (2)	W/O:Y/G (9.1) B/Y:Y/G (6.7)	W/O:Y/G B/Y:Y/G	
22	7	U	27 May	Hatch	17 Jun	2	2 (1)	Y/B:Y/G (5.7) Y/R:Y/G (6.5)	Y/R:Y/G	Y/B:Y/G chick last seen on 26 June at 9 days old.
23	7		27 May	Hatch	17 Jun	2	2 (2)	Y/A:Y/G (6.1) Y/O:Y/G (6.3)	Y/A:Y/G Y/O:Y/G	
24	7		28 May	Hatch	18 Jun	1	1 (1)	O/G:Y/G (7.5)	O/G:Y/G	
25	7	B/W:(A/G)?	29 May	Abandoned post-term	26 Jul	1	0			Nest observed incubated for 58 days from 29 May to 25 July. On 1 August, one egg in shallow nest bowl and faint tracks. Egg collected 2 September. Contents examined and a dead, desiccated embryo found inside.
26	7		25 May	Hatch	15 Jun	2	2 (2)	W/R:Y/G (6.5) W/Y:Y/G (7.1)	W/R:Y/G W/Y:Y/G	
27	6	O:B/W	21 May	Hatch	17 Jun	2	2 (2)	A/Y:Y/G (5.0) O/Y:Y/G (5.3)	A/Y:Y/G O/Y:Y/G	
28	6		29 May	Hatch	20 Jun	2	2 (2)	B/A:Y/G (7.5) R/A:Y/G (8.4)	B/A:Y/G R/A:Y/G	
29	6		29 May	Hatch	19 Jun	2	2 (2)	B/R:Y/G (5.7) R/B:Y/G (7.1)	B/R:Y/G R/B:Y/G	
30	6	B/W:G/W	25 May	Hatch	18 Jun	2	2 (unk)	U U		Two unbanded chicks last seen near nest on 21 June at two to three days old.

Appendix A. California least tern nests at ODSVRA in 2015 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledge)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
31	7	U	20 May	Hatch	13 Jun	1	1 (unk)	U		One unbanded chick last seen at nest on 14 June at one day old.
32	6		25 May	Hatch	15 Jun	2	2 (unk)	U U		Two unbanded chicks last seen on 18 June at three days old.
33	6		29 May	Hatch	20 Jun	2	2 (2)	R/G:Y/G (5.9) G/B:Y/G (5.6)	R/G:Y/G G/B:Y/G	
34	6	W/B:Y/R U	30 May	Hatch	20 Jun	2	2 (2)	B/G:Y/G (6.5) G/R:Y/G (5.9)	B/G:Y/G G/R:Y/G	
35	6		27 May	Hatch	18 Jun	2	2 (2)	G/O:Y/G (6.0) O/A:Y/G (5.3)	G/O:Y/G O/A:Y/G	
36	7		29 May	Hatch	19 Jun	2	2 (2)	O/B:Y/G (5.7) O/R:Y/G (7.1)	O/B:Y/G O/R:Y/G	On 20 June, O/R:Y/G chick was found outside nest bowl lying on back and only making small uncoordinated movements. This chick was banded, warmed in hand, replaced in nest bowl, and did fledge.
37	6	B/W:B/Y	31 May	Hatch	21 Jun	2	2 (2)	G/A:Y/G (5.7) A/B:Y/G (6.3)	G/A:Y/G A/B:Y/G	
38	6		26 May	Hatch	16 Jun	1	1 (unk)	U		One unbanded chick last seen on 16 June at hatch.
39	6	U	31 May	Hatch	21 Jun	2	2 (1)	A/G:Y/G (6.1) W/R/W:Y/G (4.8)	W/R/W:Y/G	A/G:Y/G chick last seen on 23 June at two days old.
40	6	U	4 Jun	Hatch	30 Jun	2	1 (1)	W/B/W:Y/G (7.8)	W/B/W:Y/G	On 2 July, one LT40 chick and two LT41 chicks brooded by adult at LT41 nest, located 31 feet away from LT40 nest. Unknown fate for second egg.
41	6		4 Jun	Hatch	1 Jul	2	2 (1)	Y/B/Y:Y/G (4.9) Y/R/Y:Y/G (5.0)	Y/B/Y:Y/G	On 2 July, adult broods two LT41 chicks and one LT40 chick. Y/R/Y:Y/G chick was last seen when banded on 2 July at one day old.
42	7	U	28 May	Hatch	18 Jun	2	2 (1)	B/O:Y/G (6.3) R/O:Y/G (5.4)	B/O:Y/G	On 28 June, B/O:Y/G chick (10 days old) crossed east fence and crouched ten feet east of east fence in the open riding area and was placed back into the enclosure. This chick fledged on 9 July. R/O:Y/G chick was last seen when banded at hatch on 18 June.

Appendix A. California least tern nests at ODSVRA in 2015 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledge)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
43	6	Banded	7 Jun	Depredated, raccoon	12 Jun	2	0			Nest depredated by raccoon.
44	7	U female Y/W:B/W male	7 Jun	Hatch	29 Jun	2	2 (2)	B/W/B:Y/G (5.2) R/W/R:Y/G (5.2)	B/W/B:Y/G R/W/R:Y/G	
45	6		28 May	Hatch	18 Jun	2	2 (unk)	U U		Two unbanded chicks last seen on 18 June at hatch.
46	6		25 May	Hatch	15 Jun	1	1 (unk)	U		One unbanded chick last seen on 16 June at one day old.
47	6	U (-:A/B)?	20 Jun	Hatch	11 Jul	2	1 (1)	O/B/O:Y/G (7.9)	O/B/O:Y/G	Unknown fate for second egg.
48	8		21 Jun	Hatch	12 Jul	2	2 (0)	A/B/A:Y/G (5.8) A/R/A:Y/G (5.3)		Both chicks last seen when banded on 13 July at one day old.
49	7	U	29 Jun	Hatch	20 Jul	2	2 (1)	R/Y/R:Y/G (10+) B/O/B:Y/G (9.1)	R/Y/R:Y/G	B/O/B:Y/G chick last seen when banded on 26 July at five days old.
50	7	U G/Y:B/W	29 Jun	Hatch	20 Jul	2	2 (1)	A/W/A:Y/G (5.3) B/R/B:Y/G (5.1)	A/W/A:Y/G	B/R/B:Y/G chick last seen when banded at hatch on 20 July.
51	6	Banded U	4 Jul	Hatch	25 Jul	1	1 (1)	L:Y/G (5.0)	L:Y/G	This chick was banded L:Y/G after the carcass of a fledgling from LT9, also banded L:Y/G, was found on 21 July.
52	7	B:-	12 Jul	Abandoned pre-term	31 Jul	1	0			Nest was observed incubating for 19 days from 12 July to 30 July. One egg was collected 4 August and an approximately 2.5-week-old dead embryo was found inside.
53	7		30 Jun	Hatch	21 Jul	1	1 (0)	O/Y/O:Y/G (5.4)		O/Y/O:Y/G chick last seen on 4 August at 14 days old.
54	6		Unknown	Abandoned, unknown if pre- or post-term	Unknown	2	0			Two eggs found post-season on 10 September. Egg contents revealed no sign of fertilization.

Appendix B. Snow plover nests at ODSVRA in 2015.

Plover chicks were banded to brood. Split hatch noted for nests with eggs known to hatch on more than one day. Contents of several non-hatching eggs were examined for fertilization post-season at the Santa Barbara Museum of Natural History.

In reading the codes of color-banded birds the left leg is shown first and separated by a colon from the right leg. If two bands are on a single leg the upper band is shown first. A single band with two colors (bicolor band) has colors separated by a diagonal slash. Colors for letter codes: A = aqua (light blue), B = dark blue, G = dark green, L = lime (light green), K = black, N = brown, O = orange, P = pink, R = red, S = silver (bare metal federal band), V = violet, W = white, Y = yellow.

Location: 6 = 6 enclosure, 7 = 7 enclosure, 8 = 8 enclosure, BY = Boneyard enclosure, NOF = North Oso Flaco, SOF = South Oso Flaco

Adult pair: M = male, F = female, U = unbanded

Nest protection type: see Management Actions for description of seasonal enclosure, symbolic fence, bumpout; 10'x10', circular, and mini-enclosures.

na = estimated date not available due to insufficient information

* Nests marked with an asterisk have more detailed information included in the report Notes section.

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
1	7	F=U M=R-W/B/W	20-Mar	Hatch	28-Apr	3	3 (0)	3 PG:BG	Seasonal enclosure	
2	8	F=U M=BB:YY	18-Mar	Hatch	20-Apr	3	1 (1)	1 PG:RW	Seasonal enclosure	Two eggs (without cracks) abandoned post-term.
3	7	F=NB:OW M=U	21-Mar	Hatch	22-Apr	3	2 (1)	2 VV:OY	Seasonal enclosure	One egg (without cracks) abandoned post-term.
4	SOF	F=RR:OY M=U	17-Mar	Hatch	19-Apr	3	3 (1)	3 PV:OW	Symbolic fence	
5	7	F=U M=	27-Mar	Hatch	1-May	3	3 (0)	3 unbanded	Seasonal enclosure	Split hatch. On 1 and 2 May, female inconsistently incubating and brooding at nest. Chicks not seen after hatch.
6	8	F=VV:VW M=GG:YG	27-Mar	Hatch	5-May	3	3 (1)	3 BB:BG	Seasonal enclosure	
7	7	F=U M=	29-Mar	Abandoned pre-term	25-Apr	3	0 (0)		Symbolic fence	
8	6	F=VV:VG M=PV:BR	31-Mar	Hatch	7-May	3	3 (0)	3 VO:BB	Bumpout Seasonal enclosure	
9	6	F=U M=U	31-Mar	Hatch	5-May	3	3 (2)	3 VG:VB	Seasonal enclosure	Split hatch.
10	6	F=U M=banded	19-Mar	Hatch	21-Apr	3	3 (0)	3 PG:WR	Seasonal enclosure	
11	8	F=GA:BW M=VG:WB	30-Mar	Hatch	2-May	3	1 (1)	1 PG:GW	Seasonal enclosure	Two eggs (without cracks) abandoned post-term. No sign of fertilization when egg contents examined.
12	7	F=U M=U?	31-Mar	Hatch	3-May	3	3 (0)	3 BB:AB	Seasonal enclosure	
13	8	F= M=GA:YW	27-Mar	Hatch	29-Apr	3	3 (0)	3 PV:GB	Seasonal enclosure	
14	8	F=U M=U	1-Apr	Hatch	4-May	3	2 (1)	2 BB:YR	Seasonal enclosure	One egg (without cracks) abandoned post-term. No sign of fertilization when egg contents examined.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
15	7	F=banded M=banded	na	Abandoned, unknown if pre- or post-term	7-Apr	3	0 (0)		Symbolic fence	
16	6	F=U M=GA:GY	7-Apr	Hatch	9-May	3	3 (3)	3 BB:OW	Seasonal enclosure	
17	6	F= M=VV:VB	5-Apr	Hatch	12-May	2	1 (1)	1 BB:OG	Seasonal enclosure	One egg (without cracks) abandoned post-term. No sign of fertilization when egg contents examined.
18	8	F=U M=GG:RW?	5-Apr	Hatch	8-May	3	2 (0)	1 VG:OW 1 unbanded	Seasonal enclosure	Split hatch. One egg (without cracks) abandoned post-term. Approximately one-week-old dead embryo in egg when contents examined.
19	8	F= M=U	28-Mar	Abandoned pre-term	26-Apr	3	0 (0)		Seasonal enclosure	
20	6	F=VG:OG M=	8-Apr	Hatch	14-May	3	3 (3)	3 GG:AB	Seasonal enclosure	
21	6	F=U M=U	4-Apr	Hatch	7-May	3	3 (1)	3 VV:BR	Seasonal enclosure	
22	6	F=V-:VW M=V-:AY	28-Mar	Hatch	30-Apr	3	3 (0)	3 BB:GB	Seasonal enclosure	
23	7	F=U? M=BB:YW	31-Mar	Hatch	3-May	3	2 (0)	2 PV:OG	Seasonal enclosure	One egg abandoned post-term.
24	6	F=VV:AA M=U	5-Apr	Hatch	10-May	3	2 (1)	2 PG:OG	Bumpout Seasonal enclosure	One egg (without cracks) abandoned post-term.
25	7	F= M=	na	Abandoned pre-term	na	2	0 (0)		Seasonal enclosure	
26	8	F=U? M=GG:PB	26-Mar	Hatch	28-Apr	3	3 (0)	3 BB:PY	Seasonal enclosure	
27	7	F=BG:GW M=U	28-Mar	Hatch	30-Apr	3	3 (0)	3 BB:AW	Seasonal enclosure	
28	7	F=BB:RW? M=U	7-Apr	Hatch	10-May	3	3 (0)	3 VV:OW	Seasonal enclosure	Split hatch.
29	8	F=U M=U	1-Apr	Hatch	4-May	3	1 (0)	1 PG:WB	Seasonal enclosure	Two eggs (without cracks) abandoned post-term.
30	7	F=GA:YG M=U	10-Apr	Hatch	13-May	3	3 (3)	3 VV:BW	Seasonal enclosure	
31*	6	F=U M=U	5-Apr	Hatch	8-May	3	3 (0)	3 VV:GW	Seasonal enclosure	Split hatch. On 13 May, one chick with severe limp and on 14 May, chick with limited mobility and was not seen subsequently.
32	6	F=RR:PB M=BB:BY	6-Apr	Hatch	9-May	2	2 (1)	2 PV:RY	Seasonal enclosure	
33	6	F=GG:BY M=VG:OB	7-Apr	Hatch	10-May	3	3 (3)	3 PV:PB	Seasonal enclosure	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
34	BY	F=NB:PG M=RR:OR	na	Depredated avian	9-May	3	0 (0)		Seasonal enclosure	All three eggs depredated by unidentified avian predator.
35	6	F=PV:WB M=GG:PW	12-Apr	Hatch	17-May	3	3 (0)	3 GG:PG	Seasonal enclosure	
36*	6	F=VV:BG M=U	7-Apr	Hatch	10-May	3	3 (1)	3 VG:PB	Seasonal enclosure	On 7 October, the intact carcass of a VG:PB fledgling was collected from 8 enclosure shoreline. Fledgling last seen alive on 1 October.
37	7	F=banded M=(GA:?V)?	7-Apr	Hatch	10-May	3	3 (0)	3 PV:AW	Symbolic fence	
38	8	F=VV:WY M=U	15-Apr	Hatch	18-May	3	3 (1)	3 GA:GW	Seasonal enclosure	
39	7	F=PV:VY M=GG:AY	15-Apr	Hatch	20-May	3	3 (1)	3 PG:WW	Symbolic fence	
40	7	F=PV:VG M=U	15-Apr	Hatch	18-May	3	3 (1)	3 BB:YG	Symbolic fence	
41	6	F=U M=	11-Apr	Hatch	14-May	3	3 (1)	3 PV:OB	Seasonal enclosure	On 10 September, the intact desiccated carcass of a small PV:OB chick was collected from 6 enclosure shoreline. The three chicks from this brood were last seen alive together on 15 May when one day old.
42	8	F=U M=U	3-Apr	Hatch	6-May	3	3 (0)	3 GA:BR	Seasonal enclosure	
43	NOF	F= M=BB:PB	10-Apr	Hatch	13-May	3	3 (0)	2 GA:YY 1 unbanded	Symbolic fence	One of the three chicks not banded and last seen with brood 17 May at four days old.
44	6	F= M=U	13-Apr	Hatch	17-May	3	2 (1)	2 GG:VG	Seasonal enclosure	One egg (without cracks) abandoned post-term. No sign of fertilization when egg contents examined.
45	6	F=BB:YW M=GG:RW	17-Apr	Hatch	22-May	3	3 (2)	3 PV:GG	Seasonal enclosure	
46	7	F=GG:YG M=U	9-Apr	Hatch	12-May	3	3 (2)	3 GA:AB	Seasonal enclosure	
47	7	F=U M=U	10-Apr	Hatch	13-May	3	2 (1)	2 GG:GY	Seasonal enclosure	One egg (without cracks) abandoned post-term.
48	SOF	F=U M=U	11-Apr	Hatch	14-May	3	2 (0)	2 GA:WG	Symbolic fence	One egg unknown fate.
49	7	F=U M=U	18-Apr	Hatch	19-May	3	3 (2)	3 VW:BB	Bumpout Seasonal enclosure	
50	NOF	F=U M=GG:AG	17-Apr	Depredated	20-May	3	0 (0)		Symbolic fence	All three eggs depredated by unknown species.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
51	6	F= M=banded	17-Apr	Abandoned pre-term	7-May	3	0 (0)		Seasonal enclosure	On 28 and 29 April, nest inconsistently incubated. On 30 April, camera installed. Camera confirmed female not incubating nest after 30 April. Adult female mortality suspected.
52	7	F=NO:AG M=U	19-Apr	Hatch	24-May	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
53	7	F=U M=U	18-Apr	Hatch	19-May	3	3 (2)	3 GA:VW	Seasonal enclosure	
54	SOF	F=GA:YR M=BB:GR	18-Apr	Hatch	20-May	3	3 (1)	3 VV:OG	Symbolic fence	On 22 April, symbolic fence moved west to decrease possible pedestrian disturbance.
55	7	F=U M=U	16-Apr	Hatch	19-May	3	3 (1)	3 BB:YB	Seasonal enclosure	
56	7	F= M=	20-Apr	Abandoned, suspected wind	27-Apr	3	0 (0)		Seasonal enclosure	Three eggs buried during period of high winds. No sign of fertilization when egg contents examined.
57	8	F= M=GA:OW	22-Apr	Failed, unknown cause	9-May	3	0 (0)		Symbolic fence	
58	BY	F= M=	22-Apr	Depredated avian	12-May	3	0 (0)		Seasonal enclosure	Three eggs depredated by unknown avian predator.
59	8	F=U M=U	15-Apr	Abandoned pre-term	15-May	3	0 (0)		Bumpout Seasonal enclosure	On 13 May, one egg incubated in nest bowl and two eggs well buried four feet west of nest. Of the two buried eggs, one broke open while digging and was removed and one with existing small (3 cm) hole placed in nest bowl. On 15 May, one egg missing pre-term. Approximately one-week-old dead embryo in remaining egg found when contents examined.
60	6	F=U M=BB:WB	20-Apr	Hatch	23-May	3	2 (1)	2 GG:OW	Seasonal enclosure	One egg (without cracks) abandoned post-term.
61	6	F=U M=RR:OG	20-Apr	Hatch	23-May	3	2 (2)	2 BB:RB	Seasonal enclosure	One egg (without cracks) abandoned post-term.
62	6	F=U M=U	18-Apr	Hatch	21-May	3	3 (3)	2 GA:OG 1 unbanded	Seasonal enclosure	Split hatch.
63	6	F= M=	21-Apr	Abandoned pre-term	17-May	3	0 (0)		Seasonal enclosure	
64	6	F=U M=U	17-Apr	Hatch	20-May	3	3 (2)	3 GG:WG	Seasonal enclosure	
65	8	F= M=PV:YB	18-Apr	Hatch	21-May	3	3 (0)	3 PV:WG	Seasonal enclosure	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
66	6	F=PV:GG M=U	21-Apr	Hatch	27-May	3	2 (2)	2 GG:GW	Seasonal enclosure	On 22 May, one egg missing pre-term.
67	8	F= M=U	15-Apr	Hatch	18-May	3	3 (2)	3 PV:PG	Seasonal enclosure	
68	SOF	F=PG:AG M=U	21-Apr	Hatch	22-May	3	1 (0)	1 GG:WR	Symbolic fence	One egg abandoned post-term and one egg unknown fate. Chick last seen on 26 May, moving south toward Guadalupe-Nipomo Dunes NWR.
69	6	F=U M=	24-Apr	Abandoned pre-term	22-May	3	0 (0)		Seasonal enclosure	On 22 May, one egg missing pre-term.
70	6	F=NO:GB M=GG:BR	17-Apr	Hatch	20-May	3	3 (3)	3 VV:OB	Seasonal enclosure	
71	6	F=U M=U	19-Apr	Hatch	22-May	3	3 (2)	3 PV:BB	Seasonal enclosure	
72	7	F=U M=VO:BW	22-Apr	Hatch	25-May	3	3 (1)	2 PG:VB 1 unbanded	Seasonal enclosure	Unbanded chick last seen with brood 27 May when two days old.
73	8	F= M=	26-Apr	Abandoned pre-term	2-May	3	0 (0)		Seasonal enclosure	
74	7	F=NY:RB M=NO:GB	21-Apr	Hatch	24-May	3	3 (3)	3 GA:AR	Seasonal enclosure	
75	6	F=PG:GG M=RR:YY	23-Apr	Hatch	25-May	3	2 (1)	2 VG:OB	Bumpout Seasonal enclosure	Split hatch. One egg (with cracks) abandoned post-term.
76	BY	F=U M=	17-Apr	Hatch	20-May	3	3 (0)	3 BB:AY	Seasonal enclosure	
77	6	F=OY:RB M=U	22-Apr	Hatch	28-May	3	2 (0)	2 unbanded	Seasonal enclosure	One egg unknown fate. Chicks not banded to avoid disturbing nearby young snowy plover broods.
78	7	F=U M=U	24-Apr	Hatch	26-May	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
79	8	F= M=PG:AR	24-Apr	Unknown	24-May	2	0 (0)		Symbolic fence	
80	7	F=PG:YG M=	25-Apr	Hatch	31-May	3	3 (0)	3 GG:RB	Seasonal enclosure	
81	BY	F=RR:OY? M=V-:BR	29-Apr	Hatch	30-May	3	3 (3)	3 VV:YG	Seasonal enclosure	
82	BY	F= M=	15-Apr	Failed, unknown cause	10-May	3	0 (0)		Seasonal enclosure	
83	SOF	F= M=VG:YB	26-Apr	Abandoned pre-term	7-May	2	0 (0)		Symbolic fence	
84	8	F=GA:VR M=BB:GB	23-Apr	Hatch	27-May	3	3 (3)	3 BB:GR	Seasonal enclosure	
85	6	F=U M=GA:WB	22-Apr	Hatch	27-May	3	3 (0)	3 PG:GB	Seasonal enclosure	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
86	6	F=U M=GG:WB	24-Apr	Hatch	28-May	3	3 (2)	3 VO:BW	Seasonal enclosure	
87*	6	F=U M=BB:AG	25-Apr	Hatch	31-May	3	3 (2)	3 GG:YW	Seasonal enclosure	On 16 May, unbanded female associated with nest observed with dried blood on right side and favoring right leg. On 25 May, three eggs with dried blood stains, likely transferred from injury of female. Female continued to incubate and condition improved.
88*	6	F=U M=U	29-Apr	Hatch	1-Jun	3	3 (2)	3 GA:VY	Seasonal enclosure	Split hatch. Between 4 to 27 June, chicks observed in open riding area and directed back onto enclosure shore at marker post 6 on 10 different days. On 5 June, one chick attacked by nearby SP32 adult and assumed dead. Two chicks fledging from shore near open riding area were obviously smaller in size and less developed than normal 28-day-old chicks.
89	7	F= M=U	29-Apr	Hatch	1-Jun	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
90	8	F=U M=GA:VY	26-Apr	Hatch	29-May	3	3 (2)	3 GG:RW	Seasonal enclosure	Split hatch. On 8 September, the intact desiccated carcass of one small GG:RW chick found on 8 enclosure shoreline. Chick last seen alive on 1 June when 2-3 days old.
91	8	F=U M=GA:BG	26-Apr	Hatch	29-May	3	3 (1)	3 PG:YB	Seasonal enclosure	Split hatch.
92	7	F= M=U	4-May	Hatch	7-Jun	2	2 (0)	2 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
93*	6	F=PV:PW M=U	1-May	Hatch	3-Jun	3	3 (1)	3 PG:VG	Seasonal enclosure	From 25 to 27 June, an unbanded male associated with brood was observed limping with a left leg injury.
94	7	F=U M=GG:AY	22-Apr	Hatch	19-May	3	3 (0)	3 VG:BW	Seasonal enclosure	Split hatch.
95	8	F= M=RR:WB	19-Apr	Hatch	22-May	3	1 (1)	1 VV:RG	Seasonal enclosure	Two eggs unknown fate.
96	SOF	F=U M=U	6-May	Depredated raven	22-May	2	0 (0)		Symbolic fence	Both eggs depredated by common raven.
97	6	F=U M=GG:OW	2-May	Hatch	4-Jun	3	3 (0)	3 unbanded	Symbolic fence	Split hatch. Chicks not banded to avoid disturbing nearby young snowy plover broods.
98	7	F=BB:PW M=BB:PG	4-May	Hatch	6-Jun	3	3 (2)	3 VV:WR	Seasonal enclosure	Split hatch.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
99	6	F=PG:BW M=GG:PW	1-May	Hatch	3-Jun	3	2 (2)	2 BB:OY	Seasonal enclosure	One egg (without cracks) abandoned post-term. No sign of fertilization when egg contents examined.
100	6	F=U M=U	10-May	Hatch	12-Jun	3	2 (2)	2 unbanded	Symbolic fence	One egg unknown fate. Chicks not banded to avoid disturbing nearby young snowy plover broods.
101	8	F=banded M=	22-Apr	Depredated raven	22-May	3	0 (0)		Seasonal enclosure	All three eggs depredated by common raven.
102	Unknown	F=U M=U	7-Apr	Hatch	(10-May)	1	1 (0)	1 unbanded		
103	7	F=U M=GA:Y-	28-Apr	Hatch	31-May	3	3 (2)	2 VG:YB 1 unbanded	Seasonal enclosure	Split hatch. One VG:YB chick and one unbanded chick fledged.
104	NOF	F=PG:VG M=U	13-May	Depredated raven	22-May	2	0 (0)		Symbolic fence	Both eggs depredated by common raven.
105	7	F=U M=U	1-May	Hatch	4-Jun	3	2 (2)	2 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
106	7	F=U M=VV:VR	30-Apr	Hatch	7-Jun	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
107*	6	F=banded M=RR:-	4-May	Hatch	6-Jun	3	3 (1)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods. On 12 June, one unbanded dead chick observed on shoreline near brood (and possibly associated with brood).
108	8	F= M=VV:WB	3-May	Hatch	5-Jun	3	3 (3)	3 VV:AR	Seasonal enclosure	
109	BY	F=U M=U	18-May	Hatch	21-Jun	3	3 (0)	3 unbanded	Seasonal enclosure	Not within maintained predator fencing.
110	SOF	F=U M=U	14-May	Depredated raven	22-May	3	0 (0)		Symbolic fence	All three eggs depredated by common raven.
111*	6	F=U M=U	18-May	Hatch	20-Jun	3	2 (0)	2 VG:RW	Seasonal enclosure	One egg (without cracks) abandoned post-term. No sign of fertilization when egg contents examined. On 23 June, one chick observed in the open riding area and directed back onto enclosure shore at marker post 6.
112	6	F= M=V-:AY	13-May	Hatch	15-Jun	2	1 (1)	1 PV:PW	Seasonal enclosure	One egg (with large pip hole and dead chick inside) abandoned post-term.
113	6	F=GG:GR M=PG:PW	23-May	Hatch	24-Jun	3	2 (2)	2 PV:GW	Bumpout Seasonal enclosure	One egg (without cracks) abandoned post-term.
114	7	F=U M=U	16-May	Hatch	18-Jun	2	2 (2)	2 PV:VR	Seasonal enclosure	
115	6	F= M=U	15-May	Hatch	17-Jun	3	3 (3)	2 GA:PG 1 unbanded	Seasonal enclosure	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
116	6	F= M=BB:PR	14-May	Hatch	16-Jun	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
117	NOF	F=U M=U	24-May	Hatch	24-Jun	3	3 (3)	3 PV:VW	Circular excl. with top Symbolic fence	
118	8	F=U M=U	18-May	Hatch	20-Jun	3	3 (3)	3 PG:PG	Seasonal enclosure	
119	SOF	F=U M=U	21-May	Hatch	24-Jun	3	3 (2)	2 VV:RW 1 unbanded	Circular excl. with top Symbolic fence	Unbanded chick last seen with brood 24 June, on day of hatch.
120	8	F=GA:RB M=U	28-May	Hatch	29-Jun	3	3 (3)	2 VG:WR 1 unbanded	Seasonal enclosure	
121	BY	F=NB:PG M=RR:OR	18-May	Hatch	20-Jun	3	3 (3)	3 GA:OY	Seasonal enclosure	
122	BY	F=U M=VG:YB	28-May	Hatch	29-Jun	3	3 (1)	3 PV:YG	Seasonal enclosure	
123	7	F=U? M=U	25-May	Hatch	28-Jun	2	1 (1)	1 PG:BY	Seasonal enclosure	One egg (without cracks) abandoned post-term.
124	8	F=NS:WW M=GA:OW	29-May	Hatch	28-Jun	2	2 (1)	2 PV:RW	Symbolic fence	
125	6	F=VV:BG M=V:-BR	17-May	Hatch	19-Jun	3	3 (3)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
126	SOF	F=VG:AW M=U	30-May	Hatch	1-Jul	3	3 (2)	3 VG:YR	Circular excl. with top Symbolic fence	
127*	6	F=VV:VG M=U	28-May	Hatch	27-Jun	3	3 (3)	3 PV:YW	Seasonal enclosure	On 9 August, one live juvenile observed on 8 enclosure shore with broken left wing.
128	6	F=GG:VY M=U	18-May	Abandoned pre-term	16-Jun	3	0 (0)		Seasonal enclosure	From 9 to 15 June, inconsistent incubation of nest. One egg with no sign of fertilization and two eggs with approximately two-week-old dead embryos when egg contents examined.
129	6	F=U M=GG:RW	21-May	Hatch	23-Jun	3	3 (2)	3 VG:VY	Seasonal enclosure	
130	6	F=BB:WG M=GA:OG	30-May	Hatch	29-Jun	3	3 (2)	3 VG:OY	Seasonal enclosure	
131	7	F=U M=GG:AG	25-May	Hatch	27-Jun	3	3 (3)	3 PV:BY	Seasonal enclosure	
132	8	F=VV:VW M=unb	28-May	Hatch	30-Jun	3	3 (2)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
133	6	F=U M=NO:PB	21-May	Hatch	23-Jun	3	1 (0)	1 VV:GY	Seasonal enclosure	Two eggs (one without cracks and one with dried embryo inside) abandoned post-term.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
134*	Arroyo Grande Creek area	F= M=GG:VG	29-May	Hatch	(1-Jun)	2	2 (0)	2 unbanded		On 2 June, two approximately one-day-old chicks with GG:VG male first seen at the Arroyo Grande Creek Area (likely from an unknown nest located in this area). Brood approximately 2.6 miles north of marker post 6. On 3 June, the chicks and adult were moved south to the Southern Enclosure. Chicks were last observed aggressively attacked by another brooding adult very soon after entering enclosure shore.
135	NOF	F=U M=BB:VR	27-May	Hatch	28-Jun	3	3 (2)	3 unbanded	Circular excl. with top Symbolic fence	Split hatch. Chicks not banded to avoid disturbing nearby young snowy plover broods.
136	SOF	F=GA:YR M=U	29-May	Hatch	1-Jul	3	3 (2)	3 PV:WR	Circular excl. with top Symbolic fence	
137	6	F=GG:WY M=GG:AY	21-May	Hatch	23-Jun	2	2 (2)	2 VV:YR	Seasonal enclosure	
138	SOF	F=U M=U	27-May	Hatch	29-Jun	3	3 (3)	3 GA:GR	Circular excl. with top Symbolic fence	On 5 June, symbolic fence moved west to decrease possible pedestrian disturbance.
139	6	F=U M=RO:OY	27-May	Hatch	29-Jun	3	3 (1)	3 PV:WY	Seasonal enclosure	
140	6	F= M=	26-May	Abandoned pre-term	20-Jun	3	0 (0)		Seasonal enclosure	Three eggs abandoned pre-term, all with one-week-old dead embryo development when egg contents examined.
141	6	F=U M=VG:GY	30-May	Hatch	2-Jul	3	3 (1)	2 PV:RB 1 unbanded	Seasonal enclosure	Split hatch. Unbanded chick fledged.
142	6	F=PV:VY M=U	1-Jun	Hatch	4-Jul	2	2 (2)	2 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
143	SOF	F= M=U	2-Jun	Hatch	5-Jul	3	3 (2)	2 GA:RG 1 unbanded	Circular excl. with top Symbolic fence	One GA:RG chick and one unbanded chick fledged.
144*	7	F= M=BB:YW	19-May	Hatch	21-Jun	3	3 (2)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods. From 26 to 31 July one fledgling favoring right leg, leg hangs loosely and drags on sand. Injured unbanded fledgling last seen on 31 July.
145	7	F=PV:VG M=U	24-May	Hatch	26-Jun	3	3 (2)	3 GA:PW	Symbolic fence	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
146	6	F= M=	na	Unknown	23-Jun	≥1	0 (0)		Symbolic fence	Nest location known by multiple observations of incubating adult between 4 and 22 June. To avoid disturbing young snowy plover broods, nest not walked to and complete clutch size unknown.
147	6	F=GG:VR M=GG:B(?)	26-May	Hatch	28-Jun	3	2 (0)	2 unbanded	Seasonal enclosure	One egg abandoned post-term.
148	6	F=U M=U	9-May	Hatch	11-Jun	3	3 (3)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
149	8	F=U M=banded	29-May	Hatch	1-Jul	3	3 (2)	3 VV:OR	Seasonal enclosure	
150	7	F= M=	28-May	Unknown	30-Jun	3	0 (0)		Seasonal enclosure	
151	7	F= M=	8-Jun	Abandoned pre-term	26-Jun	2	0 (0)		Seasonal enclosure	
152*	6	F=NO:WY M=	3-Jun	Hatch	6-Jul	3	3 (1)	2 PG:RB 1 unbanded	Seasonal enclosure	Split hatch. On 6 July, the two banded chicks were attacked aggressively by an adult male plover and were suspected not to survive the incident. Unbanded chick fledged.
153	BY	F=banded M=U	25-May	Hatch	27-Jun	3	3 (3)	2 PV:AG 1 unbanded	Seasonal enclosure	Split hatch.
154	Unknown	F=U M=VV:GB	6-May	Hatch	(8-Jun)	3	3 (3)	3 PV:AB		
155	7	F=U M=	9-Jun	Hatch	15-Jul	3	2 (0)	1 PG:YG 1 unbanded	Seasonal enclosure	Split hatch. One egg unknown fate. Unbanded chick last seen with brood 16 July, on day of hatch.
156*	6	F=U M=GG:PW	17-May	Hatch	19-Jun	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods. On 11 and 12 July, one chick favoring right leg. Leg hangs and foot appears swollen. Chick subsequently observed moving normally.
157	6	F=PV:GG M=GG:PW	9-Jun	Hatch	10-Jul	3	3 (3)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
158*	8	F=U M=GG:PB	24-May	Hatch	26-Jun	3	2 (1)	2 PG:WG	Seasonal enclosure	One egg (without cracks) abandoned post-term. On 28 and 31 July, fledgling observed with right wing drooping to the ground.
159	6	F=U M=U	7-Jun	Hatch	10-Jul	3	3 (2)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
160	6	F=U M=GA:GY	7-Jun	Hatch	10-Jul	3	3 (2)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
161	6	F=U M=GA:WB	9-Jun	Hatch	12-Jul	3	3 (1)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
162	8	F=U M=U	8-Jun	Hatch	11-Jul	3	3 (0)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
163	Unknown	F=U M=Y-:GO	15-Apr	Hatch	(18-May)	3	3 (2)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
164	8	F=VV:GW? M=PG:VW	25-May	Hatch	27-Jun	3	3 (3)	3 PV:WW	Seasonal enclosure	
165	8	F=U M=U	11-Jun	Hatch	14-Jul	3	3 (0)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
166	8	F=U M=U	26-May	Hatch	28-Jun	3	3 (3)	3 PV:AR	Seasonal enclosure	Split hatch.
167*	6	F=U M=BB:BY	9-Jun	Hatch	12-Jul	3	3 (2)	2 PG:VY 1 unbanded	Seasonal enclosure	Split hatch. Unbanded chick last seen with brood 22 July, when 10 days old. Between 23 July and 7 August, chicks observed in open riding area and directed back into enclosure on three different days. Two chicks fledging from shore near open riding area and were obviously smaller in size and less developed than normal 28-day-old chicks.
168	7	F=RR:(O?)Y M=U	12-Jun	Hatch	15-Jul	3	3 (0)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
169	6	F=VG:OG M=U	11-Jun	Hatch	14-Jul	3	2 (1)	2 unbanded	Symbolic fence	One egg abandoned post-term. Chicks not banded to avoid disturbing nearby young snowy plover broods.
170	6	F=BB:YW M=	na	Abandoned post-term	31-Jul	≥1	0 (0)		Symbolic fence	Nest location known by multiple observations of incubating adult during a 43-day period 18 June to 30 July. To avoid disturbing young snowy plover and least tern broods, nest not walked to and complete clutch size unknown. No evidence of hatch observed.
171	7	F=U M=banded	28-May	Unknown	30-Jun	3	0 (0)		Seasonal enclosure	

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
172	7	F= M=GA:GB	23-May	Hatch	25-Jun	≥2	2 (1)	2 unbanded	Symbolic fence	Nest location known by multiple observations of incubating adult. Minimum of two eggs based on number of observed chicks. To avoid disturbing young snowy plover broods, nest not walked to and chicks not banded.
173	7	F=PG:GG M=VO:BW	11-Jun	Hatch	14-Jul	3	3 (0)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
174	6	F=U M=BB:WB	17-Jun	Hatch	13-Jul	3	3 (2)	3 VG:PY	Seasonal enclosure	
175	6	F=U? M=	na	Abandoned, unknown if pre- or post-term	6-Jul	3	0 (0)		Seasonal enclosure	Nest observed active during a 15-day period 21 June to 5 July. On 19 September, three eggs collected from nest location.
176	7	F=RR:PW M=U	15-Jun	Hatch	18-Jul	3	3 (1)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
177	8	F=U M=VG:WB	12-Jun	Hatch	14-Jul	3	3 (0)	3 unbanded	Symbolic fence	Chicks not banded to avoid disturbing nearby young snowy plover broods.
178	7	F=(BG)? :OW M=U	16-Jun	Hatch	19-Jul	3	2 (1)	2 PV:OR	Seasonal enclosure	One egg (without cracks) abandoned post-term.
179	7	F=GG:YG M=U	4-Jun	Hatch	7-Jul	3	3 (3)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover and least tern broods.
180	8	F= M=	na	Abandoned, unknown if pre- or post-term	1-Jul	1	0 (0)		Seasonal enclosure	
181	7	F=U M=U	na	Unknown	28-Jun	≥1	0 (0)		Seasonal enclosure	Nest location known by multiple observations of incubating adult. To avoid disturbing young snowy plover and least tern broods, nest not walked to and complete clutch size unknown.
182	8	F= M=U	25-May	Hatch	27-Jun	3	3 (3)	2 PG:PB 1 unbanded	Seasonal enclosure	Split hatch.
183	6	F=PV:PW M=U	18-Jun	Hatch	19-Jul	3	3 (1)	3 VV:RY	Seasonal enclosure	
184	SOF	F= M=	27-Jun	Failed, unknown cause	7-Jul	2	0 (0)		Symbolic fence	
185	6	F= M=U	na	Abandoned, unknown if pre- or post-term	11-Jul	2	0 (0)		Symbolic fence	Nest observed active during a 12-day period 29 June to 12 July. On 7 September, 2-3 partial eggs found at nest site.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
186	7	F=U M=Y -:GO	11-Jun	Hatch	14-Jul	3	1 (1)	1 -:AY	Seasonal enclosure	One egg (without cracks) abandoned post-term. One egg (with cracks) unknown fate. Chick originally banded PV:AY and lost bands from left leg.
187	7	F=VV:AA M=U	23-Jun	Hatch	26-Jul	3	3 (1)	3 BB:AB	Seasonal enclosure	Split hatch.
188	8	F=OY:RB M=PV:YB	15-Jun	Hatch	18-Jul	3	3 (3)	2 PG:OW 1 unbanded	Seasonal enclosure	
189	6	F= M=U	13-Jun	Hatch	16-Jul	3	1 (0)	1 PG:WY	Seasonal enclosure	Two eggs (without cracks) abandoned post-term.
190	8	F= M=	5-Jun	Hatch	8-Jul	3	3 (0)	3 unbanded	Seasonal enclosure	
191	6	F=NO:GB M=U	10-Jun	Hatch	13-Jul	3	3 (2)	3 PV:YY	Seasonal enclosure	
192	7	F=U M=VV:YW	2-Jun	Hatch	5-Jul	3	1 (1)	1 unbanded	Symbolic fence	Two eggs unknown fate. Chick not banded to avoid disturbing nearby young snowy plover broods.
193	7	F=GA:GG M=U	14-Jun	Hatch	17-Jul	2	1 (0)	1 unbanded	Symbolic fence	Nest location known by multiple observations of incubating adult. On 17 July a minimum of two eggs observed through scope. To avoid disturbing young snowy plover broods, nest not walked to and chick not banded.
194	7	F=banded M=BB:GR	24-Jun	Hatch	27-Jul	3	3 (2)	3 BB:AW	Seasonal enclosure	
195	8	F=VV:VW M=GA:BG	22-Jun	Hatch	25-Jul	3	3 (2)	3 PG:BG	Seasonal enclosure	
196	8	F= M=GA:VY	25-Jun	Hatch	28-Jul	3	2 (1)	1 GA:WR 1 unbanded	Seasonal enclosure	Split hatch. One egg (with large opening and chick inside stuck to dried membrane) abandoned post-term. Unbanded chick last seen with brood 23 August, when 25 days old.
197	7	F= M=	22-Jun	Hatch	25-Jul	3	1 (0)	1 unbanded	Symbolic fence	Two eggs abandoned post-term. One of these eggs with fully developed dead embryo when egg contents examined.
198	7	F=U M=U	1-Jul	Hatch	3-Aug	2	2 (2)	2 PV:GB	Seasonal enclosure	
199	6	F=U M=RR:YY	28-Jun	Hatch	31-Jul	3	3 (2)	3 GG:VG	Symbolic fence	
200	7	F= M=	na	Unknown	21-Jul	≥1	0 (0)		Symbolic fence	Nest location known by multiple observations of incubating adult. To avoid disturbing young snowy plover and least tern broods nest not walked to and complete clutch size unknown.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
201	7	F= M=U	21-Jun	Hatch	24-Jul	3	3 (2)	3 BB:GB	Symbolic fence	
202	6	F=VV:BG M=U	29-Jun	Hatch	1-Aug	3	3 (0)	3 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
203	NOF	F=GG:WY M=U	1-Jul	Hatch	3-Aug	3	3 (3)	3 VV:GW	Symbolic fence	
204	NOF	F=PV:WB M=	4-Jul	Hatch	6-Aug	3	3 (3)	3 GA:RW	Circular excl. with top Symbolic fence	
205	6	F= M=	na	Unknown	25-Jul	≥1	0 (0)		Seasonal enclosure	To avoid disturbing young least tern broods nest not walked to when active. Minimum one egg. One egg (without cracks) abandoned, unknown pre- or post-term.
206	6	F=PV:B(G)? M=U	30-Jun	Hatch	2-Aug	2	2 (2)	2 unbanded	Seasonal enclosure	Chicks not banded to avoid disturbing nearby young snowy plover broods.
207	Unknown	F= M=RR:WB	20-Jun	Hatch	(23-Jul)	1	1 (1)	1 unbanded		Chick not banded to avoid disturbing nearby young snowy plover broods.
208	Unknown	F= M=GG:BR	28-Jun	Hatch	(31-Jul)	3	3 (2)	3 unbanded		Chicks of unknown brood found on 6 enclosure shoreline at approximately nine days old and unable to band.
209	Unknown	F=GG:AY M=U	15-May	Hatch	(17-Jun)	3	3 (3)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
210	Unknown	F=U M=PG:AG	20-May	Hatch	(22-Jun)	3	3 (3)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
211	Unknown	F=U M=U	18-May	Hatch	(20-Jun)	3	3 (0)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
212	Unknown	F=U M=GG:AY	23-May	Hatch	(25-Jun)	3	3 (3)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
213	Unknown	F=U M=GA:YW	24-May	Hatch	(26-Jun)	3	3 (2)	3 BB:RW		
214	Unknown	F=VV:WY M=U	31-May	Hatch	(3-Jul)	3	3 (3)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
215	Unknown	F=U M=banded	5-Jun	Hatch	(8-Jul)	2	2 (0)	2 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.
216	Unknown	F=U M=GG:VG	5-Jun	Hatch	(8-Jul)	3	3 (2)	3 unbanded		Chicks not banded to avoid disturbing nearby young snowy plover broods.

Appendix B. Snowy plover nests at ODSVRA in 2015 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (est.)	No. known eggs	No. chicks (No. fledged)	No. chicks banded and combination	Nest Protection Type	Notes
217*	Unknown	F=U M=U	17-Jun	Hatch	(20-Jul)	3	3 (1)	2 GG:OR 1 unbanded		When brood banded on 22 July, one chick observed with noticeable swelling on right side. This chick was not banded and last seen with brood 12 August when approximately 23 days old. Chick appeared and behaved normally when observed with binoculars and scope in field.
Insufficient information available to assign the following broods to a specific nest. Most to all of these broods were likely from nests with an assigned number, known to hatch and with chicks not banded at nest. The majority of chicks could not be banded to avoid disturbing nearby young snowy plover broods.										
UNK1	Unknown	F= M=GA:PY	na	Hatch	(12-May)	2	2 (0)	2 GA:AW		
UNK2	Unknown	F= M=U	na	Hatch	(23-May)	3	3 (2)	3 unbanded		
UNK3	Unknown	F=U M=U	na	Hatch	(25-Jun)	3	3 (3)	3 unbanded		
UNK4	Unknown	F= M=GG:OR	na	Hatch	(25-Jun)	1	1 (0)	1 unbanded		
UNK5	Unknown	F=U M=U	na	Hatch	(25-Jun)	3	3 (0)	3 unbanded		
UNK6	Unknown	F=GG:VY M=BB:YY	na	Hatch	(30-Jun)	3	3 (2)	3 unbanded		
UNK7	Unknown	F= M=U	na	Hatch	(8-Jul)	2	2 (2)	2 unbanded		
UNK8	Unknown	F= M=U	na	Hatch	(15-Jul)	3	3 (3)	3 PG:YY		
UNK9	Unknown	F= M=U	na	Hatch	(23-Jul)	1	1 (0)	1 unbanded		
UNK10	Unknown	F= M=U	na	Hatch	(27-Jul)	2	2 (1)	2 unbanded		

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015.

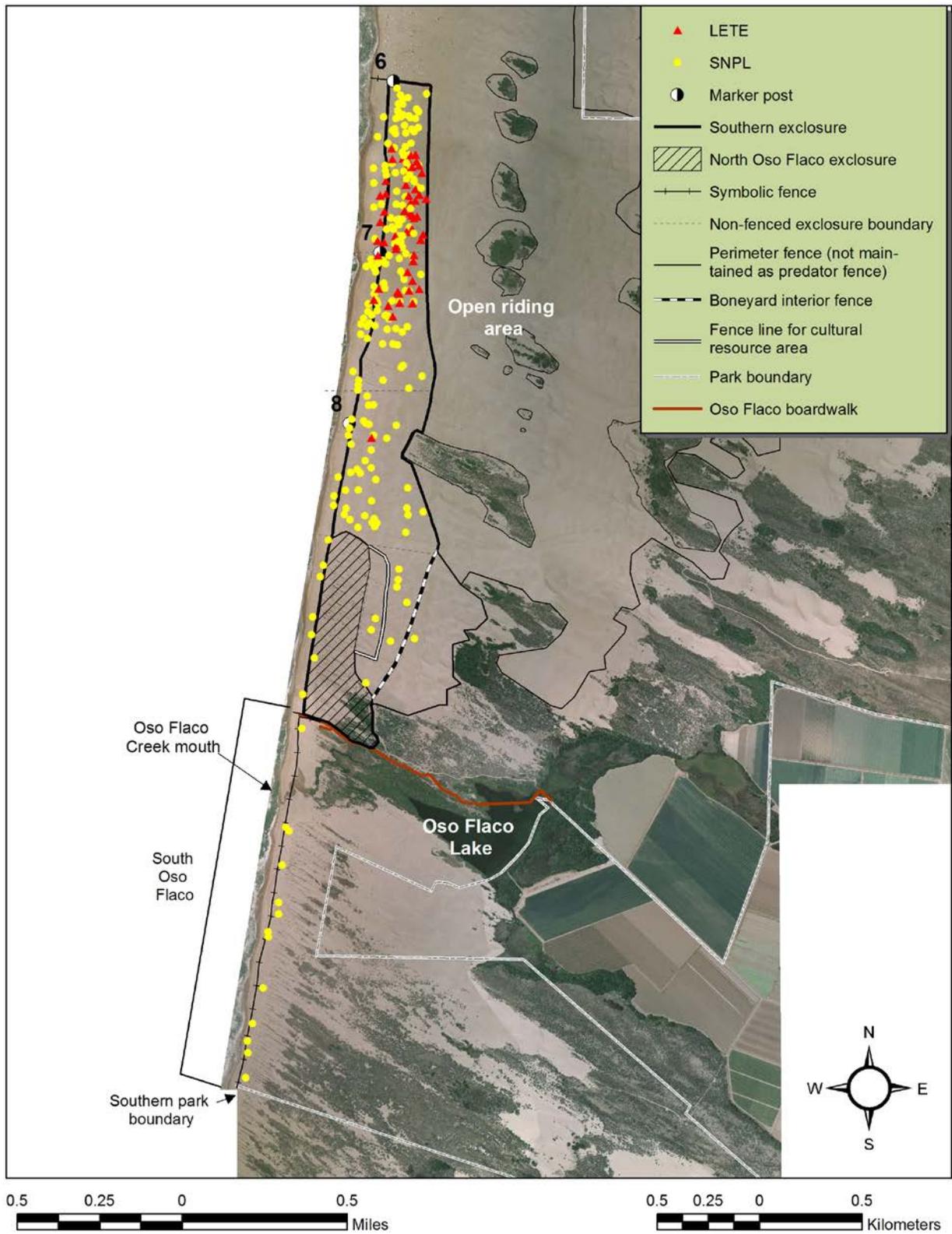


Figure C.1. All California least tern and snowy plover nest locations at ODSVRA in 2015.

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

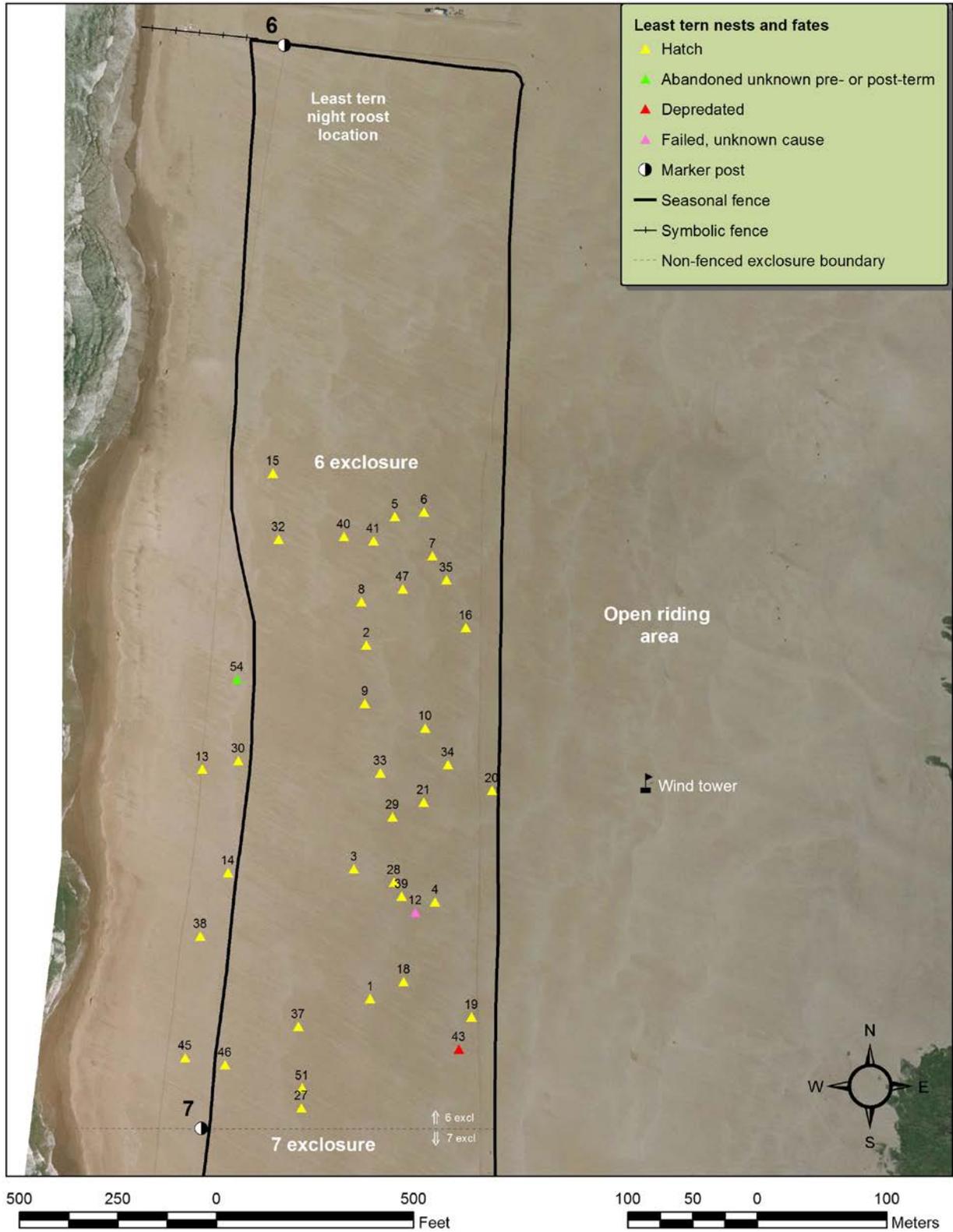


Figure C.2. California least tern nest locations at ODSVRA in 2015 (6 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

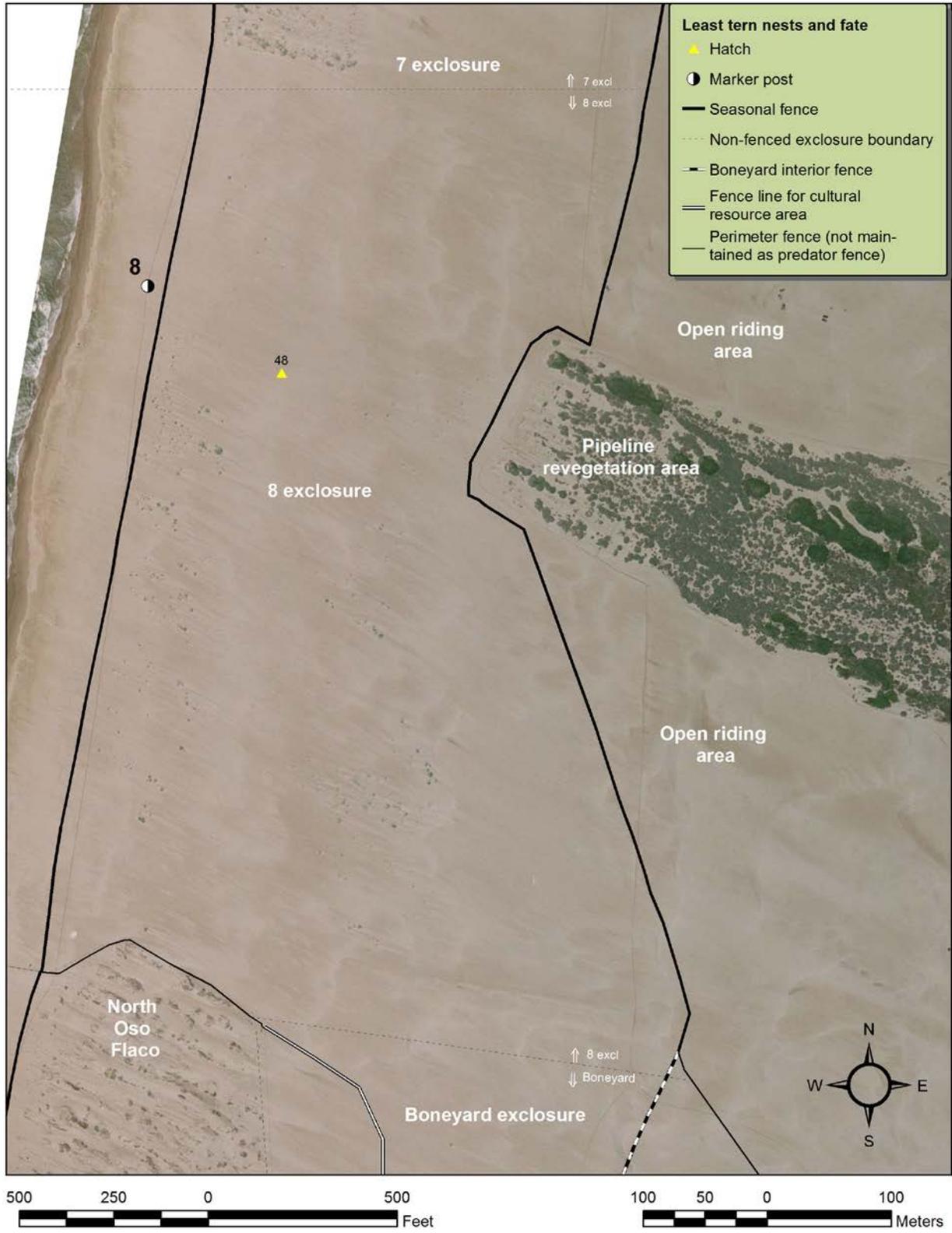


Figure C.4. California least tern nest locations at ODSVRA in 2015 (8 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

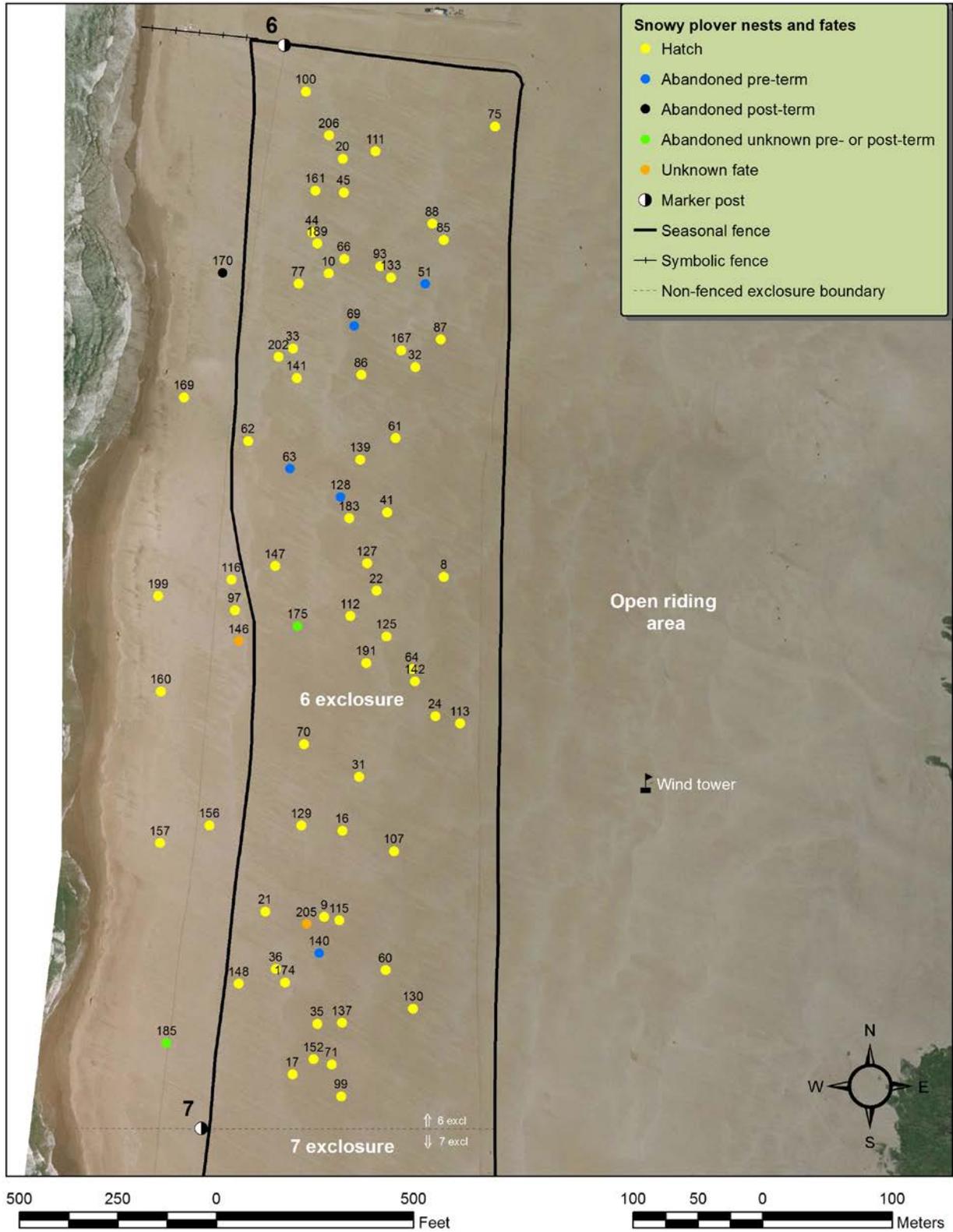


Figure C.5. Snowy plover nest locations at ODSVRA in 2015 (6 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

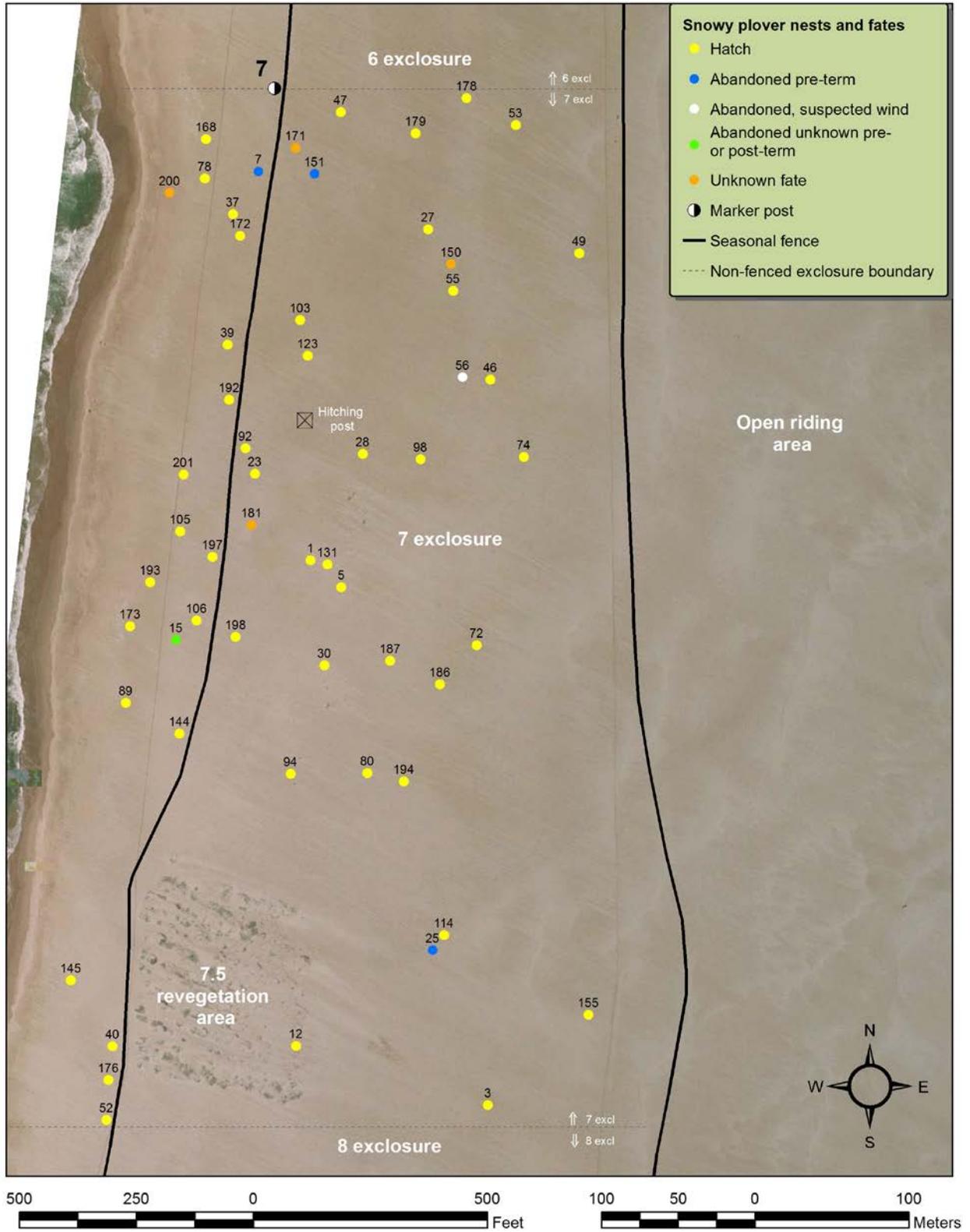


Figure C.6. Snowy plover nest locations at ODSVRA in 2015 (7 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

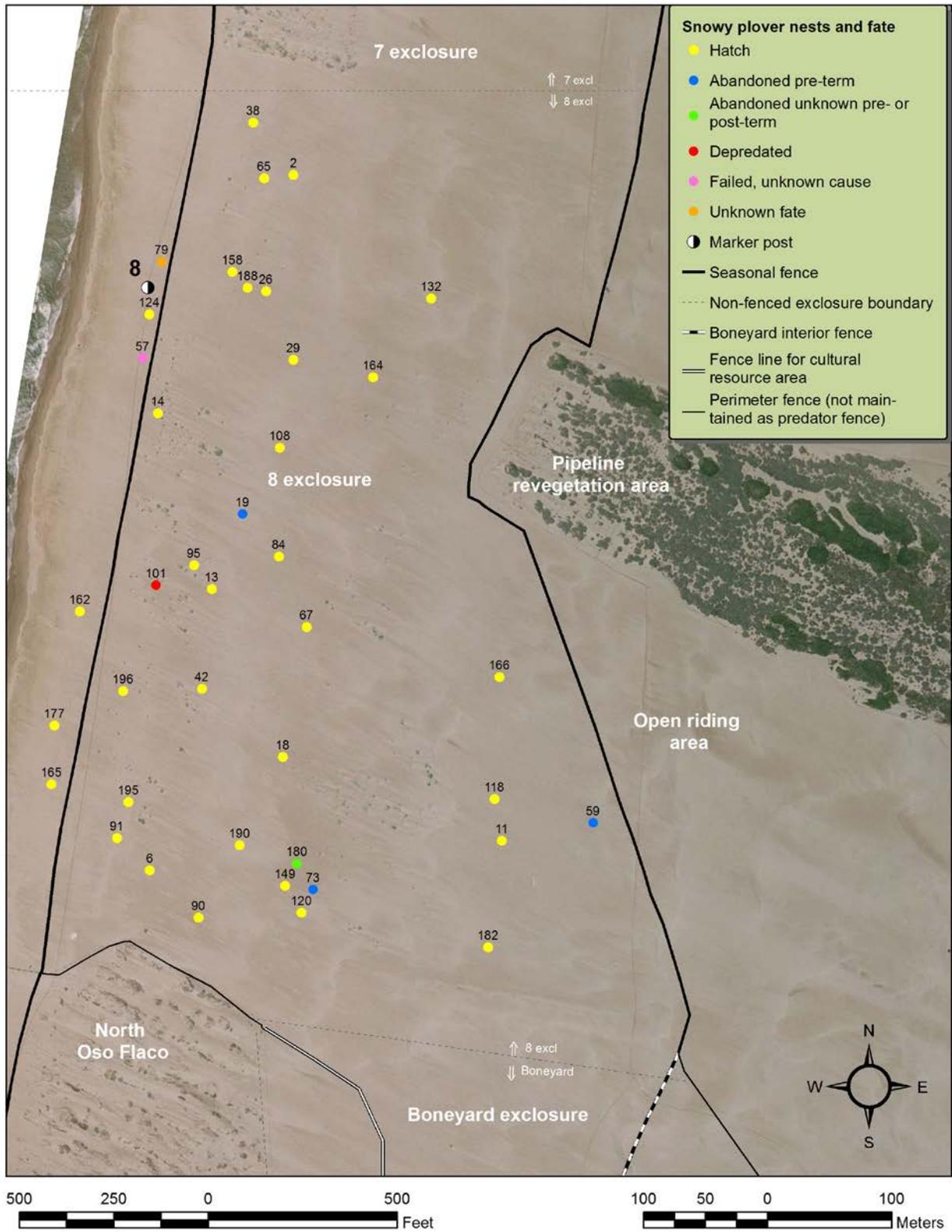


Figure C.7. Snowy plover nest locations at ODSVRA in 2015 (8 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

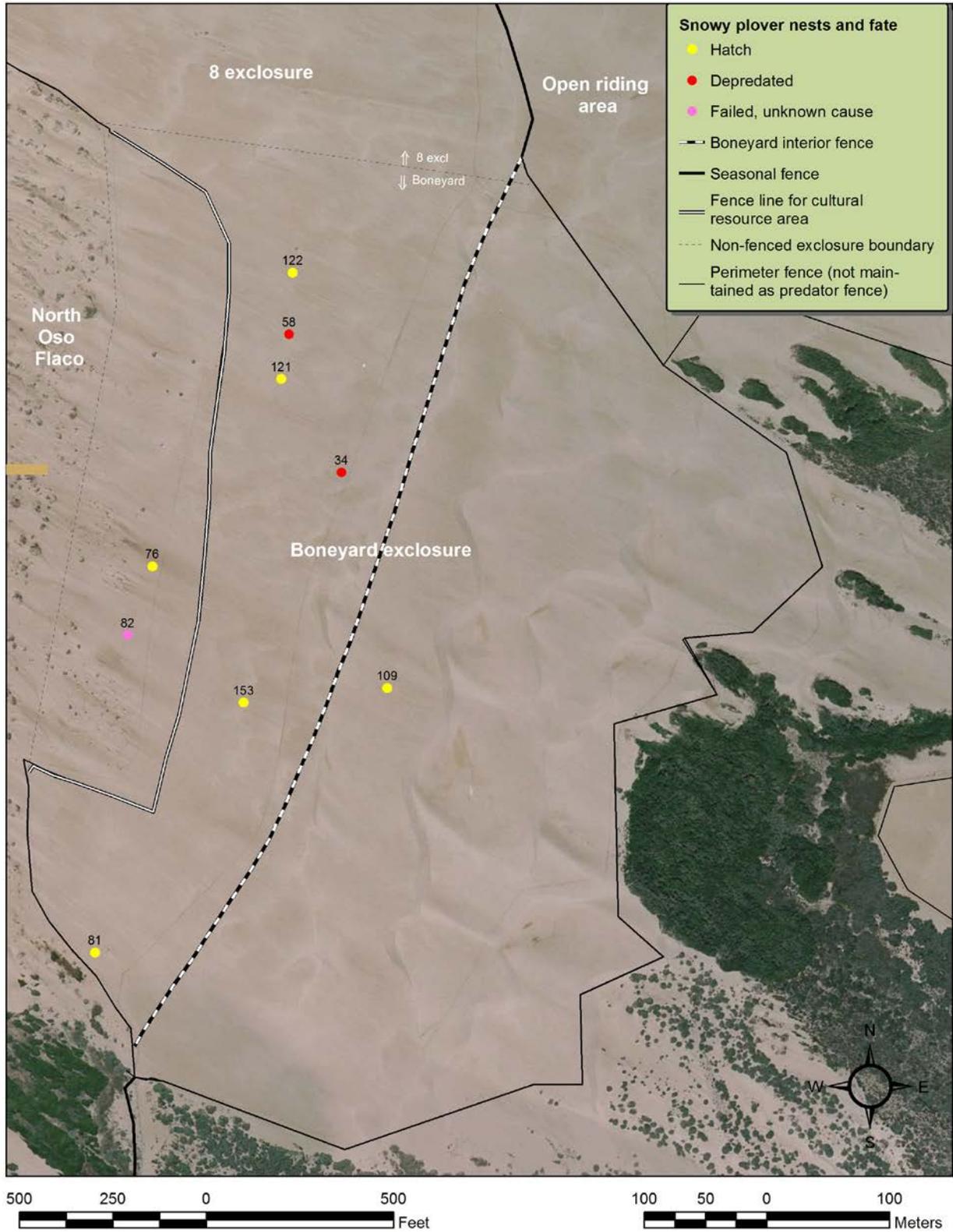


Figure C.8. Snowy plover nest locations at ODSVRA in 2015 (Boneyard enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

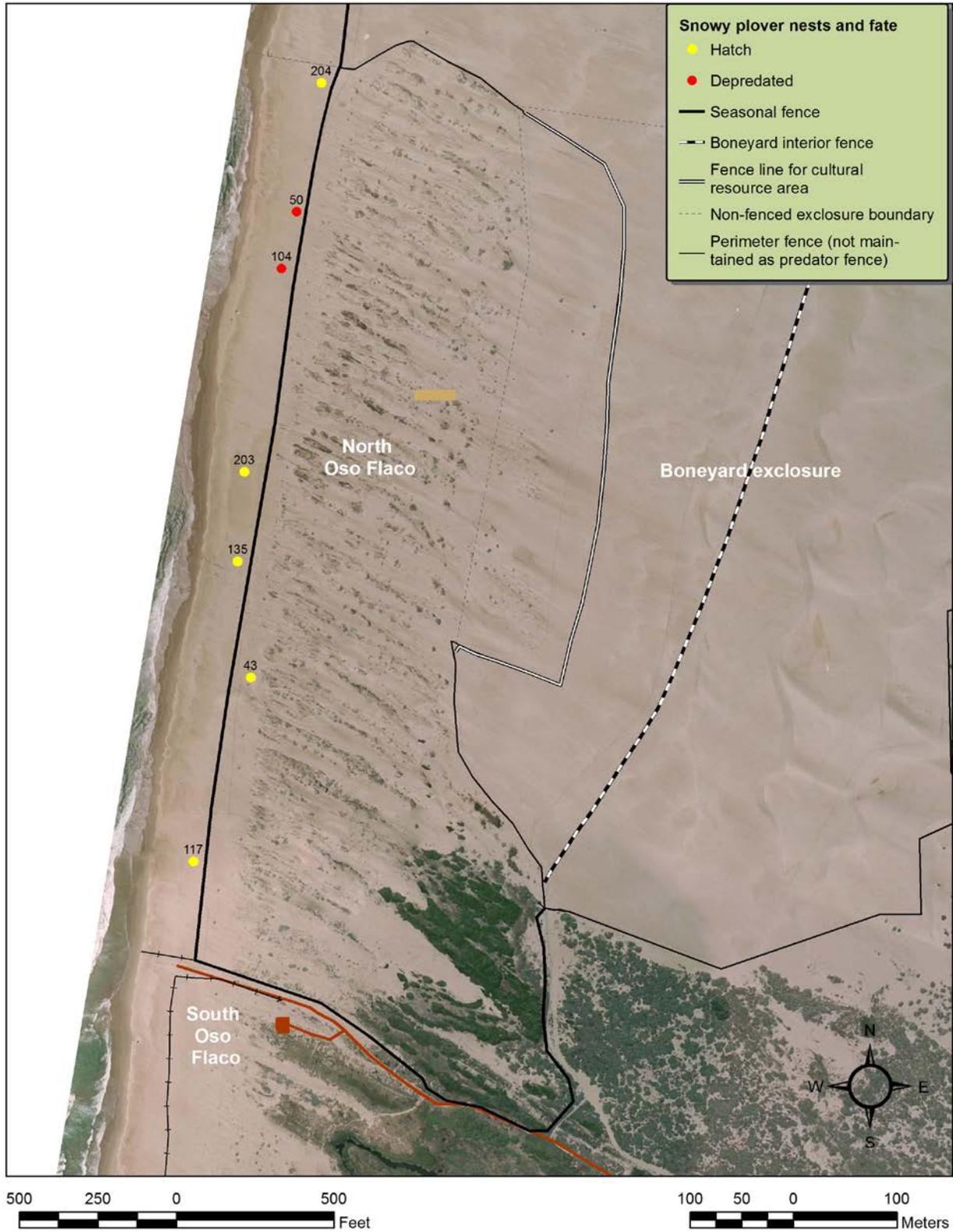


Figure C.9. Snowy plover nest locations at ODSVRA in 2015 (North Oso Flaco).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2015 (continued).

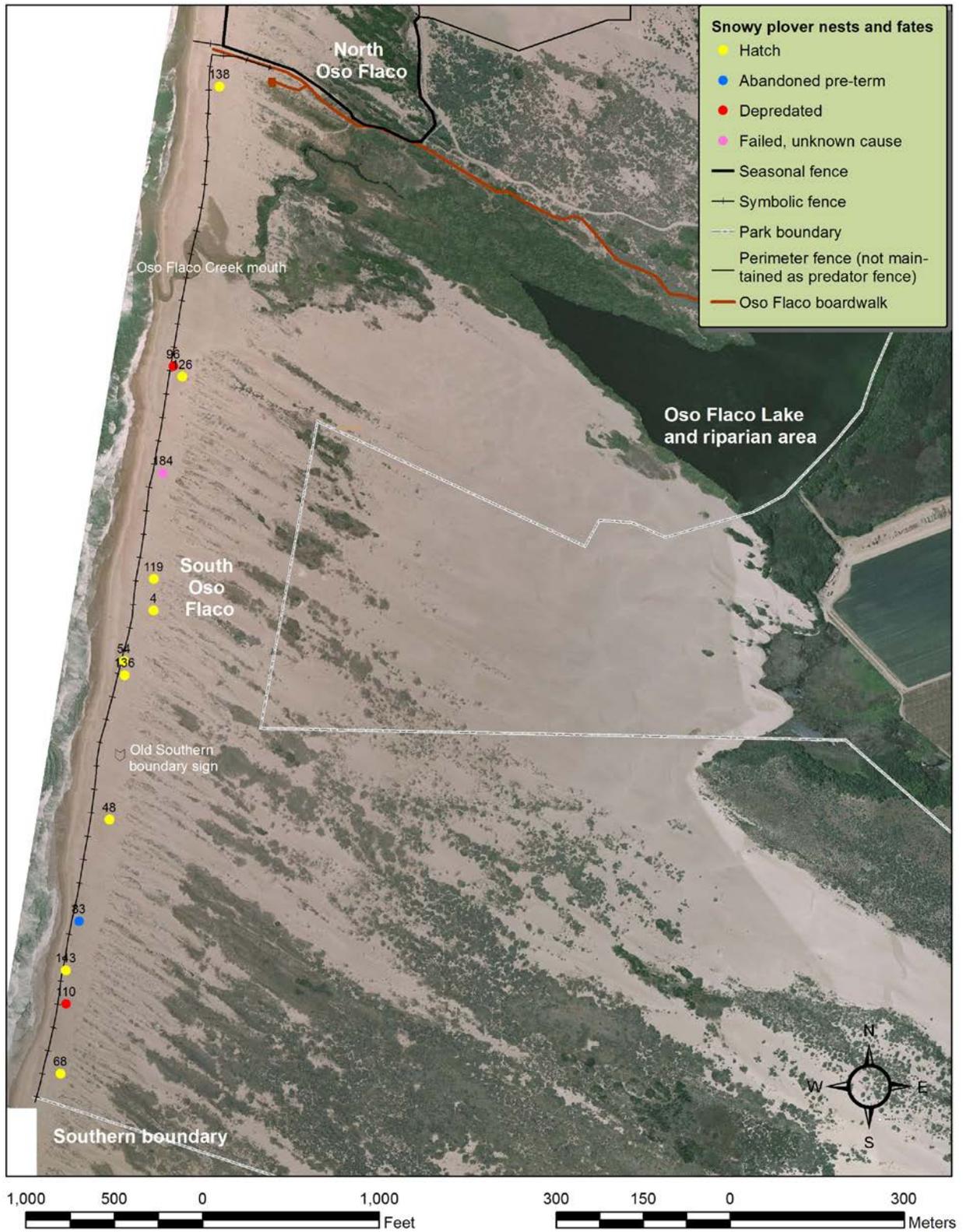


Figure C.10. Snowy plover nest locations at ODSVRA in 2015 (South Oso Flaco).

Appendix D. Banded least terns and snowy plovers.

Table D.1. Banded least terns recorded at ODSVRA in 2015.

Juveniles fledged from ODSVRA in 2015 are not included. All birds from ODSVRA were banded as chicks. Additional color-banded birds were recorded but combinations not confirmed. A number of birds had a band on only one leg. These birds may have been banded on only one leg or have lost a band. All possible band combinations of birds known fledging from ODSVRA are listed for incomplete band combinations or for band combinations that were used multiple years. Sex is included if copulation was observed and bands could be determined at that time. (For a description of color band letter codes see Appendix B.)

Band	Dates Seen	Origin and Year Banded	Notes
-:A/B	5/8	ODSVRA 2006, 2008, 2010, or 2011	Y/G:A/B in 2006, G/Y:A/B in 2008, W/B:A/B in 2010, B/W:A/B in 2011.
-:G/O	5/8, 6/11	ODSVRA 2008 or 2011	G/Y:G/O in 2008, B/W:G/O in 2011. LT6 breeding adult.
-:G/B	6/9	ODSVRA 2008 or 2011	G/Y:G/B in 2008, B/W:G/B in 2011. LT7 breeding adult.
-:S	6/17, 7/18, 7/23, 7/26, 8/4	unknown	Multiple sites may band with only the federal band. Also may be any ODSVRA fledgling from 2004 when all banded G/Y:S or any ODSVRA fledgling that lost the left band and tape on a metal band. LT17 breeding adult.
-:W/A	6/10, 7/18, 8/13	ODSVRA 2006, 2008, 2010, or 2011	Y/G:W/A in 2006, G/Y:W/A in 2008, W/B:W/A in 2010, B/W:W/A in 2011. LT1 breeding adult.
-:Y/O	7/26	ODSVRA 2006, 2008, or 2011	Y/G:Y/O in 2006, G/Y:Y/O in 2008, B/W:Y/O in 2011.
B:-	7/28	ODSVRA 2007, 2009, or 2013	B:G/Y in 2007, B:W/B in 2009 and 2013.
B/W:(A/G)?	7/7	ODSVRA 2011	LT25 breeding adult.
B/W:B/O	7/18	ODSVRA 2011	
B/W:B/Y	7/1, 7/8, 7/21	ODSVRA 2011	LT37 breeding adult.
B/W:G/W	7/18	ODSVRA 2011	LT30 breeding adult.
B/W:O/W	6/16	ODSVRA 2011	
B/W:O/Y	5/20, 7/28	ODSVRA 2011	
B/W:P	7/18	ODSVRA 2011	
B:W/B	5/25, 6/17, 7/18, 7/26	ODSVRA 2009 or 2013	LT17 breeding adult.
G/Y:B/W	7/7, 7/26, 8/4, 8/11, 8/12	ODSVRA 2008 or 2012	LT50 breeding adult.
G/Y:-	5/20, 5/10	ODSVRA 2004, 2008, or 2013	Male. May be any ODSVRA fledgling from 2004 when all banded G/Y:S, from 2008 when all were banded G/Y on left leg, or G/Y:W/B from 2013.
K:W/B	7/14	ODSVRA 2013	
O/A:W/B	7/18, 7/26	ODSVRA 2009 or 2013	
O/Y:B/W	5/19, 7/26	ODSVRA 2012	Male.
O:B/W	7/8, 7/23	ODSVRA 2012	LT27 breeding adult.
R/W:W/B	6/9, 7/18	ODSVRA 2013	
S:-	5/8, 6/11, 6/30, 7/18	unknown	Multiple sites may band with only the federal band. May also be any ODSVRA fledgling that lost the right band and tape on a metal band. LT6 breeding adult.
V:B/W	6/15, 6/16, 7/18, 7/20	ODSVRA 2012	LT21 breeding adult.
W/B:G/Y	5/17	ODSVRA 2007	
W/B:R/Y	6/15	ODSVRA 2010	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.1. Banded least terns recorded at ODSVRA in 2015 (continued).

Band	Dates Seen	Origin and Year Banded	Notes
W/B:W	7/18	ODSVRA 2010	
W/B:W/Y	7/18, 7/26, 7/28	ODSVRA 2010	
W/B:Y/R	6/24	ODSVRA 2010	
W/R/W:W/B	6/21	ODSVRA 2013	
W/R:B/W	6/21, 7/4	ODSVRA 2012	
W/R:W/B	7/18, 7/26	ODSVRA 2013	
W:-	5/20, 7/20	ODSVRA 2007, 2009, 2012	W:G/Y in 2007, W:W/B in 2009 and 2014, or W:B/W in 2012. LT4 breeding female.
Y/G:B/W	8/3	ODSVRA 2006 or 2012	
Y/G:W/B	7/18	ODSVRA 2006 or 2013	
Y/O:W/B	6/16, 7/18	ODSVRA 2009	LT20 breeding adult.
Y/W:B/W	6/10	ODSVRA 2012	LT44 possible breeding adult.
Y/W/Y:-	7/1	ODSVRA 2007	Y/W/Y:G/Y banded in 2007
Y:B/W	7/18	ODSVRA 2012	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015.

All birds were banded as chicks unless otherwise noted. Chicks banded outside of San Luis Obispo County are noted in order from north to south. Some sites band to brood and can have more than one bird with the same combination. At ODSVRA, the same combination may be on birds hatched in different years. (For a description of color band letter codes see Appendix B.)

ODSVRA=Oceano Dunes SVRA, SLO=San Luis Obispo, VAFB=Vandenberg Air Force Base, SB=State Beach, NWR=National Wildlife Refuge

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
-:Sb	Dunes Overlook 2012	Douglas - Lane boundary, OR	10/13, 12/3, 12/8	Silver on upper leg
AG:GA	Moss Landing Salt Ponds 2014	Monterey, CA	11/3, 10/19, 12/3, 2/9	
AW:RG	Pajaro Spit 2014	Monterey	10/6, 10/14, 10/19, 11/19, 12/3, 12/8	
RO:OY	Salinas River SB 2014	Monterey	10/5, 10/6, 10/14, 10/17, 10/19, 10/22, 10/29, 11/3, 11/10, 11/19, 12/8, 2/25	
OL:GP	Salinas River NWR 2009	Monterey	12/3, 12/8, 12/24, 12/28, 12/29	
WA:BL	Salinas River NWR 2012	Monterey	10/19, 10/28, 11/10, 11/19	
YP:OL	Salinas River NWR 2008	Monterey	10/30, 11/19, 12/8, 12/29, 1/20	
OY:RB	Reservation Road 2014	Monterey	10/5, 10/14, 10/19, 10/22, 10/28, 10/29, 11/13, 11/19, 12/8, 12/28, 12/29, 1/20	
GB:AW	Fort Ord 2013	Monterey	10/5, 10/6, 10/14, 10/19, 10/22, 10/28, 10/30, 11/19, 12/24, 12/29, 1/20, 2/9	
-:BB	ODSVRA 2010	SLO, CA	11/10	
BB:BY	ODSVRA 2005, 2010, or 2013	SLO	10/6, 10/17, 10/19, 10/22, 10/28, 11/19, 12/8, 12/28, 1/20, 2/25	
BB:GB	ODSVRA 2014	SLO	10/6, 10/10, 10/13, 10/14, 10/21, 10/30, 11/19, 12/3, 12/29	
BB:GG	ODSVRA 2013 or 2014	SLO	10/17, 11/4	
BB:OB	ODSVRA 2010 or 2014	SLO	11/10, 2/25	
BB:OG	ODSVRA 2010 or 2014	SLO	12/28	
BB:PB	ODSVRA 2010 or 2013	SLO	10/11, 10/17, 10/19, 10/22, 10/28, 12/3, 12/28, 1/30, 2/9	
BB:PG	ODSVRA 2013 or 2014	SLO	10/6, 10/11, 10/20, 10/30, 12/28, 12/29, 1/20, 2/25	
BB:PW	ODSVRA 2014	SLO	10/17, 10/28, 11/11, 12/8	
BB:RG	ODSVRA 2007	SLO	12/24	
BB:VR	ODSVRA 2011, 2013, or 2014	SLO	10/13, 10/19, 10/22, 11/19, 12/3, 1/20, 2/4, 2/25	
BB:WW	ODSVRA 2010 or 2013	SLO	10/9, 10/11, 10/13, 10/17, 10/19, 10/28	
BB:WY	ODSVRA 2010 or 2013	SLO	10/10, 10/13, 10/19, 10/22, 11/13, 11/19, 12/29	
BB:YW	ODSVRA 2010 or 2013	SLO	10/5, 10/6, 10/13, 10/17, 10/18, 10/19, 10/21, 10/22, 10/29, 10/30, 11/10, 11/11, 11/13, 12/3, 12/8, 12/29, 1/20, 2/25	

Appendix D. Banded least terns and snowy plovers (continued.)

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015 (continued).

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
BB:YY	ODSVRA 2010	SLO	10/17, 10/20, 11/11, 11/19, 12/8, 12/29, 1/20, 2/9, 2/25	
GA:BW	ODSVRA 2011 or 2013	SLO	10/17, 10/19, 10/28, 10/30, 12/3, 12/28, 2/4	
GA:GG	ODSVRA 2011, 2013, or 2014	SLO	11/5, 12/8, 12/28, 2/25	
GA:GY	ODSVRA 2012 or 2013	SLO	10/6, 10/11, 10/17, 10/19, 10/21, 11/10, 11/11, 12/3, 12/8, 1/20, 2/4	
GA:RB	ODSVRA 2010	SLO	12/8, 2/4	
GA:VY	ODSVRA 2014	SLO	12/3, 12/28, 12/29, 1/20, 2/9, 2/25	
GA:WY	ODSVRA 2013 or 2014	SLO	10/21, 10/28, 10/30, 11/13, 12/8	
GA:YR	ODSVRA 2014	SLO	10/22, 10/29, 11/5	
GA:YW	ODSVRA 2010 or 2013	SLO	10/5, 10/19, 10/20, 12/3, 12/26, 12/28, 2/4, 2/25	
GG:AG	ODSVRA 2013 or 2014	SLO	10/5, 10/19, 12/28	
GG:AW	ODSVRA 2012 or 2013	SLO	10/28	
GG:AY	ODSVRA 2012 or 2013	SLO	10/10, 10/19, 10/22, 10/29, 12/28, 2/25	
GG:BB	ODSVRA 2005, 2010, or 2013	SLO	11/19	
GG:BR	ODSVRA 2013 or 2014	SLO	10/14, 10/17, 10/21, 10/28, 10/30, 12/8, 12/24, 12/28, 1/20	
GG:GG	ODSVRA 2011 or 2013	SLO	10/9, 10/17, 10/18, 10/19, 10/21, 10/28, 11/6, 11/19, 12/3, 12/8, 12/26, 1/20	
GG:OG	ODSVRA 2013 or 2014	SLO	10/10, 10/14, 10/17, 10/18, 10/19, 10/30, 11/6, 11/10, 11/19, 12/3, 12/28, 1/20, 2/25	
GG:OR	ODSVRA 2014	SLO	10/5, 10/19, 10/22, 10/28, 10/30, 11/19, 12/17, 2/25	
GG:PB	ODSVRA 2012 or 2013	SLO	10/5, 10/11, 10/19, 11/3, 11/19, 11/25, 12/3, 12/8, 1/20, 2/4, 2/9	
GG:PW	ODSVRA 2013 or 2014	SLO	10/6, 10/9, 10/12, 10/13, 10/14, 10/17, 10/18, 10/19, 10/22, 10/30, 11/5, 11/10, 11/13, 11/19, 12/3, 12/8, 12/17, 12/24, 12/29, 1/20, 2/4, 2/25, 2/25	
GG:RW	ODSVRA 2014	SLO	10/6, 10/13, 10/14, 12/3, 12/24, 12/28, 1/20	
GG:VG	ODSVRA 2014	SLO	10/13, 10/17, 10/18, 10/21, 10/30, 11/13, 11/19, 12/8, 12/29, 2/9, 2/25	
GG:VW	ODSVRA 2013 or 2014	SLO	12/3	
GG:VY	ODSVRA 2008, 2011, or 2013	SLO	10/6, 10/9, 10/13, 10/14, 10/17, 10/21, 10/28, 10/30, 11/10, 11/19, 12/8, 12/28, 2/4	
GG:WG	ODSVRA 2014	SLO	11/19, 12/8, 12/22, 1/20	

Appendix D. Banded least terns and snowy plovers (continued.)

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015 (continued).

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
GG:YG	ODSVRA 2011 or 2013	SLO	10/10, 12/29, 2/9	
GG:YW	ODSVRA 2013	SLO	12/3	
PG:AB	ODSVRA 2012 or 2014	SLO	11/10	
PG:AG	ODSVRA 2012 or 2014	SLO	10/22, 11/13, 11/19, 12/8, 12/24, 1/20, 2/4	
PG:AR	ODSVRA 2014	SLO	10/6, 10/13, 10/14, 10/17, 10/19, 10/21, 10/22, 10/28, 10/30, 11/10, 11/19, 12/3, 12/8, 12/24, 12/26, 12/29, 1/20, 2/9	Two birds with this band combination.
PG:BR	ODSVRA 2012 or 2014	SLO	10/10, 10/13, 11/6, 11/19	
PG:BW	ODSVRA 2012 or 2014	SLO	10/14, 10/19, 10/22, 10/28, 12/22, 1/20, 2/25	
PG:GG	ODSVRA 2012 or 2013	SLO	10/13, 10/22, 11/13, 11/19, 12/3, 12/28, 12/29, 1/20, 2/9	
PG:GR	ODSVRA 2011 or 2014	SLO	10/6, 10/11, 10/13, 10/17, 10/22, 12/8, 12/24, 12/28, 12/29, 1/20, 1/30, 2/9, 2/25	
PG:OB	ODSVRA 2012 or 2014	SLO	10/17, 10/18	
PG:PG	ODSVRA 2014	SLO	10/9, 10/13, 10/17, 10/20, 10/29, 1/20, 2/25	
PG:VW	ODSVRA 2011 or 2013	SLO	10/13, 12/8, 12/29, 1/20, 2/25	
PG:WG	ODSVRA 2014	SLO	10/11, 10/14, 10/19, 10/22, 11/3, 11/13, 11/19, 12/8, 1/20	
PG:WY	ODSVRA 2014	SLO	11/19	
PG:YW	ODSVRA 2012 or 2014	SLO	11/19	
PV:AB	ODSVRA 2014	SLO	10/17, 10/19, 10/20	
PV:AR	ODSVRA 2014	SLO	2/18, 2/25	
PV:BB	ODSVRA 2014	SLO	10/6, 10/13, 10/17, 10/19, 10/21	
PV:BG	ODSVRA 2011 or 2013	SLO	11/11	
PV:BR	ODSVRA 2007	SLO	11/5, 11/13, 12/3, 12/8, 1/20, 2/4, 2/25	
PV:BW	ODSVRA 2012 or 2014	SLO	10/17, 10/19, 10/21, 10/22, 10/28, 11/10, 11/19, 12/3, 12/28, 12/29	
PV:GG	ODSVRA 2014	SLO	10/7, 10/17, 10/19, 10/21, 10/22, 10/30, 11/3, 11/11, 12/8, 12/28	
PV:RW	ODSVRA 2014	SLO	10/14, 10/17, 10/22, 10/28	
PV:VG	ODSVRA 2013	SLO	10/5, 10/19, 10/30, 11/10, 12/17, 12/28, 12/29, 2/9, 2/25	
PV:VW	ODSVRA 2014	SLO	10/22	
PV:VY	ODSVRA 2009	SLO	10/5, 10/14, 10/17, 10/18, 10/19, 11/19, 12/8, 12/28, 2/9	
PV:WB	ODSVRA 2007 or 2010	SLO	1/20	

Appendix D. Banded least terns and snowy plovers (continued.)

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015 (continued).

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
PV:WY	ODSVRA 2014	SLO	10/5, 10/6, 10/17, 10/19, 10/28, 11/19, 12/3, 12/26, 12/28	
RR:OY	ODSVRA 2010	SLO	2/25	
RR:PB	ODSVRA 2007 or 2010	SLO	12/28, 12/29, 2/25	
RR:VB	ODSVRA 2008 or 2010	SLO	12/29, 1/20, 2/4	
RR:VW	ODSVRA 2009 or 2011	SLO	10/11, 10/17, 11/5, 12/8, 12/24, 1/20	
RR:YR	ODSVRA 2010	SLO	10/13, 10/17, 10/22, 10/28, 11/6, 11/19, 12/28, 12/29, 1/20	
VG:AB	ODSVRA 2011 or 2013	SLO	10/3, 10/10, 10/22, 11/19, 12/3, 12/24	
VG:AR	ODSVRA 2011	SLO	10/13, 10/19, 10/20, 10/21, 11/3, 11/6, 11/11, 11/13, 12/8, 12/28	
VG:AW	ODSVRA 2011 or 2013	SLO	1/20, 2/4, 2/9, 2/25	
VG:BR	ODSVRA 2013 or 2014	SLO	10/13, 10/19, 11/19, 12/22, 2/25	
VG:GW	ODSVRA 2011 or 2013	SLO	10/10, 10/13, 11/5, 12/24, 12/28, 1/20, 2/25	
VG:OB	ODSVRA 2014	SLO	10/5, 10/13, 10/14, 10/17, 10/19, 10/22, 10/30, 11/10, 2/9	
VG:OG	ODSVRA 2011	SLO	11/19, 12/3, 12/8, 12/28, 1/20, 2/9, 2/25	
VG:PR	ODSVRA 2011	SLO	1/20	
VG:VR	ODSVRA 2009 or 2011	SLO	10/22, 11/19, 12/3, 12/8	
VG:WB	ODSVRA 2012 or 2013	SLO	10/6, 10/13, 10/17, 10/22, 11/19, 12/3, 12/8, 12/24, 12/29, 2/25	
VG:WR	ODSVRA 2012	SLO	10/22, 12/29	
VG:YB	ODSVRA 2014	SLO	2/25	
VV:AA	ODSVRA 2011	SLO	10/5, 10/13, 10/17, 10/20, 10/22, 10/28, 11/11, 11/19, 12/8, 12/29, 1/20, 2/9, 2/25	
VV:BB	ODSVRA 2011 or 2013	SLO	11/3, 12/28, 12/29	
VV:BG	ODSVRA 2009 or 2013	SLO	10/6, 10/19, 11/19, 12/3, 12/8	
VV:GR	ODSVRA 2012 or 2013	SLO	10/19, 10/22, 10/29, 10/30, 11/19, 12/24	
VV:VB	ODSVRA 2011 or 2013	SLO	10/13, 10/19, 10/21, 10/22, 10/28, 11/13, 11/19, 12/3, 2/4, 2/25	
VV:VG	ODSVRA 2009, 2011, or 2013	SLO	10/10, 10/22, 12/28, 12/29, 1/20, 2/25	
VV:VW	ODSVRA 2008, 2011, or 2013	SLO	10/17, 10/30, 12/8, 12/28, 1/20, 2/25	
VV:VY	ODSVRA 2011	SLO	12/24	
VV:WB	ODSVRA 2013 or 2014	SLO	12/8, 12/28, 12/29, 1/20, 2/9	
VV:WG	ODSVRA 2012	SLO	2/4	
VV:WW	ODSVRA 2011 or 2013	SLO	10/6	

Appendix D. Banded least terns and snowy plovers (continued.)

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015 (continued).

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
VV:WY	ODSVRA 2012 or 2013	SLO	10/5, 10/6, 10/17, 10/19, 10/21, 11/3, 11/13, 11/19, 12/3, 12/8, 12/24, 12/28, 1/20, 2/4, 2/9, 2/25	
VV:YG	ODSVRA 2013	SLO	10/6, 10/9, 10/17, 10/21, 10/28, 10/30, 11/19, 12/8, 12/28	
VV:YR	ODSVRA 2014	SLO	10/13, 10/19	
VV:YW	ODSVRA 2011 or 2013	SLO	10/22, 11/5, 12/3, 12/8, 12/28, 1/20, 2/4, 2/25	
AN:AR	VAFB 2014	Santa Barbara, CA	10/5, 10/17, 12/3, 2/9	
AN:OB	VAFB 2014	Santa Barbara	10/10, 10/13, 11/10, 11/19, 12/8	Read as AN:RB on 10/10, 10/13, 11/10, and 11/19.
AN:RW	VAFB 2014	Santa Barbara	10/17, 11/19	
B-:Y/G	VAFB 2013	Santa Barbara	10/19, 10/30, 12/28	
NB:GR	VAFB 2011	Santa Barbara	2/9	
NB:GR	VAFB 2011	Santa Barbara	12/8	
NB:OW	VAFB 2011	Santa Barbara	10/17, 10/19, 11/19, 12/3, 12/8, 12/29	
NB:PG	VAFB 2011	Santa Barbara	12/28, 2/4	
NO:AG	VAFB 2013	Santa Barbara	10/9, 10/19, 10/22, 10/28, 10/30, 11/6, 11/10, 11/25, 12/3, 12/24, 12/28, 12/29, 1/20	
NO:GB	VAFB 2013	Santa Barbara	10/5, 10/17, 10/19, 10/28, 10/30, 11/11, 11/19, 12/8, 1/20, 2/25	
NO:PG	VAFB 2014	Santa Barbara	10/14	
NO:WG	VAFB 2012	Santa Barbara	10/14	
NO:WY	VAFB 2013	Santa Barbara	10/11, 10/19, 10/22, 11/19, 12/3, 12/8, 2/25	
NS:WW	VAFB 2009	Santa Barbara	12/3, 12/8, 2/9, 2/25	
NW:PG	VAFB 2014	Santa Barbara	10/17	
NW:WG	VAFB 2014	Santa Barbara	10/13, 10/17, 10/19, 10/22, 10/28, 11/11, 11/13, 11/19, 12/3, 12/8, 12/24, 12/28, 2/9, 2/25	
NY:RB	VAFB 2008 or 2013	Santa Barbara	2/4	
NY:RW	VAFB 2012	Santa Barbara	12/29	
O:B/W	VAFB 2014	Santa Barbara	12/29, 2/4, 12/26	
P:W/O/W	VAFB 2013	Santa Barbara	12/3, 12/8, 12/28, 1/20, 2/4	
P-:W/R/W	VAFB 2013	Santa Barbara	10/6, 10/19, 10/22, 10/30	
R:W/B/W	VAFB 2013	Santa Barbara	10/5, 10/18, 10/19, 10/22, 10/28, 11/6, 11/10, 11/13, 1/20	
V:G/W/G	VAFB 2014	Santa Barbara	11/19, 12/8	

Appendix D. Banded least terns and snowy plovers (continued.)

Table D.2. Banded snowy plovers seen at ODSVRA 1 October 2014 to 28 February 2015 (continued).

Band Combination	Origin and Year Banded	County Banded	Dates Seen	Notes
W:Y/G	VAFB 2012	Santa Barbara	10/6, 10/7, 10/17, 10/20, 10/28, 11/11, 12/8, 2/25	
Y:G/O/G	VAFB 2013	Santa Barbara	10/13, 10/17, 10/28, 11/6, 11/19, 1/20, 2/4	
B-:OB	Origin Unknown	Unknown	10/5, 10/19, 10/22, 11/19, 12/28, 12/29, 1/20	
OS:PG	Origin unknown	Unknown	12/3, 12/28, 1/20	
RR:R-	Origin Unknown	Unknown	10/19, 10/20, 10/30, 11/11, 11/13, 11/19	
V-:VW	Origin Unknown	Unknown	10/5, 10/17, 10/30, 1/20	
V-:AY	Origin Unknown	Unknown	10/13, 10/20, 11/19, 12/28, 2/4	
V-:BR	Origin Unknown	Unknown	10/17, 11/19, 12/3	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015.

Juveniles fledged from ODSVRA in 2015 are not included. All birds were banded as chicks unless otherwise noted. Chicks banded outside of San Luis Obispo County are noted in order north to south. Some sites band to brood and can have more than one bird with the same combination. (For a description of color band letter codes see Appendix B.)

ODSVRA=Oceano Dunes SVRA, SLO=San Luis Obispo, VAFB=Vandenberg Air Force Base, SB=State Beach, NWR=National Wildlife Refuge

J=Juvenile, F=Female, M=Male

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
YW:WG	M	New River SB 2012	Coos County, OR	4/4, 4/22, 4/25	Banded as adult male.
BO:OO	J	Sunset SB 2015	Santa Cruz, CA	7/28, 7/29, 7/30	
AO:WO	J	Pajaro Spit 2015	Monterey, CA	8/14	
BG:OG	J	Pajaro Spit 2015	Monterey	9/25	
WA:RW	J	Pajaro Spit 2015	Monterey	8/26	
AG:GA		Moss Landing SP 2014	Monterey	3/5, 3/12, 3/18	
GO:RW		Moss Landing SP 2013	Monterey	6/30	
OY:RO		Moss Landing SP 2011	Monterey	4/27	
RO:OY	M	Salinas River SB 2014	Monterey	3/3, 3/4, 3/7, 3/8, 3/12, 3/21, 5/10, 6/9, 6/10, 6/29, 7/3, 7/4, 7/5, 7/10, 7/28, 8/6, 8/12, 8/13, 9/4	ODSVRA breeding male.
AO:RO	J	Marina SB 2015	Monterey	7/9	
AR:OO	J	Marina SB 2015	Monterey	7/16	
BG:GW	F	Marina SB 2013	Monterey	4/30	ODSVRA breeding female.
OW:RO	J	Fort Ord 2015	Monterey	9/8	
OY:RB	F	Reservation Road 2014	Monterey	3/9, 4/4, 5/18, 5/31, 6/18, 7/27, 8/6, 8/26, 9/4, 9/6	ODSVRA breeding female.
BB:AG	M	ODSVRA 2013	SLO, CA	4/11, 4/29, 5/25, 5/31, 6/28	ODSVRA breeding male.
BB:BY	M	ODSVRA 2010 or 2013	SLO	3/17, 4/18, 5/2, 5/4, 5/12, 5/14, 5/22, 5/30, 5/31, 6/4, 6/11, 6/25, 6/27, 7/18, 7/19, 8/10, 8/13, 8/30, 9/4	ODSVRA breeding male.
BB:GB	M	ODSVRA 2014	SLO	5/6, 6/9, 6/10	ODSVRA breeding male.
BB:GG	M	ODSVRA 2013 or 2014	SLO	5/19, 6/9, 6/10	
BB:GR	M	ODSVRA 2012	SLO	4/2, 4/4, 4/19, 4/21, 5/26, 5/30, 5/31, 6/4, 8/5, 8/23, 9/11, 9/29	ODSVRA breeding male.
BB:OY		ODSVRA 2014	SLO	9/3, 9/4	
BB:PB	M	ODSVRA 2013	SLO	3/7, 3/26, 5/17	ODSVRA breeding male.
BB:PG	M	ODSVRA 2013 or 2014	SLO	5/8, 6/9, 6/18, 6/20, 8/14	ODSVRA breeding male.
BB:PR	M	ODSVRA 2011 or 2014	SLO	6/9, 6/24, 6/26, 6/27, 6/28, 6/29, 7/3, 7/8, 7/15, 7/23, 7/28	ODSVRA breeding male.
BB:PW	F	ODSVRA 2010 or 2014	SLO	4/27/2015, 8/6, 8/14	ODSVRA breeding female.
BB:RB		ODSVRA 2010	SLO	4/14	
BB:RW		ODSVRA 2014	SLO	3/1, 8/12, 8/22, 9/11, 9/12, 9/25	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
BB:VR	M	ODSVRA 2011, 2013 or 2014	SLO	3/18, 3/26, 6/30, 7/15, 7/21, 7/23, 7/26	ODSVRA breeding male.
BB:WB	M	ODSVRA 2013	SLO	4/18, 5/6, 5/18, 5/23, 5/31, 6/17, 6/20, 7/9, 7/13, 7/23, 7/28, 7/31, 8/6, 8/12	ODSVRA breeding male.
BB:WG	F	ODSVRA 2010 or 2013	SLO	5/15, 5/19, 7/5	ODSVRA breeding female.
BB:WY		ODSVRA 2010 or 2013	SLO	8/17	
BB:YB		ODSVRA 2013	SLO	4/18, 5/15	
BB:YG		ODSVRA 2011	SLO	3/1, 7/4	
BB:YW	F & M	ODSVRA 2010 or 2013	SLO	3/4, 3/5, 3/17, 3/18, 3/19, 3/22, 3/31, 4/4, 4/19, 4/23, 5/4, 5/8, 5/18, 5/19, 5/25, 5/28, 6/6, 6/8, 6/9, 6/18, 6/27, 6/28, 7/15, 8/7, 8/11, 8/13, 8/14, 8/27, 8/31, 9/3, 9/29	ODSVRA breeding female and male.
BB:YY	M	ODSVRA 2010	SLO	3/16, 4/2, 4/30, 5/5, 5/19, 6/18, 7/15, 7/19, 7/21, 7/28, 7/30, 8/5, 8/7	ODSVRA breeding male.
GA:BG	M	ODSVRA 2011 or 2013	SLO	5/31, 7/21, 7/28, 7/31, 8/18, 8/19	ODSVRA breeding male.
GA:BW	F	ODSVRA 2011 or 2013	SLO	5/26, 5/14, 5/17, 5/21, 7/1, 7/4, 8/18	ODSVRA breeding female.
GA:GB	M	ODSVRA 2012, 2013, or 2014	SLO	3/18, 4/28, 5/11, 7/5, 7/6, 7/30	ODSVRA breeding male.
GA:GG	F	ODSVRA 2011, 2013, or 2014	SLO	3/6, 3/18, 4/6, 4/17, 5/5, 5/18, 5/22, 6/4, 7/1, 8/20, 9/8	ODSVRA breeding female.
GA:GW		ODSVRA 2011 or 2013	SLO	5/19	
GA:GY	M	ODSVRA 2012 or 2013	SLO	5/10, 5/14, 5/23, 6/14, 7/8, 7/10, 7/11, 7/31, 8/2, 8/3, 8/4, 8/6, 8/7, 8/12, 8/17, 9/2, 9/4, 9/10, 9/15	ODSVRA breeding male.
GA:OG	M	ODSVRA 2014	SLO	6/30, 7/5, 7/11, 7/23, 7/30	ODSVRA breeding male.
GA:OW	M	ODSVRA 2013 or 2014	SLO	5/1, 5/4, 5/25, 5/30, 6/20, 8/15, 8/31	ODSVRA breeding male.
GA:OY	M	ODSVRA 2014	SLO	6/9, 8/14	
GA:PY	M	ODSVRA 2010	SLO	5/14, 5/15	ODSVRA breeding male.
GA:RB	F	ODSVRA 2010	SLO	3/4, 7/16	ODSVRA breeding female.
GA:VR	F	ODSVRA 2009	SLO	4/24, 5/30	ODSVRA breeding female.
GA:VW		ODSVRA 2014	SLO	9/8	
GA:VY	M	ODSVRA 2014	SLO	4/4, 5/31, 6/1, 6/9, 7/28, 7/31, 8/2, 8/13, 8/14, 8/15, 8/19, 8/22, 8/23	ODSVRA breeding male.
GA:WB	M	ODSVRA 2012 or 2013	SLO	3/25, 3/27, 4/1, 4/5, 4/20, 4/24, 5/17, 5/30, 7/15, 7/22, 7/24, 7/25, 7/27, 7/28, 7/31, 8/3, 8/4, 8/6, 8/7, 8/10, 8/11, 8/14	ODSVRA breeding male.
GA:YG	F	ODSVRA 2011 or 2013	SLO	3/28, 3/30, 4/11, 4/23	ODSVRA breeding female.
GA:YR	F	ODSVRA 2014	SLO	3/18, 3/21, 4/2, 4/4, 4/19, 4/21, 5/10, 5/18, 5/20, 6/4, 6/9, 7/17, 7/28, 7/30, 8/6, 8/9, 9/8	ODSVRA breeding female.
GA:YW	M	ODSVRA 2010 or 2013	SLO	3/4, 3/25, 6/9, 6/27, 6/28, 6/30, 7/9, 7/23, 7/24	ODSVRA breeding male.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
GG:AG	M	ODSVRA 2013 or 2014	SLO	4/11, 4/17, 4/26, 4/27, 5/3, 7/21, 7/29, 8/9	ODSVRA breeding male.
GG:AR		ODSVRA 2011	SLO	3/23	
GG:AY	F & M (3)	ODSVRA 2012 or 2013	SLO	3/7, 3/18, 3/28, 4/28, 5/3, 5/8, 5/17, 5/19, 5/20, 5/21, 5/31, 6/9, 6/17, 6/25, 6/27, 6/30, 7/7, 7/15, 7/17, 7/25, 7/27, 7/30, 8/6, 8/7, 8/8, 9/4, 9/8	ODSVRA breeding female and three breeding males.
GG:BG		ODSVRA 2013 or 2014	SLO	3/6, 4/22	
GG:BR	M	ODSVRA 2013 or 2014	SLO	3/4, 3/12, 3/17, 3/31, 5/17, 5/20, 5/23, 6/9, 6/14, 6/17, 6/24, 6/27, 7/10, 7/17, 8/11, 8/16, 8/20, 8/28	ODSVRA breeding male.
GG:BY	F	ODSVRA 2014	SLO	5/16	ODSVRA breeding female.
GG:GG		ODSVRA 2011 or 2013	SLO	3/5, 3/13, 3/18, 6/24, 7/9, 9/19	
GG:GR	F	ODSVRA 2011 or 2013	SLO	4/23, 5/19, 6/27, 7/17	ODSVRA breeding female.
GG:GW		ODSVRA 2014	SLO	9/2	
GG:OG		ODSVRA 2013 or 2014	SLO	3/4, 3/5, 3/6, 3/17, 3/21	
GG:OR	M	ODSVRA 2014	SLO	6/28, 6/29, 8/8, 8/20	ODSVRA breeding male.
GG:OW	M	ODSVRA 2014	SLO	6/8, 6/15, 7/4, 7/6, 7/10, 8/13, 8/26	ODSVRA breeding male.
GG:PB	M	ODSVRA 2012 or 2013	SLO	6/26, 8/9, 8/29, 9/14	ODSVRA breeding male.
GG:PG		ODSVRA 2014	SLO	8/13, 9/25	
GG:PW	M (3)	ODSVRA 2013 or 2014	SLO	3/4, 3/4, 3/5, 3/17, 3/18, 5/8, 5/13, 5/16, 5/17, 5/21, 5/30, 5/31, 6/9, 6/29, 7/1, 7/10, 7/11, 7/14, 7/23, 7/27, 7/28, 8/2, 8/3, 8/6, 8/7, 8/9, 8/10, 8/13, 8/16, 8/17, 8/19, 8/21, 9/8, 9/26	Three ODSVRA breeding males.
GG:RW	M	ODSVRA 2014	SLO	3/1, 3/17, 3/19, 4/24, 5/2, 5/3, 5/10, 5/16, 5/18, 5/25, 5/28, 6/8, 6/25, 6/27, 7/2, 7/9, 7/11, 7/16, 7/25, 7/28, 8/6, 8/18, 8/20, 8/26, 8/30, 9/8	ODSVRA breeding male.
GG:RY		ODSVRA 2012 or 2014	SLO	8/19	
GG:VG	M	ODSVRA 2014	SLO	3/4, 3/7, 3/13, 3/15, 3/17, 3/18, 3/25, 4/11, 4/14, 4/25, 5/6, 5/19, 5/24, 5/26, 6/2, 7/10, 7/15, 7/22, 7/27, 7/28, 7/30, 7/31, 8/7, 8/9, 8/10, 8/15, 9/30	ODSVRA breeding male.
GG:VR		ODSVRA 2011 or 2013	SLO	5/19	
GG:VR		ODSVRA 2011 or 2013	SLO	8/12, 8/13	
GG:VY	F	ODSVRA 2008, 2011, or 2013	SLO	3/4, 3/18, 5/18, 5/23, 7/4, 7/15, 8/5, 8/16, 8/30, 9/2	ODSVRA breeding female.
GG:WB	M	ODSVRA 2011 or 2013	SLO	4/19, 5/17, 5/25, 5/31, 6/17, 6/18, 6/27	ODSVRA breeding male.
GG:WG		ODSVRA 2014	SLO	3/12, 3/18	
GG:WW		ODSVRA 2012 or 2013	SLO	3/1	
GG:WY	F	ODSVRA 2012 or 2013	SLO	3/4, 5/17, 5/19, 6/25, 8/8, 8/12, 8/14	ODSVRA breeding female.
GG:YG	F & M	ODSVRA 2011 or 2013	SLO	3/1, 4/14, 5/5, 5/19, 5/21, 5/25, 6/9, 7/9, 7/10, 7/28, 8/2, 8/4, 8/17, 8/18	ODSVRA breeding female and male.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
GG:YW		ODSVRA 2013	SLO	3/18, 8/2, 8/24, 9/8	
PG:AG	F & M	ODSVRA 2012 or 2014	SLO	3/4, 3/6, 3/13, 3/17, 3/21, 4/28, 5/29, 6/2, 6/8, 6/24, 6/25, 6/29, 7/2, 7/5, 7/11, 7/17, 7/28, 8/5, 8/7, 9/14	ODSVRA breeding female and male.
PG:AR	M	ODSVRA 2014	SLO	3/6, 3/13, 3/25, 3/26, 4/4, 8/5, 8/7	ODSVRA breeding male.
PG:BW	F	ODSVRA 2012 or 2014	SLO	3/5, 3/12, 4/11, 6/13	ODSVRA breeding female.
PG:GG	F	ODSVRA 2012 or 2013	SLO	3/4, 4/4, 4/6, 4/23, 4/24, 5/25, 6/9, 7/15, 8/6, 8/11, 8/30, 9/26	ODSVRA breeding female.
PG:GR		ODSVRA 2011 or 2014	SLO	3/4, 3/18, 4/4, 4/17, 7/17	
PG:PB		ODSVRA 2014	SLO	8/7	
PG:PG		ODSVRA 2014	SLO	3/4, 3/5, 5/19, 6/27, 7/12, 7/17, 8/16, 8/17, 8/20, 9/6	
PG:PW	M	ODSVRA 2012 or 2014	SLO	3/10, 3/18, 3/19, 4/29, 5/6, 5/19, 6/10, 6/27, 7/21, 7/27, 8/6, 8/14, 8/15, 8/16, 8/17, 8/18	ODSVRA breeding male.
PG:VG	F	ODSVRA 2014	SLO	6/4, 8/21, 9/8	ODSVRA breeding female.
PG:VW	M	ODSVRA 2011 or 2013	SLO	3/4, 3/18, 4/2, 5/13, 6/29, 7/23, 7/31	ODSVRA breeding male.
PG:WY		ODSVRA 2014	SLO	3/20, 3/21, 4/19, 4/26	
PG:YG	F & M	ODSVRA 2014	SLO	3/28, 3/30, 4/11, 4/23, 4/28	ODSVRA breeding female and male.
PV:AR		ODSVRA 2014	SLO	8/9	
PV:BB		ODSVRA 2014	SLO	7/9	
PV:BG		ODSVRA 2011 or 2013	SLO	3/5, 8/22, 8/30	
PV:BR	M	ODSVRA 2007	SLO	3/18, 4/5, 4/13, 5/14	ODSVRA breeding male.
PV:GG	F	ODSVRA 2014	SLO	3/4, 3/12, 3/25, 5/17, 7/11, 8/12, 8/20, 8/21, 9/8, 9/11	ODSVRA breeding female.
PV:OG		ODSVRA 2011	SLO	5/29, 8/17	
PV:PW	F	ODSVRA 2014	SLO	3/17, 3/22, 4/7, 4/9, 6/18, 7/23, 7/24, 8/13, 8/14	ODSVRA breeding female.
PV:RW		ODSVRA 2014	SLO	4/26	
PV:VG	F	ODSVRA 2013	SLO	3/4, 6/24, 8/6, 8/13, 8/26, 8/30	ODSVRA breeding female.
PV:VY	F	ODSVRA 2009	SLO	3/23, 5/20, 7/10, 7/11, 8/16, 8/21	ODSVRA breeding female.
PV:WB	F	ODSRA 2007 or 2010	SLO	8/3, 8/5, 8/14, 8/16, 8/21, 8/22, 8/24, 9/2, 9/8	ODSVRA breeding female.
PV:YB	M	ODSVRA 2012	SLO	5/1, 5/18, 5/30, 6/4, 6/18, 6/21, 7/31, 8/7, 8/13, 8/16, 8/22	ODSVRA breeding male.
RR:OG	M	ODSVRA 2012	SLO	3/16, 5/18, 5/25, 6/9, 6/27	ODSVRA breeding male.
RR:OR	M	ODSVRA 2010	SLO	3/6, 5/14, 6/24, 7/7	ODSVRA breeding male.
RR:OY	F	ODSVRA 2010	SLO	4/19, 8/20	ODSVRA breeding female.
RR:PB	F	ODSVRA 2010	SLO	3/18, 5/11, 5/14, 5/17, 5/18, 9/25, 9/26	ODSVRA breeding female.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
RR:PW	F	ODSVRA 2014	SLO	3/17, 3/18, 4/29, 5/9, 6/9, 8/13, 8/16, 8/17	ODSVRA breeding female.
RR:RB		ODSVRA 2012	SLO	8/12	
RR:WB	M	ODSVRA 2011	SLO	5/1, 5/8, 5/25, 5/30, 6/9, 6/20, 8/5, 8/7, 8/14, 8/15, 8/17, 8/19	ODSVRA breeding male.
RR:YR		ODSVRA 2010	SLO	3/15	
RR:YY	M	ODSVRA 2010	SLO	4/6, 4/24, 5/20, 6/9, 6/24, 6/25, 6/27, 7/11, 7/23, 7/24, 8/2, 8/10, 8/13, 8/14, 8/17, 8/21, 8/26, 8/27	ODSVRA breeding male.
VG:AW	F	ODSVRA 2011 or 2013	SLO	3/12, 3/17, 6/7, 6/28, 7/2, 7/3, 8/7, 8/15, 8/31	ODSVRA breeding female.
VG:BR		ODSVRA 2013 or 2014	SLO	3/4, 9/2, 9/3, 9/6, 9/17, 9/27	
VG:BW		ODSVRA 2013	SLO	3/16	
VG:GW		ODSVRA 2011 or 2013	SLO	8/17	
VG:GY	M	ODSVRA 2013 or 2014	SLO	5/19, 6/24, 7/11	ODSVRA breeding male.
VG:OB	M	ODSVRA 2014	SLO	3/18, 4/24, 4/27, 5/17, 5/28, 5/31, 7/10, 8/10, 8/12, 8/13, 8/17, 8/20, 8/21, 8/30, 9/3	ODSVRA breeding male.
VG:OG	F	ODSVRA 2011	SLO	3/16, 5/14, 5/21, 5/28, 5/31, 7/16, 8/6, 8/13, 8/21, 9/2, 9/3, 9/11, 9/24, 9/26, 9/30	ODSVRA breeding female.
VG:PY		ODSVRA 2014	SLO	9/4	
VG:WB	M	ODSVRA 2012 or 2013	SLO	4/26, 5/4, 5/5, 5/21, 5/30, 6/9, 7/10	ODSVRA breeding male.
VG:WR		ODSVRA 2012	SLO	3/6, 4/2	
VG:YB	M	ODSVRA 2014	SLO	3/1, 3/18, 4/17, 4/23, 5/2, 6/18	ODSVRA breeding male.
VO:BW	M	ODSVRA 2014	SLO	4/7, 5/5, 5/25, 5/27, 6/9, 7/11, 7/15, 9/8	ODSVRA breeding male.
VV:AA	F	ODSVRA 2011	SLO	3/11, 3/21, 3/24, 4/10, 5/14, 8/6, 8/13, 8/16, 8/30, 9/23, 9/29	ODSVRA breeding female.
VV:AW		ODSVRA 2013 or 2014	SLO	5/29	
VV:BB		ODSVRA 2011 or 2013	SLO	5/17	
VV:BG	F (2)	ODSVRA 2009 or 2013	SLO	5/13, 6/21, 7/16, 7/31, 8/21, 8/23, 8/25, 8/26, 8/27, 9/30	Two ODSVRA breeding females.
VV:BW		ODSVRA 2014	SLO	5/19, 7/24, 8/3, 8/11, 8/20, 9/4, 9/15, 9/30	
VV:BY		ODSVRA 2007 or 2013	SLO	3/17, 4/17, 4/28, 5/5, 5/22, 8/5, 9/4	
VV:GB	M	ODSVRA 2009	SLO	4/18, 4/29, 6/9, 6/10, 6/27, 6/29, 7/11	ODSVRA breeding male.
VV:GR		ODSVRA 2012 or 2013	SLO	8/13, 8/30, 9/3, 9/5	
VV:OB		ODSVRA 2013	SLO	7/22, 8/13	
VV:VB	M	ODSVRA 2011 or 2013	SLO	5/21, 5/27, 6/9	ODSVRA breeding male.
VV:VG	F	ODSVRA 2009, 2011 or 2013	SLO	3/1, 4/9, 7/16, 8/6, 8/14, 8/15	ODSVRA breeding female.
VV:VR	M	ODSVRA 2008	SLO	5/11, 5/28, 6/4, 6/10, 6/15, 6/28, 6/29	ODSVRA breeding male.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
VV:VW	F (2)	ODSVRA 2008, 2011, or 2013	SLO	4/5, 5/5, 5/8, 7/4, 7/8, 7/28, 8/6, 8/7	Two ODSVRA breeding females.
VV:WB	M	ODSVRA 2013 or 2014	SLO	3/7, 3/13, 3/15, 3/17, 3/25, 3/26, 3/28, 4/3, 4/4, 5/17, 6/9, 6/14, 6/24, 7/28, 7/31, 8/5, 8/9, 9/14	ODSVRA breeding male.
VV:WG		ODSVRA 2012	SLO	3/12	
VV:WY	F	ODSVRA 2012 or 2013	SLO	5/19, 7/7, 7/30	ODSVRA breeding female.
VV:YB		ODSVRA 2012 or 2013	SLO	3/20	
VV:YW	M	ODSVRA 2011 or 2013	SLO	4/6, 7/15, 7/21, 7/27, 7/28, 7/30, 8/2, 8/15	ODSVRA breeding male.
AN:BB	J	VAFB 2015	Santa Barbara, CA	9/3	
AN:NB	J	VAFB 2015	Santa Barbara	9/17, 9/30	
B:Y/G		VAFB 2013	Santa Barbara	3/4, 3/12, 3/25,	
NB:OW	F	VAFB 2011	Santa Barbara	3/28	ODSVRA breeding female.
NB:PG	F	VAFB 2011	Santa Barbara	4/13, 4/17, 6/25, 6/26	ODSVRA breeding female.
NO:AB		VAFB 2012	Santa Barbara	8/23	
NO:AG	F	VAFB 2013	Santa Barbara	3/12, 5/25, 5/27, 5/30, 6/1, 6/14, 6/20	ODSVRA breeding female.
NO:GB	F & M	VAFB 2013	Santa Barbara	3/1, 3/4, 3/31, 4/29, 5/20, 5/23, 6/9, 6/17, 6/28, 8/13, 8/17, 9/3	ODSVRA breeding female and male.
NO:PB	M	VAFB 2014	Santa Barbara	4/24, 4/27, 5/9, 5/29, 6/24, 6/26, 8/4, 8/6	ODSVRA breeding male.
NO:WY	F	VAFB 2013	Santa Barbara	7/11, 7/19, 7/27, 7/28, 7/30, 7/31, 8/1, 8/2, 8/4, 8/6, 8/7, 8/17, 8/18, 8/26	ODSVRA breeding female.
NO:YW	J	VAFB 2015	Santa Barbara	9/7	
NR:GB	J	VAFB 2015	Santa Barbara		
NS:WW	F	VAFB 2009	Santa Barbara	5/25, 5/30, 7/15	ODSVRA breeding female.
NW:AW	J	VAFB 2015	Santa Barbara	8/14	
NW:WG		VAFB 2014	Santa Barbara	3/4, 3/13, 3/25, 4/11, 4/26, 8/6, 8/13, 8/30, 9/4, 9/17, 9/25	
NY:GW	J	VAFB 2015	Santa Barbara	7/10	
NY:NR	J	VAFB 2015	Santa Barbara	7/14	
NY:OY	J	VAFB 2015	Santa Barbara	8/14	
NY:RB	F	VAFB 2008 or 2013	Santa Barbara	5/24, 6/29, 8/4, 8/13	ODSVRA breeding female.
NY:WW	J	VAFB 2015	Santa Barbara	7/19	
NY:YR	J	VAFB 2015	Santa Barbara	6/27	
O:B/W		VAFB 2014	Santa Barbara	3/1	
P:W/O/W		VAFB 2013	Santa Barbara	3/10	
R:W/B/W	M	VAFB 2013	Santa Barbara	3/13, 4/28	ODSVRA breeding male.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2015 (continued).

Band	Sex	Origin and Year Banded	County Banded	Dates Seen	Notes
W:-Y/G		VAFB 2012	Santa Barbara	3/12	
Y:G/O/G		VAFB 2013	Santa Barbara	3/18, 3/25, 8/13	
GA:Y-	M	Unknown Origin		6/18, 6/29	ODSVRA breeding male.
RR:--	M	Unknown Origin		5/17, 5/19, 6/7, 6/8, 6/9, 6/17, 6/27, 6/29, 7/4, 7/5, 8/12, 8/16	ODSVRA breeding male.
V:-AY	M	Unknown Origin		5/14, 6/17, 6/30, 7/21	ODSVRA breeding male.
V:-BR	M (2)	Unknown Origin		6/21, 6/25, 6/26, 6/27, 7/23, 8/12	Two ODSVRA breeding males.
V:-VW	F	Unknown Origin		5/14, 5/16, 7/31, 8/4, 8/21, 8/30, 9/11, 9/30	ODSVRA breeding female.
Y:-GO	M	Unknown Origin		4/6, 4/8, 5/19, 5/21, 5/25, 5/27, 5/30, 6/4, 6/14, 7/28, 7/29, 8/7, 8/5	ODSVRA breeding male.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.4. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2014 to 28 February 2015.

This is a partial list based on information received from Point Blue Conservation Science (pers. comm. F. Bidstrup), Morro Bay State Park (pers. comm. R. Orr) and from sightings by ODSVRA staff at nearby sites. ODSVRA bands chicks to brood and some bands have been used multiple years and it is possible to have more than one bird with the same combination. (For a description of color band letter codes see Appendix B.)

VAFB = Vandenberg Air Force Base, SLO = San Luis Obispo, SB = State Beach

Band Combination	Year Banded	Location Seen	County	Dates Seen
RR:PW	2014	Manchester Beach	Mendocino, CA	10/21
VV:OB	2011	Half Moon Bay	San Mateo, CA	12/14
GG:BY	2014	Carmel River Mouth	Monterey, CA	12/31
GA:YG	2011 or 2013	Arroyo Laguna	SLO, CA	10/8, 10/15, 10/29, 11/4, 11/14, 11/18
GG:AG	2013 or 2014	Arroyo Laguna	SLO	10/8, 10/15, 10/22, 11/4, 11/18
GG:AY	2012 or 2013	Arroyo Laguna	SLO	11/4, 11/14,
GG:BG	2013 or 2014	Arroyo Laguna	SLO	10/22, 10/29
GG:PB	2012 or 2013	Arroyo Laguna	SLO	10/8, 10/15, 10/22, 10/29, 11/4, 11/14
GG:VG	2014	Arroyo Laguna	SLO	10/8, 10/15, 11/4, 11/14, 11/18
PG:GR	2011 or 2014	Arroyo Laguna	SLO	11/14
GA:YG	2011 or 2013	San Simeon	SLO	1/7, 1/14, 1/20, 2/4, 2/10
GG:AG	2013 or 2014	San Simeon	SLO	1/7, 1/14, 1/20, 1/28, 2/4, 2/10
GG:AY	2012 or 2013	San Simeon	SLO	1/7, 1/14, 1/20, 1/28
GG:BY	2014	San Simeon	SLO	1/14
GG:PB	2012 or 2013	San Simeon	SLO	1/7, 1/14, 1/20, 1/28, 2/4, 2/10
GG:VG	2014	San Simeon	SLO	1/7, 1/14, 1/20, 2/4
GG:YG	2011 or 2013	San Simeon	SLO	1/28
PV:BW	2012 or 2014	San Simeon	SLO	11/14
VV:YR	2014	San Simeon	SLO	1/7
GA:AG	2012 or 2013	Villa Creek	SLO	10/14, 10/29, 11/4
GG:AG	2013 or 2014	Villa Creek	SLO	2/11
PG:OB	2012 or 2014	Villa Creek	SLO	12/30,2/11
PV:GG	2014	Villa Creek	SLO	2/10
VG:OB	2014	Villa Creek	SLO	12/9,12/17,1/6,1/20,2/3,2/11
VV:YR	2014	Villa Creek	SLO	10/29
GA:AG	2012 or 2013	Morro Strand	SLO	12/3, 12/5, 12/9, 1/6
GA:VR	2009	Morro Strand	SLO	11/4
GG:AG	2013 or 2014	Morro Strand	SLO	11/4, 1/6, 1/20
GG:YB	2009 or 2013	Morro Strand	SLO	10/3, 10/22, 11/4, 11/18, 11/25, 12/3,12/9,12/19

Appendix D. Banded least terns and snowy plovers (continued).

Table D.4. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2014 to 28 February 2015 (continued).

Band Combination	Year Banded	Location Seen	County	Dates Seen
PG:BB	2011, 2013, or 2014	Morro Strand	SLO	11/4, 11/18, 12/3, 12/5, 12/9
PG:BR	2012 or 2014	Morro Strand	SLO	10/8
PG:GY	2012 or 2014	Morro Strand	SLO	10/15, 10/22, 11/4, 11/18, 12/30, 1/6, 1/20
PG:OB	2012 or 2014	Morro Strand	SLO	11/18, 11/19, 11/25, 12/17, 1/6, 1/20
PG:YG	2014	Morro Strand	SLO	11/25
PV:GG	2014	Morro Strand	SLO	11/4, 11/18, 1/20
PV:RW	2014	Morro Strand	SLO	11/4, 12/3, 1/6
PV:RW	2014	Morro Strand	SLO	11/25, 12/9
PV:W-	2008	Morro Strand	SLO	10/22, 11/25, 12/3, 12/5, 12/17, 1/6
VG:OB	2014	Morro Strand	SLO	11/4
VV:WB	2013 or 2014	Morro Strand	SLO	10/3, 10/15, 10/22, 11/18, 11/25, 12/3, 12/9, 12/19, 12/30, 1/6, 1/20,
VV:YR	2014	Morro Strand	SLO	11/4, 11/18, 11/25
GA:AG	2012 or 2013	Morro Bay Sandspit	SLO	12/17, 1/20
GA:VR	2009	Morro Bay Sandspit	SLO	10/8, 10/22, 10/29, 11/25, 12/17, 1/6, 1/20, 2/3, 2/10, 2/18
GA:YR	2014	Morro Bay Sandspit	SLO	11/18, 11/25, 1/6, 1/13, 1/20, 1/27, 2/18
GG:AG	2013 or 2014	Morro Bay Sandspit	SLO	10/15, 10/22, 10/29, 12/9,
GG:OG	2013 or 2014	Morro Bay Sandspit	SLO	10/22, 10/29, 11/18, 11/25, 12/17, 1/6, 1/20, 1/27, 2/3, 2/10, 2/18
GG:PB	2012 or 2013	Morro Bay Sandspit	SLO	2/18
GG:WB	2011 or 2013	Morro Bay Sandspit	SLO	10/8, 10/15, 10/22, 11/18, 1/20, 2/3, 2/10, 2/18
GG:YB	2009 or 2013	Morro Bay Sandspit	SLO	10/15, 10/29
PG:BB	2011, 2013, or 2014	Morro Bay Sandspit	SLO	10/15, 10/22,
PG:BW	2012 or 2014	Morro Bay Sandspit	SLO	10/8, 11/25, 1/6, 1/13, 1/20, 1/27, 2/3, 2/18
PG:GY	2012 or 2014	Morro Bay Sandspit	SLO	12/17
PG:PW	2012 or 2014	Morro Bay Sandspit	SLO	10/22, 10/29, 11/18, 12/9, 1/6, 1/20, 2/3, 2/10, 2/18
PV:GG	2014	Morro Bay Sandspit	SLO	10/8, 11/25, 12/17, 2/18
RR:WW	2010	Morro Bay Sandspit	SLO	10/8, 10/15, 10/22, 10/29, 2/3, 2/10, 2/18
VG:OB	2014	Morro Bay Sandspit	SLO	10/8, 10/22, 10/29
VV:GY	2014	Morro Bay Sandspit	SLO	10/8, 10/15, 11/18, 11/25, 1/6, 1/13, 1/20, 1/27, 2/11
VV:WB	2013 or 2014	Morro Bay Sandspit	SLO	12/17, 2/10, 2/18
GA:AB	2013	VAFB	Santa Barbara, CA	2/3, 2/16
GA:WB	2012 or 2013	VAFB	Santa Barbara	2/16
GG:WB	2011 or 2013	VAFB	Santa Barbara	11/25, 12/17, 12/28

Appendix D. Banded least terns and snowy plovers (continued).

Table D.4. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2014 to 28 February 2015 (continued).

Band Combination	Year Banded	Location Seen	County	Dates Seen
GG:YY	2011 or 2013	VAFB	Santa Barbara	11/25
PG:YW	2012 or 2014	VAFB	Santa Barbara	11/24,12/22,1/20
PV:PW	2014	VAFB	Santa Barbara	2/3
PV:VB	2014	VAFB	Santa Barbara	11/24, 2/24
RR:LY	2010	VAFB	Santa Barbara	11/25,12/17,1/20
VG:VR	2009 or 2011	VAFB	Santa Barbara	11/25,12/4,12/17
VV:OA	2011	VAFB	Santa Barbara	1/20,2/3
GA:VG	2012 or 2013	Jalama Beach	Santa Barbara	11/25, 12/20, 12/21, 1/21
GG:VW	2013 or 2014	Jalama Beach	Santa Barbara	11/25, 12/20, 1/21
GG:WY	2012 or 2013	Jalama Beach	Santa Barbara	12/20, 12/21, 1/21
PG:AW	2012 or 2014	Jalama Beach	Santa Barbara	11/25, 12/20, 12/21, 1/21
RR:PB	2007 or 2010	Jalama Beach	Santa Barbara	1/21
GA:OY	2014	Malibu Lagoon	Los Angeles, CA	10/3, 12/28
GG:AR	2011	Malibu Lagoon	Los Angeles	12/28
VV:AW	2013 or 2014	Malibu Lagoon	Los Angeles	10/17
VG:AY	2011 or 2013	Bolsa Chica	Orange, CA	10/22, 12/31
GA:GB	2012, 2013, or 2014	San Quintin	Baja California, Mexico	11/1, 12/11, 1/22
GA:WB	2012 or 2013	San Quintin	Baja California, Mexico	12/11, 1/22
GG:AB	2007	San Quintin	Baja California, Mexico	12/11, 1/22

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

This is a partial list based on information received from Point Blue Conservation Science (pers. comm. F. Bidstrup, J. Miller), Morro Bay State Park (pers. comm. R. Orr), Chevron property in Guadalupe-Nipomo Dunes complex (pers. comm. K. Paradis), and from sightings by ODSVRA staff at nearby sites. Note: ODSVRA bands chicks to brood and some bands have been used multiple years and it is possible to have more than one bird with the same combination. (For a description of color band letter codes see Appendix B.)

SLO = San Luis Obispo, Chevron = Chevron property in Guadalupe-Nipomo Dunes complex, NWR = National Wildlife Refuge, SB = State Beach, VAFB = Vandenberg Air Force Base

J = juvenile, M = male, F = female.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
GG:OB	2013 or 2014	M	Eel River Wildlife Area	Humboldt, CA	7/15, 7/29	Eel River Wildlife Area breeding male.
VG:AB	2011 or 2013		Eel River Wildlife Area	Humboldt	5/19, 5/29	
GG:OB	2013 or 2014	M	MacKerricher SP	Mendocino, CA	5/2	
VG:BG	2011		Salinas River SB	Monterey, CA	8/15	
GG:AG	2013 or 2014	F	Arroyo Laguna Creek	SLO, CA	9/17, 9/24	
PV:BY	2015	J	Arroyo Laguna Creek	SLO	9/3	
PV:YW	2015	J	Arroyo Laguna Creek	SLO	8/25, 9/3	
VV:YR	2014 or 2015		Arroyo Laguna Creek	SLO	9/24	
GA:YG	2011 or 2013	F	San Simeon	SLO	3/5, 3/21	
GG:AG	2013 or 2014	F	San Simeon	SLO	3/25, 4/2, 4/15, 4/17, 4/22	
GG:AG	2013 or 2014		Villa Creek	SLO	3/4, 3/12	
PG:OB	2012 or 2014	F	Villa Creek	SLO	3/6, 3/26	
PG:YB	2015	J	Villa Creek	SLO	7/29	
PV:W-	2008	M	Villa Creek	SLO	3/10, 3/11, 3/18, 3/20, 3/23, 3/26, 3/30, 4/8, 4/9, 4/14, 4/18, 4/22, 4/24, 4/28, 4/30, 5/3, 5/5, 5/6, 5/7, 5/8, 5/12, 5/14, 5/15, 5/18, 5/19, 5/20, 5/22, 5/26, 5/27, 5/28, 6/1, 6/4, 6/5, 6/8, 6/9, 6/10	Villa creek breeding male. Banded in 2008 as PV:PW. On 21 August and 22 September, observed with missing pink band on left leg. Now banded V:-W-.
PV:WR	2015	J	Villa Creek	SLO	9/3	
VG:OB	2014	F	Villa Creek	SLO	3/16, 3/18, 3/20, 3/23, 3/30, 4/2, 4/6, 4/9, 4/13, 4/14, 4/15, 4/16, 4/22, 4/24, 4/27, 4/28, 4/29, 4/30, 5/1, 5/3, 5/4, 5/5, 5/6, 5/8, 5/12, 5/13, 5/14, 5/15	Villa Creek breeding female.
VG:VB	2015	J	Villa Creek	SLO	7/13	
VV:RG	2015	J	Villa Creek	SLO	7/28	
GA:GR	2015	J	Morro Strand SB	SLO	9/1	
GA:PG	2015	J	Morro Strand SB	SLO	9/3	
GG:AB	2015	J	Morro Strand SB	SLO	9/1	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
PV:AB	2014 or 2015		Morro Strand SB	SLO	9/3, 9/10, 9/24	
V-W-	2008	M	Morro Strand SB	SLO	8/21	Originally banded PV:PW.
VG:VB	2015	J	Morro Strand SB	SLO	7/11, 7/14	
VV:RW	2015	J	Morro Strand SB	SLO	9/1	
BB:GR	2015	J	Morro Bay Sandspit	SLO	8/6, 8/7, 8/28	
BB:RB	2015	J	Morro Bay Sandspit	SLO	8/7	
GA:AR	2015	J	Morro Bay Sandspit	SLO	8/7, 8/25, 8/28, 9/1, 9/10, 9/22, 9/24	Tape is peeling on red band.
GA:OY	2015	J	Morro Bay Sandspit	SLO	8/27, 8/28, 9/1, 9/10, 9/22, 9/24	
GA:VR	2009	F	Morro Bay Sandspit	SLO	3/3, 8/25, 8/27, 9/17, 9/22	
GA:VW	2015	J	Morro Bay Sandspit	SLO	7/27, 7/28	
GA:VY	2015	J	Morro Bay Sandspit	SLO	9/3	
GA:YR	2014	F	Morro Bay Sandspit	SLO	3/3, 8/25	
GG:BR	2013 or 2014	F	Morro Bay Sandspit	SLO	5/22	
GG:GW	2015	J	Morro Bay Sandspit	SLO	7/28, 8/4, 8/5, 8/7, 8/9	
GG:OG	2013 or 2014	M	Morro Bay Sandspit	SLO	3/11, 3/26, 3/31, 4/8, 4/9, 4/14, 4/22, 4/23, 4/27, 4/28, 4/30, 5/1, 5/4, 5/5, 5/6, 5/11, 5/12, 5/15, 5/18, 5/19, 5/20, 5/25, 5/26, 5/27, 6/3, 6/5, 6/6, 6/8, 6/9, 6/12, 6/15, 6/16, 6/18, 6/19, 7/1, 7/7, 7/9, 8/9, 8/27, 9/8, 9/10, 9/22, 9/24	Morro Bay Sandspit breeding male.
GG:PB	2012 or 2013	F	Morro Bay Sandspit	SLO	3/3, 3/11, 3/12, 3/16, 3/31, 4/9, 4/10, 4/13, 4/17, 4/20, 4/22, 4/23, 4/27, 4/29, 4/30, 5/5, 5/13, 5/15, 5/18, 5/19, 5/22, 5/25, 5/26, 5/27, 5/29, 6/3, 6/4, 6/9, 6/12, 7/16, 8/9, 8/21, 8/28, 9/3, 9/17	Morro Bay Sandspit breeding female.
GG:VG	2014	F	Morro Bay Sandspit	SLO	7/14	
GG:WB	2011 or 2013	F	Morro Bay Sandspit	SLO	3/3, 3/4, 3/10, 3/13, 3/16, 3/17, 3/18, 3/20, 8/25, 8/27, 8/28, 9/3	Morro Bay Sandspit breeding female.
GG:WG	2015	J	Morro Bay Sandspit	SLO	7/30, 8/8, 8/20, 8/25, 9/15, 9/17	
PG:BW	2012 or 2014	M	Morro Bay Sandspit	SLO	3/3, 3/4, 3/26, 4/14, 4/16, 4/29, 5/5, 5/7, 5/8, 5/12, 5/13, 5/15, 5/19, 5/21, 5/26, 5/27, 6/3, 6/9, 6/11, 6/18, 7/3, 7/9, 7/11, 7/16, 8/9, 8/18, 8/25, 9/3, 9/22, 9/24	Morro Bay Sandspit breeding male.
PG:GW	2015	J	Morro Bay Sandspit	SLO	7/15, 7/17	
PG:GY	2012 or 2014	F	Morro Bay Sandspit	SLO	3/13	
PG:OB	2012 or 2014	F	Morro Bay Sandspit	SLO	3/11, 3/17, 4/14, 4/21, 4/29, 5/18, 5/21, 5/26, 5/27, 5/28, 6/11, 6/12, 6/15, 6/19, 7/16, 8/9, 8/18, 8/25, 9/22, 9/24	Morro Bay Sandspit breeding female.
PG:OW	2015	J	Morro Bay Sandspit	SLO	9/22	
PG:PW	2014	M	Morro Bay Sandspit	SLO	3/3	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
PG:WG	2015	J	Morro Bay Sandspit	SLO	9/15, 9/22, 9/24	
PG:WW	2015	J	Morro Bay Sandspit	SLO	8/6, 8/20	
PG:YB	2015	J	Morro Bay Sandspit	SLO	7/30, 8/3, 8/5, 8/13, 8/19, 8/20	
PG:YG	2014	M	Morro Bay Sandspit	SLO	4/24	
PG:YY	2015	J	Morro Bay Sandspit	SLO	9/3, 9/10	
PV:AB	2014 or 2015		Morro Bay Sandspit	SLO	4/22, 8/20, 8/21, 8/27, 9/15, 9/17	
PV:AR	2014 or 2015		Morro Bay Sandspit	SLO	9/22, 9/24	
PV:BY	2015	J	Morro Bay Sandspit	SLO	9/8, 9/22	
PV:GG	2014 or 2015		Morro Bay Sandspit	SLO	3/3, 7/30	
PV:PB	2015	J	Morro Bay Sandspit	SLO	8/1, 8/3, 8/5, 8/12, 8/13, 8/28, 9/8, 9/22	
PV:RY	2015	J	Morro Bay Sandspit	SLO	8/19, 8/20, 9/8	
PV:VR	2015	J	Morro Bay Sandspit	SLO	8/27, 9/22	
PV:W-	2008	M	Morro Bay Sandspit	SLO	7/7, 7/11	Banded in 2008 as PV:PW. On 21 August and 22 September, observed with missing pink band on left leg. Now banded V:-W-.
PV:WR	2015	J	Morro Bay Sandspit	SLO	8/25, 9/15	
PV:WY	2014	M	Morro Bay Sandspit	SLO	4/6	
PV:YG	2015	J	Morro Bay Sandspit	SLO	9/3, 9/8, 9/10, 9/15	
PV:YW	2015	J	Morro Bay Sandspit	SLO	8/18, 8/19, 8/21	
RR:WW	2010	M	Morro Bay Sandspit	SLO	3/3, 3/4, 3/5, 3/6, 3/9, 3/10, 3/16, 3/20, 3/25, 3/31, 4/1, 4/9, 4/21, 5/7, 5/12, 5/14, 5/26, 5/27, 5/29, 6/2, 6/9, 6/11, 6/30, 7/9, 7/13, 7/14, 8/19, 8/20, 8/25	Morro Bay Sandspit breeding male.
V:-W-	2008		Morro Bay Sandspit	SLO	9/22	Originally banded PV:PW.
VG:BR	2013 or 2014	F	Morro Bay Sandspit	SLO	4/20, 4/23, 4/24, 5/1, 5/7, 5/12, 5/19, 5/26, 5/27, 6/9, 6/11, 6/17, 6/18, 7/9, 7/14, 8/9, 8/19, 8/27, 8/28	Morro Bay Sandspit breeding female.
VG:PY	2015	J	Morro Bay Sandspit	SLO	9/15, 9/17, 9/22, 9/24	
VV:GR	2012 or 2013	F	Morro Bay Sandspit	SLO	3/25, 3/31, 4/1, 5/12, 5/19, 5/22, 6/9, 7/1, 7/7	
VV:GY	2014	M	Morro Bay Sandspit	SLO	3/4, 3/31, 4/1, 4/23	Morro Bay Sandspit breeding male.
VV:RG	2015	J	Morro Bay Sandspit	SLO	7/30	
VV:WB	2013 or 2014	M	Morro Bay Sandspit	SLO	3/10, 3/17, 4/1, 4/3, 4/4, 4/14	Morro Bay Sandspit breeding male.
PG:GY	2012 or 2014		Diablo Power Plant	SLO	3/20	Carcass found.

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
GG:RG	2012 or 2014	F	Guadalupe-Nipomo Dunes NWR	SLO	5/20, 6/19	
PG:PG	2014	M	Guadalupe-Nipomo Dunes NWR	SLO	5/20, 7/17	NWR breeding male.
PV:PY	2014	F	Guadalupe-Nipomo Dunes NWR	SLO	5/20	
VV:BB	2011 or 2013	M	Guadalupe-Nipomo Dunes NWR	SLO	5/20	
BB:GY	2006	M	Chevron	SLO	3/18, 3/20, 3/25, 4/3, 4/6, 4/10, 4/13, 4/15, 4/17, 4/20, 4/22, 4/29, 5/8, 5/12, 5/13, 5/15, 5/18, 5/20, 6/15	Chevron breeding male.
BB:LY	2010	F	Chevron	SLO	6/8, 6/19	
BB:OW	2015	J	Chevron	SLO	7/8	
BB:OY	2015	J	Chevron	SLO	7/24, 7/27	
BB:PG	2013 or 2014		Chevron	SLO	7/20	
BB:RW	2015	J	Chevron	SLO	8/19	
BB:WG	2010 or 2013	F	Chevron	SLO	3/23, 3/25, 3/27, 3/30, 4/6, 4/10, 4/13, 4/15, 4/17, 4/20, 4/27	Chevron breeding female.
BB:YG	2011	F	Chevron	SLO	4/8, 7/22	
GA:PW	2015	J	Chevron	SLO	8/25, 9/8	
GG:AB	2015	J	Chevron	SLO	7/17	
GG:AY	2012 or 2013	M	Chevron	SLO	4/24	
GG:GR	2011 or 2013	M	Chevron	SLO	5/18, 5/20, 5/22, 5/26	
GG:GW	2014	M	Chevron	SLO	7/15	
GG:LY	2012	F	Chevron	SLO	3/13, 3/16, 3/18, 3/20, 3/23, 3/30, 4/1, 4/6, 4/8, 4/15, 4/17, 4/20, 4/22, 5/20, 5/29, 6/26, 7/2, 7/8, 9/10	Chevron breeding female.
GG:WB	2011 or 2013	M	Chevron	SLO	4/20	
GG:WG	2014	F	Chevron	SLO	4/22	
GG:WR	2014	M	Chevron	SLO	4/20, 4/22	
PG:AB	2012 or 2014	M	Chevron	SLO	3/20, 4/15, 4/17, 5/29, 6/1	
PG:AG	2012 or 2014	F	Chevron	SLO	3/11, 3/13, 3/16, 3/18, 3/20, 3/23, 4/1, 4/3, 4/10, 4/15, 4/24, 4/27, 5/12, 5/13, 5/18, 5/20, 6/3, 6/12, 6/15, 7/2, 7/8, 7/15, 7/29	Chevron breeding female.
PG:GR	2011 or 2014	F	Chevron	SLO	3/18	
PG:PY	2014	M	Chevron	SLO	5/12, 5/13, 5/18, 5/20, 5/27, 5/29, 6/3, 6/8, 6/12, 6/17, 6/19, 6/24, 7/2, 7/3, 7/8, 7/10, 7/15, 7/17	
PG:RY	2014	M	Chevron	SLO	4/22, 4/29, 5/5, 5/6, 6/26, 7/3, 7/29, 7/31	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
PG:WG	2014		Chevron	SLO	8/27, 9/1, 9/8	
PV:AB	2014 or 2015	F	Chevron	SLO	7/29	
PV:BY	2015	J	Chevron	SLO	8/27	
PV:GW	2015	J	Chevron	SLO	8/12	
PV:WY	2015	J	Chevron	SLO	9/8	
RR:BY	2010	M	Chevron	SLO	4/29	
RR:WG	2012	M	Chevron	SLO	3/13, 3/16, 3/20, 3/23, 3/25, 3/30, 4/3, 4/6, 4/10, 4/15, 4/17, 4/22, 4/27, 6/1, 6/3, 6/5, 6/12, 6/26, 7/6, 7/10, 7/17, 7/20, 7/22, 7/24	
VG:AW	2011 or 2013	F	Chevron	SLO	6/26	
VG:OY	2015	J	Chevron	SLO	9/8, 9/10	
VG:VW	2011 or 2013	M	Chevron	SLO	4/8, 4/10, 4/20, 4/27, 5/15, 5/20, 5/22, 6/3, 6/12, 6/19, 6/24, 6/26, 7/3, 7/6	Chevron breeding male.
VG:VY	2015	J	Chevron	SLO	7/29	
VG:WR	2012 or 2015		Chevron	SLO	9/10	
VV:AW	2013 or 2014		Chevron	SLO	7/3	
VV:BW	2015	J	Chevron	SLO	7/22, 7/24	
VV:GW	2009	F	Chevron	SLO	7/6	
VV:GY	2014		Chevron	SLO	9/8	
VV:OY	2015	J	Chevron	SLO	9/2, 9/8, 9/10	
VV:WG	2012	F	Chevron	SLO	3/30, 4/1, 4/6, 4/8, 4/10, 4/13, 4/15, 4/17, 4/22, 5/18, 6/3, 6/19, 7/10, 7/24, 9/10	Chevron breeding female.
VV:WR	2015	J	Chevron	SLO	7/29	
BB:RB	2015	J	VAFB	Santa Barbara	8/18	
BB:RW	2015	J	VAFB	Santa Barbara	8/12	
GA:AB	2013	F	VAFB	Santa Barbara	3/10, 5/5	VAFB breeding female.
GA:GR	2015	J	VAFB	Santa Barbara	8/18, 8/20	
GA:WB	2012 or 2013	F	VAFB	Santa Barbara	3/10, 7/22, 8/7	VAFB breeding female.
GG:AG	2013 or 2014	F	VAFB	Santa Barbara	6/19, 8/27, 9/3	
GG:AY	2012 or 2013		VAFB	Santa Barbara	3/10, 3/16, 3/30, 8/20, 9/2, 9/9, 9/14	
GG:WB	2011 or 2013	M	VAFB	Santa Barbara	6/12, 8/5, 8/7, 8/12, 8/24	VAFB breeding male.
PG:BB	2011, 2013, or 2014		VAFB	Santa Barbara	7/21	
PG:GR	2011 or 2014		VAFB	Santa Barbara	8/26, 9/2, 9/14	
PG:OB	2012 or 2014	M	VAFB	Santa Barbara	3/10	
PG:PG	2015	J	VAFB	Santa Barbara	8/20	

Appendix D. Banded least terns and snowy plovers (continued).

Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2015.

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen	Notes
PG:RW	2012		VAFB	Santa Barbara	7/1	
PG:VB	2015	J	VAFB	Santa Barbara	8/20	
PG:YW	2012 or 2014	F	VAFB	Santa Barbara	3/11, 3/19, 3/26, 6/30, 9/14	
PV:AG	2015	J	VAFB	Santa Barbara	8/13	
PV:AR	2014 or 2015		VAFB	Santa Barbara	8/18	
PV:BB	2014		VAFB	Santa Barbara	3/30	
RR:LY	2010	M	VAFB	Santa Barbara	3/9, 3/13, 3/18, 3/20, 3/23, 3/27, 3/30, 6/12, 8/5, 8/10, 8/12, 8/18, 8/24, 9/1, 9/9, 9/23	
RR:WY	2010		VAFB	Santa Barbara	3/9	
VG:WR	2015	J	VAFB	Santa Barbara	8/20, 8/24	
VG:YB	2015	J	VAFB	Santa Barbara	8/4, 8/20	
VV:AW	2013 or 2014	F	VAFB	Santa Barbara	3/13, 3/18, 3/20, 3/23, 3/27, 3/30, 5/18, 6/12, 8/5, 8/7, 8/12, 8/18, 8/27, 9/1, 9/9, 9/23	
VV:OA	2011	F	VAFB	Santa Barbara	3/11, 3/19, 3/26, 3/30	
VW:BB	2015	J	VAFB	Santa Barbara	8/20, 8/26, 9/14	
GA:VG	2012 or 2013		Jalama Beach	Santa Barbara	8/19	
PG:AW	2012 or 2014		Jalama Beach	Santa Barbara	8/19	
GA:OY	2014	F	Coal Oil Point	Santa Barbara	5/22	Coal Oil Point breeding female.
GA:YR	2014	F	Coal Oil Point	Santa Barbara	5/22	
GG:GG	2011 or 2013	M	Coal Oil Point	Santa Barbara	5/22	Coal Oil Point breeding male.
GA:GR	2015	J	Point Mugu	Ventura	8/25	
PV:VW	2015	J	Malibu Lagoon SB	Los Angeles	8/29	
GA:AB	2013 or 2015		Hermosa Beach	Los Angeles	7/29	
PG:RW	2012		Hermosa Beach	Los Angeles	7/11	
PV:RW	2014 or 2015		Hermosa Beach	Los Angeles	8/28	
VV:BW	2014 or 2015		Huntington Beach	Orange	7/29	
GA:OY	2014		Bolsa Chica	Orange County	6/20	
GG:AB	2015	J	Carlsbad SB	San Diego	7/24	
VG:GY	2013 or 2014	M	Cardiff SB	San Diego	5/4	
BB:YR	2015	J	Camp Pendleton	San Diego	7/18	
PG:BR	2012 or 2014		Camp Pendleton	San Diego	7/4	
RR:YY	2010		Silver Strand SB	San Diego	3/15	
BB:BG	2015	J	Tijuana River Mouth	San Diego	8/13, 8/16	
GA:AB	2013 or 2015		Tijuana River Mouth	San Diego	7/30, 8/13	

Appendix E. Addendums to snowy plover nesting success.

Table E.1. Nesting success of snowy plovers in identifiable areas at ODSVRA, 2001-15.

Nests from unknown locations (identified only by presence of broods) are not included in table. Percent nests hatching is calculated using number of hatching nests from known location divided by number of known location and fate nests. Those chicks whose specific area where hatching could not be identified are not included in table. Beginning in 2006, an additional 0.4 mile of shoreline at the southern end of the park has been monitored by ODSVRA (a survey conducted by the Guadalupe-Nipomo Dunes NWR in 2005 determined this area was part of the ODSVRA and not the refuge, as was previously thought). Between 1998-2003, increases occurred in the size of the seasonal Southern Enclosure; size has remained consistent since 2004. Information on areas in table is provided in the report Site Description section on page 3.

Excl. = Enclosure, BY = Boneyard

Year	Area	No. known location nests	No. nests with known location and known fate	No. nests with known location hatching	% nests hatching	No. chicks from known location	No. chicks from known location and with known fate	No. chicks from known location and with known fate fledged	% chicks known fledged
2001	Open Riding Area	1	1	0	0	0	0	0	0
	Arroyo Grande Excl. ¹	3	3	3	100	9	9	0	0
	Southern Enclosure	25	24	21	88	56	56	2	4
	Oso Flaco	4	2	2	100	6	6	1	17
	Total	33	30	26	87	71	71	3	4
2002	Southern Enclosure	33	33	25	76	62	62	35	56
	Oso Flaco	2	2	0	0	0	0	0	0
	Total	35	35	25	71	62	62	35	56
2003	Dune Preserve	1	1	1	100	3	3	0	0
	Open Riding Area	1	1	1	100	3	3	3	100
	Pipeline Revegetation	3	3	2	67	4	4	2	50
	East of BY Enclosure ²	2	2	1	50	3	3	2	67
	Southern Enclosure	74	73	52	71	136	135	92	68
	Oso Flaco	13	13	5	38	11	11	7	64
Total	94	93	62	67	160	159	106	67	
2004	Open Riding Area	1	1	0	0	0	0	0	0
	Pipeline Revegetation	1	1	1	100	3	3	0	0
	Southern Enclosure	113	111	87	78	208	205	59	29
	Oso Flaco	27	27	17	63	40	39	7	18
	Total	142	140	105	75	251	247	66	27
2005	East of BY Enclosure ²	2	2	2	100	6	6	2	33
	Southern Enclosure	79	79	60	76	142	142	57	40
	Oso Flaco	22	22	18	82	49	49	23	47
	Total	103	103	80	78	197	197	82	42
2006	Open Riding Area	1	1	0	0	0	0	0	0
	Southern Enclosure	87	84	65	77	173	173	8	5
	Oso Flaco	29	29	22	76	57	57	9	16
	Total	117	114	87	76	230	230	17	7
2007	Southern Enclosure	76	76	61	80	159	157	58	37
	Oso Flaco	15	15	9	60	20	20	4	20
	Total	91	91	70	77	179	177	62	35
2008	Southern Enclosure	100	100	73	73	172	172	64	37
	Oso Flaco	19	19	8	42	19	19	5	26
	Total	119	119	81	68	191	191	69	36

Appendix E. Addendums to snowy plover nesting success (continued).

Table E.1. Nesting success of snowy plovers in identifiable areas at ODSVRA, 2001-15 (continued).

Year	Area	No. known location nests	No. nests with known location and known fate	No. nests with known location hatching	% nests hatching	No. chicks from known location	No. chicks from known location and with known fate	No. chicks from known location and with known fate fledged	% chicks known fledged
2009	Pismo Lagoon	1	1	0	0	0	0	0	0
	Southern Exclosure	125	124	86	69	221	221	79	36
	Oso Flaco	23	22	8	36	22	22	2	9
	Total	149	147	94	64	243	243	81	33
2010	Carpenter Creek	1	1	0	0	0	0	0	0
	Arroyo Grande Creek	3	3	0	0	0	0	0	0
	Open Riding Area	1	1	1	100	2	2	2	100
	Southern Exclosure	126	123	95	77	234	234	86	37
	Oso Flaco	22	22	13	59	33	33	15	45
	Total	153	150	109	73	269	269	103	38
2011	Open Riding Area	2	2	2	100	5	5	1	20
	Southern Exclosure	140	135	113	84	300	300	129	43
	Oso Flaco	23	23	16	70	40	40	18	45
	Total	165	160	131	82	345	345	148	43
2012	Open Riding Area	3	3	0	0	0	0	0	0
	Southern Exclosure	194	186	143	77	353	353	85	24
	Oso Flaco	14	14	9	64	21	21	4	19
	Total	211	203	152	75	374	374	89	24
2013	Southern Exclosure	147	144	115	80	288	288	147	51
	Oso Flaco	23	23	15	65	39	39	25	64
	Total	170	167	130	78	327	327	172	53
2014	Open Riding Area	1	1	0	0	0	0	0	0
	Southern Exclosure	201	194	173	89	428	428	142	33
	Oso Flaco	44	44	33	75	86	86	35	41
	Total	246	239	206	86	514	514	177	34
2015	Arroyo Grande Creek ³	1	-	1	-	2	2	0	0
	Southern Exclosure	182	175	153	87	401	401	215	54
	Oso Flaco	20	20	14	70	39	39	24	62
	Total	203	195	168	86	442	442	239	54

¹Arroyo Grande Excl.: A seasonal exclosure (with two-inch by four-inch wire mesh fencing and closed from the riding area) in use in 2001 and 2002, but not subsequently. This area had three nests in 2001, none in 2002.

²East of BY Exclosure: Area closed to vehicles year-around and open to pedestrians. There were two nests in 2003 and two nests in 2005. All nests had a single nest exclosure (10-foot by 10-foot exclosure).

³Brood with approximately one-day-old chicks found in Arroyo Grande Creek area, likely from an unknown nest nearby.

Appendix E. Addendums to snowy plover nesting success (continued).

Table E.2. Nest protection used at ODSVRA in 2015.

Nests with unknown location and unknown fate nests are excluded. The large seasonal enclosure is the portion of 6, 7, 8, Boneyard enclosures, and North Oso Flaco that is protected with predator fencing (does not include the shoreline). Any use of single nest circular enclosures (used in conjunction with symbolic rope fencing) occurred on the shoreline of the 6, 7, 8 enclosures, North Oso Flaco, and South Oso Flaco. Percent in parentheses is percent nests hatched.

un=unknown predator; av=avian; rav=common raven; pre=abandoned pre-term; pos=abandoned post-term; ukp=abandoned unknown pre- or post-term; win=abandoned, suspected wind; unk=failed, cause unknown.

Area	Large seasonal enclosure		Symbolic fencing	
	No additional fencing	Bumpout	No additional fencing	Circular
6 enclosure	59	4	11	0
Nests hatched	53 (90%)	4 (100%)	9 (82%)	
Nests depredated				
Nests failed other causes	6 (5 pre, 1 ukp)		2 (1 pos, 1 ukp)	
7 enclosure	32	1	20	0
Nests hatched	29 (91%)	1 (100%)	18 (90%)	
Nests depredated				
Nests failed other causes	3 (2 pre, 1 win)		2 (1 pre, 1 ukp)	
8 enclosure	33	1	5	0
Nests hatched	29 (88%)		4 (80%)	
Nests depredated	1 (1 rav)			
Nests failed other causes	3 (2 pre, 1 ukp)	1 (1 pre)	1 (1 unk)	
Boneyard	9	0		
Nests hatched	6 (67%)			
Nests depredated	2 (2 av)			
Nests failed other causes	1 (1 unk)			
SOUTHERN ENCLOSURE TOTALS	133	6	36	0
Nests hatched	117 (88%)	5 (83%)	31 (86%)	
Nests depredated	3 (2 av, 1 rav)			
Nests failed other causes	13 (9 pre, 2 ukp, 1 win, 1 unk)	1 (1 pre)	5 (1 pre, 1 pos, 2 ukp, 1 unk)	
North Oso Flaco	0	0	4	3
Nests hatched			2 (50%)	3 (100%)
Nests depredated			2 (1 un, 1 rav)	
Nests failed other causes				
South Oso Flaco			8	5
Nests hatched			4 (50%)	5 (100%)
Nests depredated			2 (2 rav)	
Nests failed other causes			2 (1 pre, 1 unk)	
OSO FLACO TOTALS	0	0	12	8
Nests hatched			6 (50%)	8 (100%)
Nests depredated			4 (1 un, 3 rav)	
Nests failed other causes			2 (1 pre, 1 unk)	
GRAND TOTAL	133	6	48	8
Nests hatched	117 (88%)	5 (84%)	37 (77%)	8 (100%)
Nests depredated	3 (2 av, 1 rav)		4 (1 un, 3 rav)	
Nests failed other causes	13 (9 pre, 2 ukp, 1 win, 1 unk)	1 (1 pre)	7 (2 pre, 1 pos, 2 ukp, 2 unk)	

Appendix E. Addendums to snowy plover nesting success (continued).

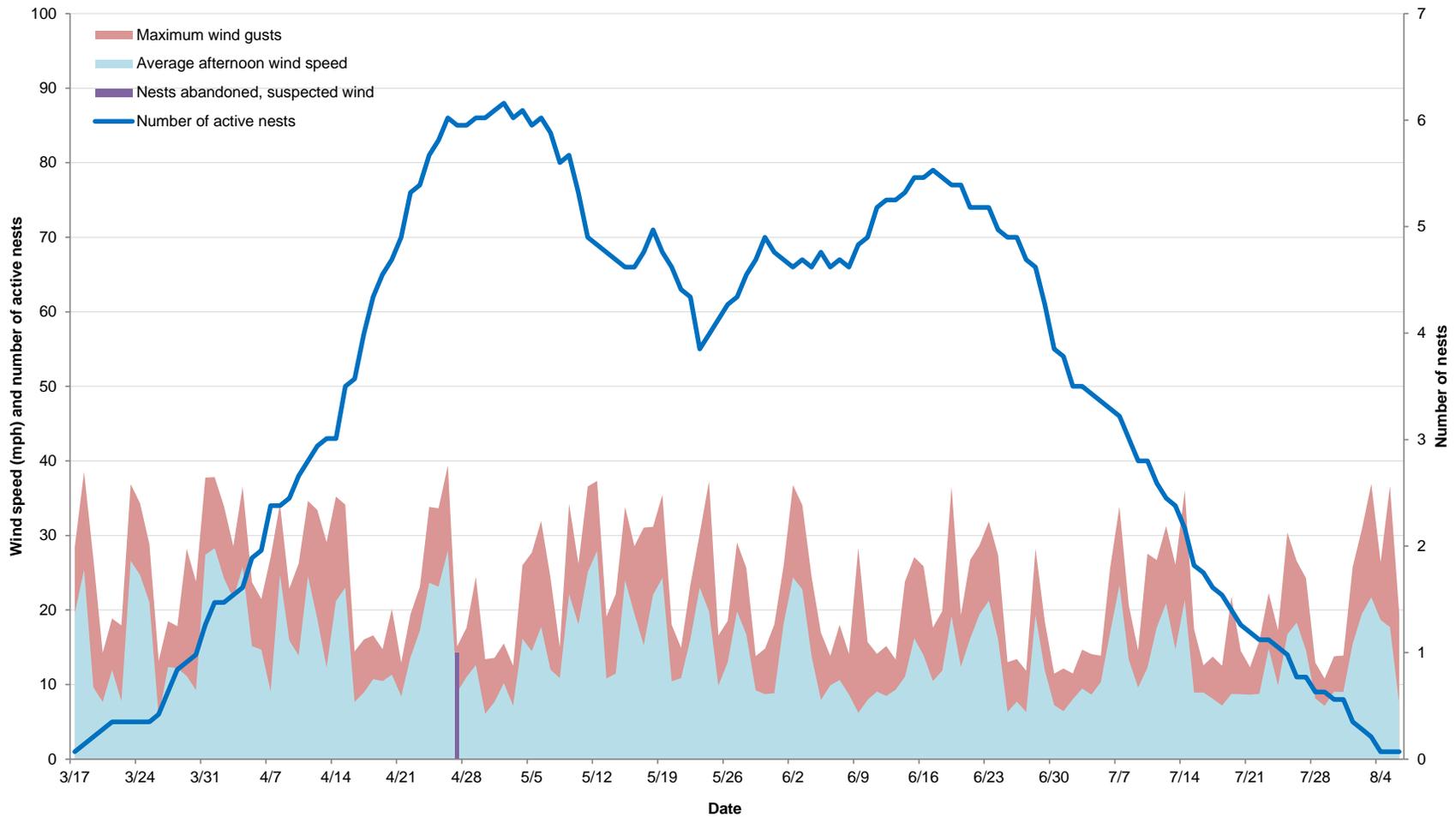


Figure E.1. Daily wind speed data (daily afternoon average and daily maximum wind gust) and snowy plover nest loss attributed to wind at ODSVRA from 17 March to 6 August 2015.

The left y-axis corresponds to wind speed in miles per hour (mph) and total number of active nests. The right y-axis corresponds to number of nests lost with fate abandoned, suspected wind. Wind speed was collected at the S1wind tower, located approximately 375 feet east of 6 enclosure since 2011, from an anemometer at 10 meters height. The daily afternoon average wind speed is calculated from the average of the hours 1:00 pm – 5:00 pm. The maximum wind gust represents the maximum wind speed for the entire day.

Appendix F. Predator summary tables and figures.

Table F.1. Summary of predators detected in the Southern Enclosure and Oso Flaco at ODSVRA in 2015.

Observations from 1 March - 10 September (a 194-day period). Contracted predator management specialists were essentially done and observer presence in field by park staff was reduced after the first week of September (no remaining chicks). Min no. individ. = minimum number of different individuals identified during season. This number was not determined for mammals or owls as these species are primarily nocturnal with occurrences detected by tracks.

Species	First date observed	Last date observed	No. days detected	Min no. individ.	Notes
Mammalian					
Bobcat	11 Mar	9 Aug	9	-	Tracks encountered in South Oso Flaco on four days. Noted inside the predator fencing of the Southern Enclosure on four days and outside the predator fencing in Boneyard enclosure on one day.
Coyote	12 Mar	10 Sep	99	-	Common on the Southern Enclosure shoreline and North and South Oso Flaco shoreline. Noted inside the predator fencing of the Southern Enclosure on 41 days. Five coyotes were lethally removed this season.
Domestic dog	9 Mar	29 Aug	26	-	Documented by tracks and live sightings. Twenty-six occurrences on 6 shoreline and one on 8 shoreline. Most of these were short trespasses onto 6 enclosure shoreline.
Opossum	10 Mar	18 Aug	4	-	Activity noted in North Oso Flaco, 6 and 8 enclosures.
Raccoon	2 Mar	10 Sep	56	-	Highest occurrences within the predator fencing of 6 enclosure. Less frequently noted in 7 and 8 enclosures and on shoreline, and North and South Oso Flaco. On 13 June one tern nest, LT43, was taken by raccoon.
Skunk	10 May	8 Sep	17	-	Activity primarily noted in 8 enclosure. Tracks also seen in North and South Oso Flaco and on two days in 6 enclosure.
Avian					
Osprey	Common throughout the season				Although not documented as a predator of plovers or least terns, ospreys are included in this table due to the disturbance they can cause when perched for long periods of time in sensitive areas. Primarily observed flying over 6, 7 and 8 enclosures and occasionally perched and eating fish. Two osprey present at the same time was not uncommon.
Northern harrier	6 Mar	9 Sep	26	3	Almost all observations in flight and/or hunting. Minimum of 3 individuals (based on age and sex characteristics) observed during season: one adult male, one sub-adult female and one juvenile female. On 23 April, one sub-adult female was trapped and relocated.
Red-tailed hawk	3 Mar	31 Aug	65	4	Observed primarily perch-hunting in north end of North Oso Flaco, 7.5 revegetation area, and South Oso Flaco. Minimum of four individuals (based on age characteristics) observed during this season: two adults, one juvenile and one immature.
American kestrel	2 Mar	9 Sep	18	3	Observed perch-hunting primarily in North and South Oso Flaco. Perched on 6 and 7 enclosure fences on eight days.
Merlin	12 Mar	8 Apr	16	2	Observed hunting throughout Southern Enclosure and over shoreline, as well as North and South Oso Flaco. On 12 March, an adult male merlin was observed with snowy plover prey in 7 enclosure (see Appendix G).

Appendix F. Predator summary tables and figures (continued).

Table F.1. Summary of predators detected in the Southern Enclosure and Oso Flaco at ODSVRA in 2015 (continued).

Species	First date observed	Last date observed	No. days detected	Min no. individ.	Notes
Peregrine falcon	2 Mar	9 Sep	64	6	Observed throughout the Southern Enclosure, North Oso Flaco and South Oso Flaco in flight and perching, sometimes over an extended time period. Observed multiple times pursuing and/or consuming prey on the shoreline and inside the enclosure. Peregrines were documented taking three plover adults in 2015 (see Table G.1 in Appendix G). Minimum of 6 individuals (based on age and sex characteristics) observed during season: one adult male, one unbanded adult female, one VID banded adult female "17D," one unbanded sub-adult male, and two juveniles. On 8 May, one unbanded sub-adult male was trapped, banded with VID band "50AB", and relocated. This bird returned to ODSVRA by 14 August.
Large owl spp.	21 Apr	10 Sep	5	-	Primarily identified by tracks, believed to be from great horned owl. Noted inside 7 enclosure on two days.
Gull spp.	Present daily throughout season				The maximum number for a monthly count of gulls in the entire park was 3,225 on 2 July. This includes birds in flight, foraging on shoreline, and roosting. On 5 June, a first winter western gull repeatedly picked up and dropped a small plover chick before flying with it to the waterline where it wet the chick. It is suspected that the chick was then eaten by the gull. An agitated adult plover was present.
American crow	8 Jun	5 Jul	2	1	Observed flying over 8 and Boneyard enclosures, and North Oso Flaco on two days.
Common raven	2 Mar	4 Jul	7	2	Observed in flight over South Oso Flaco and over 6, 7 and 8 enclosures. Two ravens observed taking one plover nest on 22 May. Four nests total documented depredated by raven. One raven was removed lethally off-site on 1 June.
White-tailed kite	15 Mar	28 May	2	1	Observed on two days in flight or kiting in South Oso Flaco.

Appendix F. Predator summary tables and figures (continued).

Table F.2. Mammalian and avian predators removed under predator management actions for least terns and snowy plovers at ODSVRA in 2015.

Five coyotes and one raven were lethally removed. All other animals were live-trapped and relocated. When the live-trapped date differs from the relocation date, the relocation date is given in parentheses. All animals trapped or removed were within ODSVRA boundaries with the exception of one raven.

Date	Species	Age/Sex	Location
Lethally removed			
21 Apr	Coyote	Female	Oso Flaco Creek
15 May	Coyote	Male	East side of Boy Scout Revegetation Area (Open Riding Area)
26 May	Coyote	Female	Oso Flaco Creek
1 Jun	Coyote	Female	Maidenform Revegetation Area (Open Riding Area)
1 Jun	Common Raven		Rancho-Guadalupe Dunes County Park (off-site, south end of dunes complex)
2 Jun	Coyote	Female	Boy Scout Revegetation Area (Open Riding Area)
Live-trapped and relocated			
23 Apr	Northern harrier	Sub-adult/female	South end of North Oso Flaco foredunes
4 May (8 May)	Peregrine falcon	Sub-adult/male	South Oso Flaco

Appendix F. Predator summary tables and figures (continued).

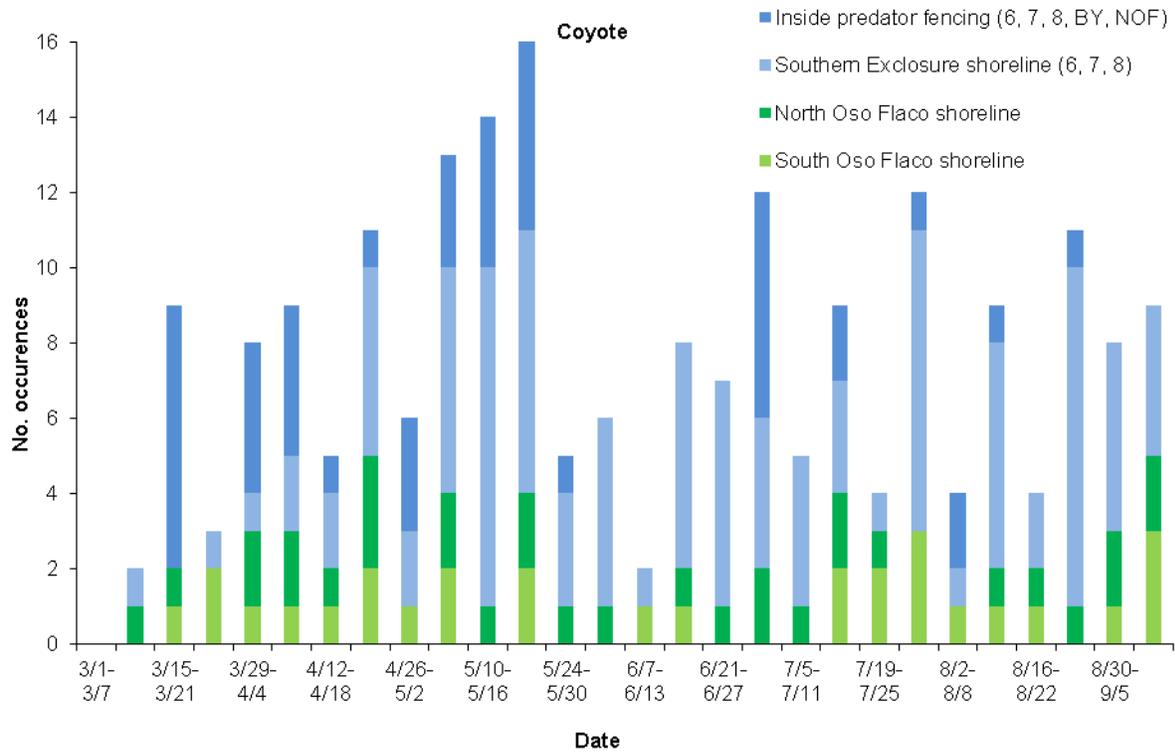


Figure F.1. Coyote occurrences documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2015.

Observations from 1 March - 10 September (a 194-day period). Coyote presence is documented for the Southern Exclosure shoreline (6, 7, and 8 exclosures), North Oso Flaco shoreline, South Oso Flaco shoreline, and inside the predator fencing of the Southern Exclosure (6, 7, 8, Boneyard, and North Oso Flaco) as separate occurrences. For the Southern Exclosure (6, 7, 8, and Boneyard exclosures) and North Oso Flaco, a distinction is made between the shoreline and inside the predator fencing of the exclosures because coyotes are typically excluded from the area protected by predator fencing.

Appendix F. Predator summary tables and figures (continued).

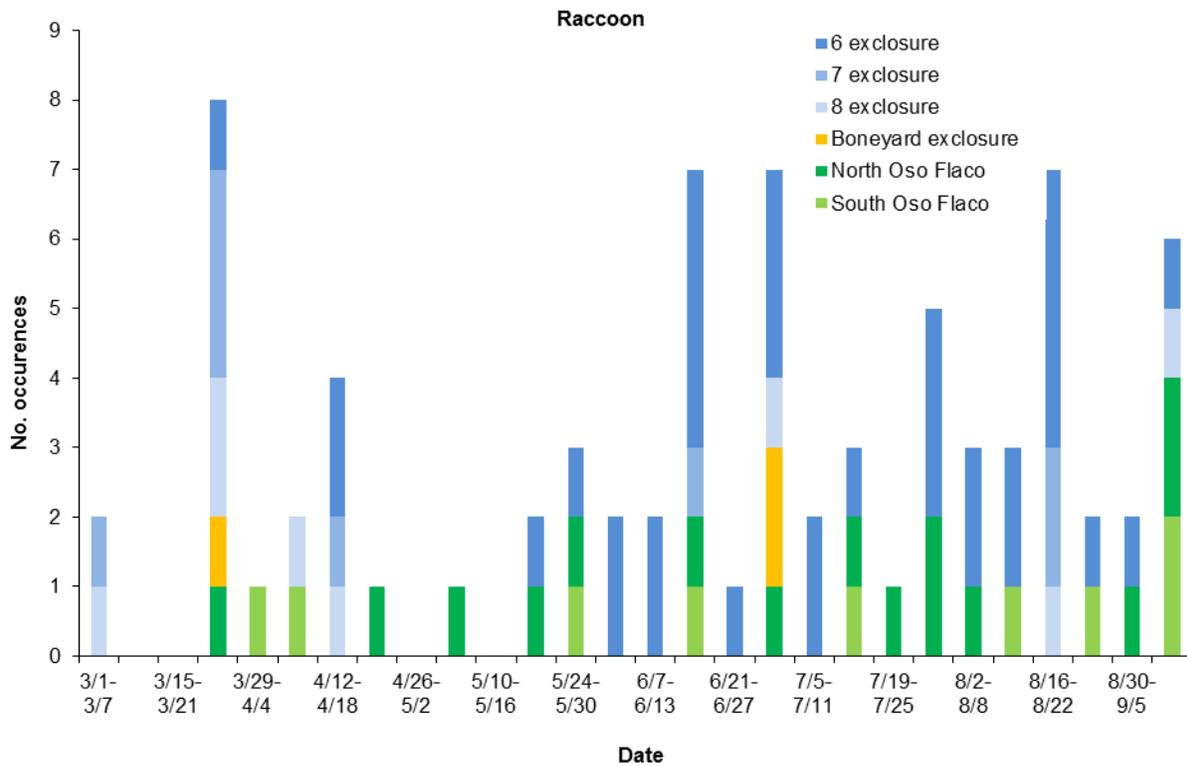


Figure F.2. Raccoon occurrences documented in the Southern Enclosure and Oso Flaco at ODSVRA in 2015.

Observations from 1 March - 10 September (a 194-day period). Raccoon presence is documented for each of the areas of the Southern Enclosure (6, 7, 8, and Boneyard enclosures), North Oso Flaco, and South Oso Flaco as separate occurrences. No distinction is made between the shoreline and inside the predator fencing of the enclosure since raccoons are able to climb over the predator fencing.

Appendix F. Predator summary tables and figures (continued).

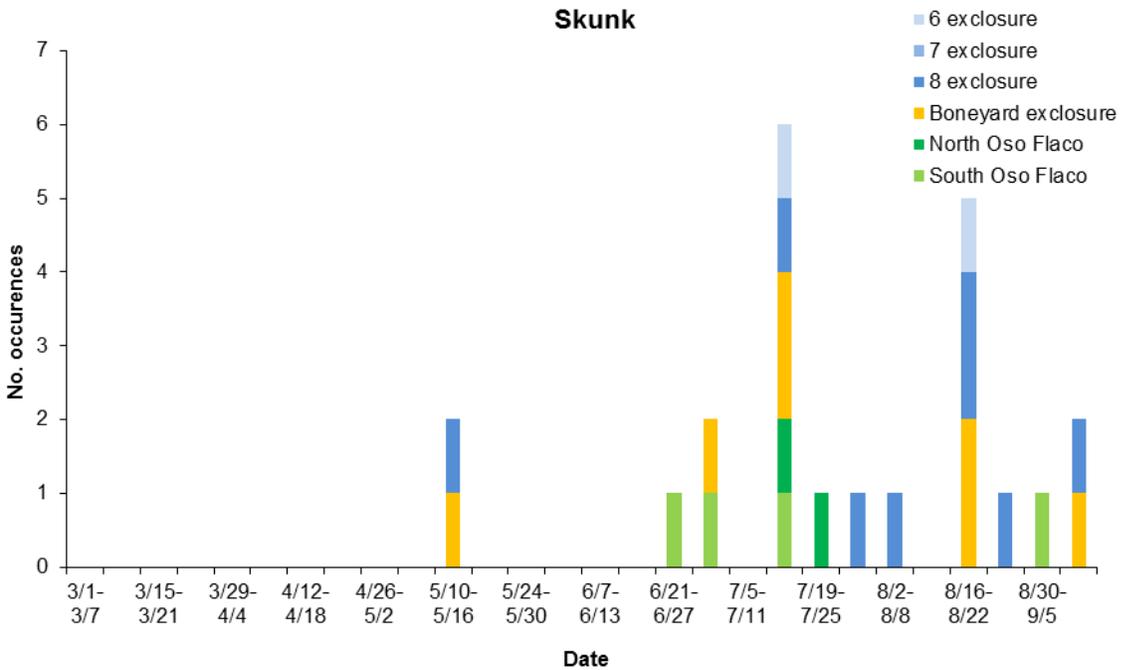


Figure F.3. Skunk occurrences documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2015.

Observations from 1 March - 10 September (a 194-day period). Skunk presence is documented for each of the areas of the Southern Exclosure (6, 7, 8, and Boneyard exclosures), North Oso Flaco, and South Oso Flaco as separate occurrences. No distinction is made between the shoreline and inside the predator fencing of the exclosure since skunks are able to pass through predator fencing.

Appendix F. Predator summary tables and figures (continued).

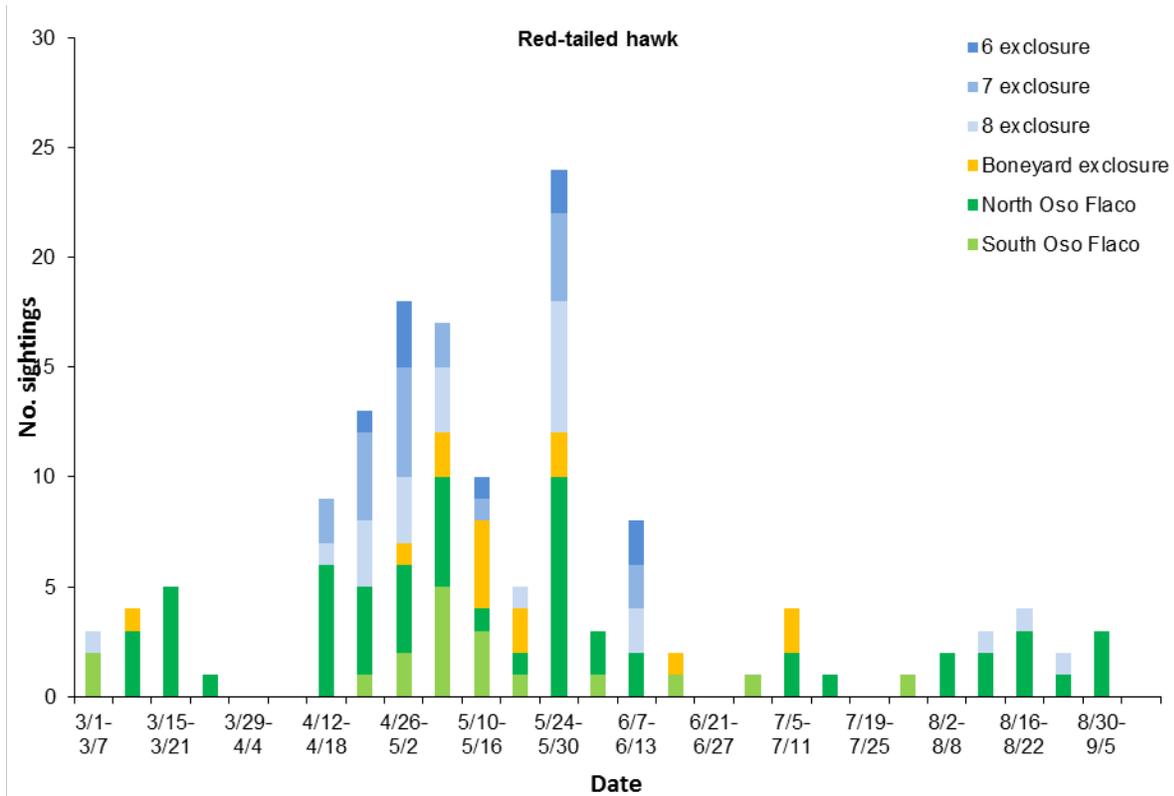
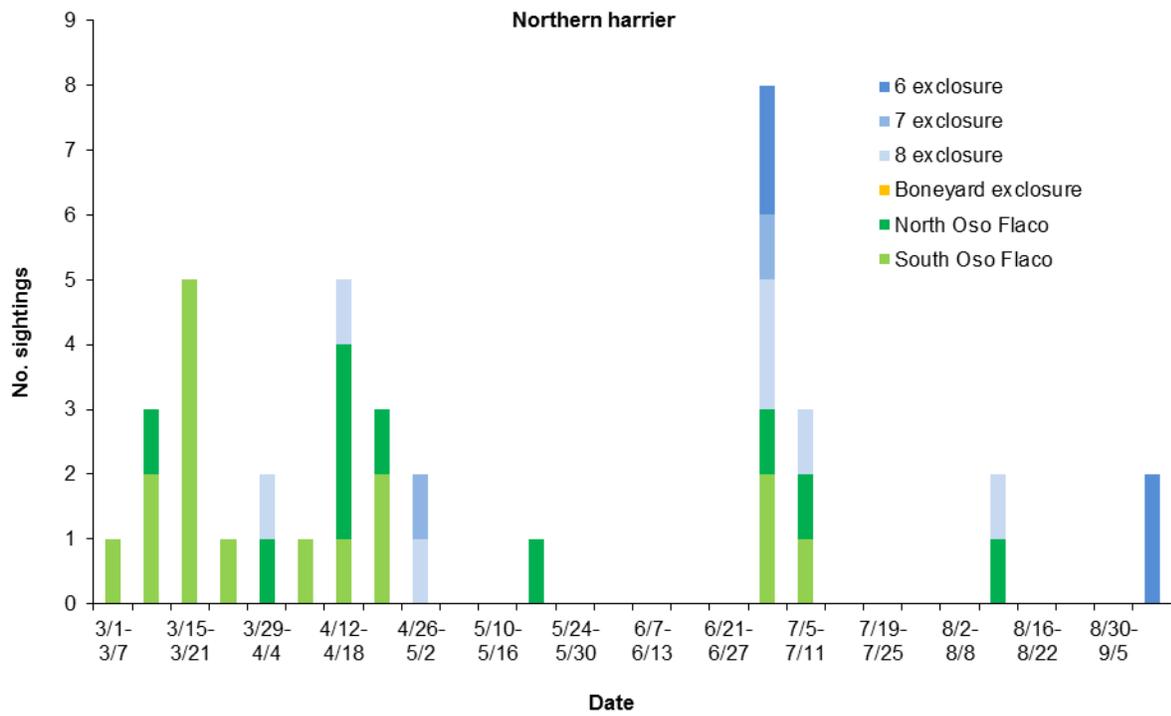


Figure F.4. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2015.

Observations from 1 March - 10 September (a 194-day period).

Appendix F. Predator summary tables and figures (continued).

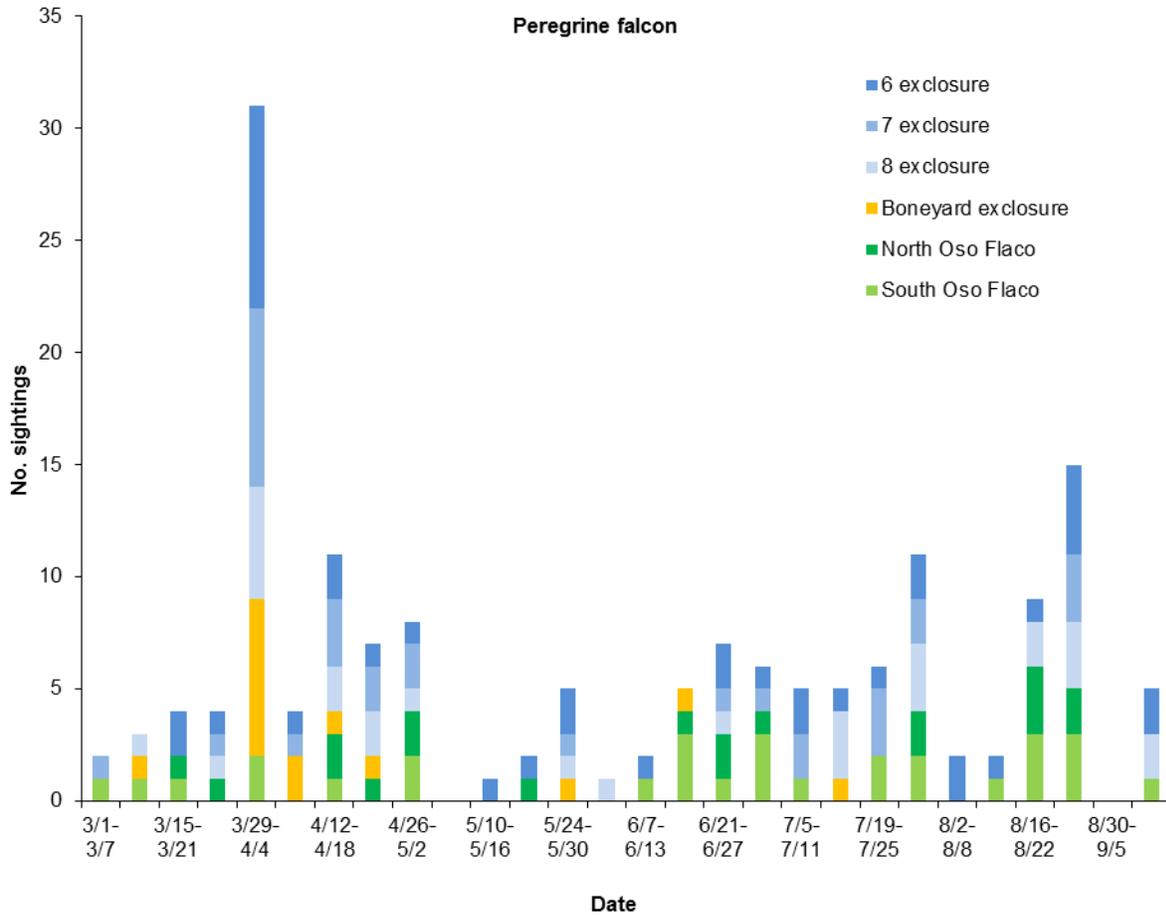


Figure F.4. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2015 (continued).

Observations from 1 March - 10 September (a 194-day period).

Appendix F. Predator summary tables and figures (continued).

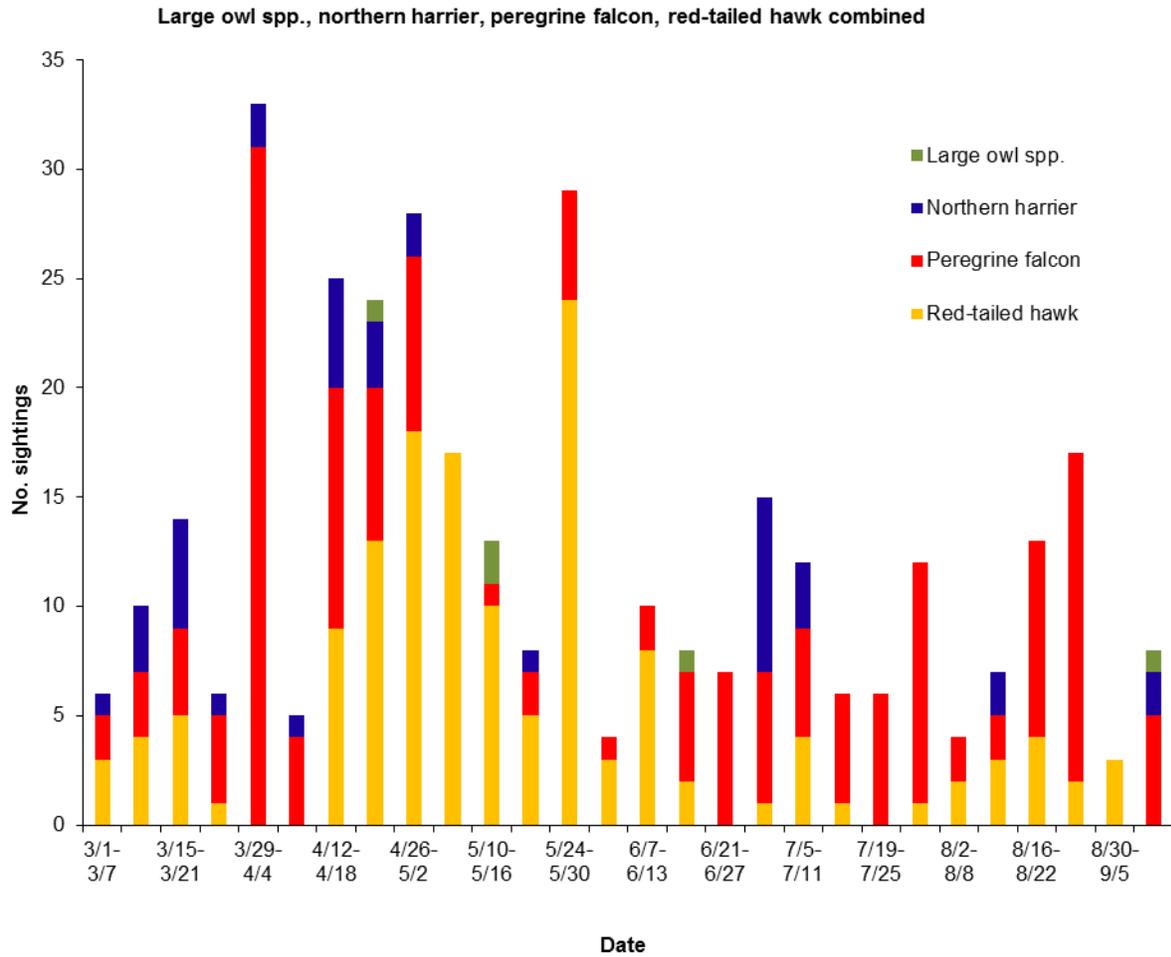


Figure F.4. Avian predator sightings documented in the Southern Enclosure and Oso Flaco at ODSVRA in 2015 (continued).

Observations from 1 March - 10 September (a 194-day period).

Appendix G. Documented mortality of California least tern and snowy plover chicks, juveniles, and adults at ODSVRA.

There was no documented predation of least tern chicks, juveniles, or adults in 2015.

Table G.1. Documented predation of snowy plovers from 1 March to 30 September 2015.

No. (age)	Predator	Location	Notes
1 (adult)	Merlin	7 exclosure	On 12 March, an adult male merlin was observed eating an adult plover banded GG:WW on 7 exclosure shoreline. A plover with this combination was previously seen on 1 March with a flock of 124 plovers roosting between marker post 2 and marker post 3 in the open riding area. A chick banded at ODSVRA with this combination was known to have fledged in each of the years 2002, 2008, 2012, and 2013.
1 (adult)	Peregrine falcon	8 exclosure	On 28 April, an unbanded sub-adult male peregrine falcon was observed eating an adult plover in 8 exclosure. This peregrine was trapped on 4 May, banded, and relocated off-site on 8 May (see Predator section).
1 (chick)	Western gull	6 exclosure	On 5 June, a first winter western gull repeatedly picked up and dropped a small plover chick before flying with it to the waterline where it dipped the chick in water. It is suspected that the chick was then eaten by the gull. An agitated adult plover was present.
1 (adult)	Peregrine falcon	8 exclosure	On 18 August, a juvenile male peregrine falcon was observed eating a small prey item on 8 exclosure shoreline. Feathers were collected at the prey site and identified as belonging to an adult plover.
1 (adult)	Peregrine falcon	6 exclosure	On 28 August, the returning sub-adult male peregrine falcon banded and relocated on 8 May caught and ate a banded plover on the 6 exclosure shoreline (see Predator section).

Appendix G. Documented mortality of California least tern and snowy plover chicks, juveniles, and adults at ODSVRA (continued).

Table G.2. Mortality, other than documented predation, of least terns from 1 March to 30 September 2015.

See Notes section and attached necropsy reports for more detail. All remains not suitable for necropsy were saved to be provided to a designated depository.

No. (age)	Location	Notes
1 (juvenile)	7 enclosure	On 21 July, the intact decomposed carcass of a juvenile least tern (L:Y/G from LT9) was found in 7 enclosure with ventral surface to the ground and wings folded in a natural position. The left wing chord measured 158 mm. This bird was last seen alive on 10 June on the day it hatched.
1 (juvenile)	7 enclosure	On 22 July, a live unbanded juvenile least tern was observed with a likely broken left wing (wing twisted and outer portion of wing pointed forward) and drooping right wing in 7 enclosure. Although a carcass was not recovered it is assumed that this bird did not survive.

Table G.3. Mortality, other than documented predation, of snowy plovers from 1 March to 7 October 2015.

See Notes section and attached necropsy reports for more detail. All remains not suitable for necropsy were saved to be provided to a designated depository.

No. (age)	Location	Notes
2 (chicks)	6 enclosure	On 3 June, the one to two-day-old two-chick brood with attending male from SP134 was directed southward from Arroyo Grande Creek to the Southern Enclosure (a distance of over 2.6 miles) by resource staff, both on foot and in vehicles. Upon being directed onto 6 enclosure shoreline both chicks were repeatedly attacked by plover adults with broods in the area and were assumed to not survive the incident (see Notes section).
1 (chick)	6 enclosure	On 5 June, one four-day-old GA:VY chick from the three-chick SP88 brood was picked up and pecked repeatedly by an adult with the nearby SP32 nest on the 6 enclosure shoreline. The chick was observed motionless for twenty minutes and assumed dead after the attack as this brood was only seen with two chicks after the incident. Later in the day a sub-adult California gull was seen picking up and dropping a plover chick, unknown if dead or alive, in the same location before carrying it away. The chick was banded but combination not determined (a green band was noted). This may have been the GA:VY chick suspected killed earlier by an adult plover.
1 (chick)	6 enclosure	On 12 June, one unbanded chick was observed dead on 6 enclosure shoreline but could not be recovered due to proximity of young plover broods.
2 (chicks)	6 enclosure	On 6 July, the two banded chicks from SP152 were attacked aggressively by an adult male plover that alternated between attacking the chicks and incubating the remaining egg at the nest. Chicks were attacked and not brooded for a sustained period. All three chicks from this brood were seen the following morning, but the two banded chicks were not seen subsequently and were believed to have died as a result of the incident.
1 (chick)	8 enclosure	On 8 September, the desiccated carcass of a small GG:RW chick from SP90 was collected on the 8 enclosure shoreline. This brood was last seen with all three chicks on 1 June at two days old (two chicks known to fledge).
1 (chick)	7 enclosure	On 8 September, the desiccated carcass of a large unbanded chick was collected on the 7 enclosure shoreline.
1 (chick)	6 enclosure	On 10 September, the desiccated carcass of a small PV:OB chick from SP41 was collected on the 6 enclosure shoreline. This brood was last seen with all three chicks on 15 May at one day old (one chick known to fledge).
1 (chick)	6 enclosure	On 10 September, the desiccated carcass of a small unbanded chick was collected on the 6 enclosure shoreline.
1 (adult)	7 enclosure	On 12 September, the desiccated carcass of an unbanded adult plover was collected in 7 enclosure.
1 (juvenile)	ORA (8 enclosure)	On 7 October, the desiccated carcass of an unbanded large chick or young fledging was found three feet west of the 6 enclosure west fence in the riding area during fence removal. The carcass was not in tire tracks, and was slightly buried and very dry. The last unbanded chick fledged on 30 August.
1 (juvenile)	ORA (8 enclosure)	On 7 October, the carcass of a juvenile plover (VG:PB from SP36) was found a few feet west of the 8 enclosure shoreline west fence in the riding area during fence removal. The carcass did not appear to have been driven over, lacked eyes, and was full of maggots, but was otherwise whole and intact. This juvenile was known to fledge from ODSVRA on 9 June and was last seen alive on 8 enclosure shoreline 1 October.

Oceano Dunes State Vehicular Recreation Area

2015 Predator Management Report



Submitted To:

Ronnie Glick
Senior Environmental Scientist
Oceano Dunes District
340 James Way, Suite 270
Pismo Beach, CA 93449

Submitted By:

Barry Lowry, Wildlife Specialist
&
Eric Covington, District Supervisor
San Luis District
CA Wildlife Services Program

Introduction

Prior to the 2015 California Least Tern (*Sternula antillarum browni*)(CLTE) and Western Snowy Plover (*Charadrius nivosus nivosus*)(SNPL) nesting season, USDA-APHIS-Wildlife Services entered into an agreement with Oceano Dunes State Vehicular Recreation Area (ODSVRA) to conduct predator management activities in the CLTE and SNPL nesting areas. Wildlife Services Specialist (WSS) Barry Lowry was assigned to the ODSVRA project to monitor, or selectively remove, mammalian and avian predators for protection of nesting CLTE and SNPL.

WSS Barry Lowry began working the ODSVRA project March 9, 2015. WSS Lowry underwent mandatory APHIS-WS training (firearms, trapping, defensive driving, civil rights, all aspects of safety, and all other USDA mandatory training) used during the project.

Methods of Predator Management

Many methods were used for CLTE and SNPL protection throughout their nesting season. Methods included surveying, hazing, trapping, calling, shooting, and spotlighting.

Daytime surveys were performed by either hiking or driving on the dunes and shoreline in an attempt to locate predators through track identification and binoculars or spotting scope. Wildlife Services stayed in communication with State Park resource staff in order to stay up to date on their observations of predator activity. Predator surveys were conducted in Eucalyptus, Table Top, Pipeline revegetation, Boy Scout, Maidenform, Southern Enclosure, North Oso Flaco and the South Oso Flaco areas (Appendix 1).

Hazing was conducted throughout the season in an attempt to harass predatory birds away from the SNPL and CLTE enclosures. WS would fire pyrotechnics at the bird until it left the site. The type of pyrotechnic that was used was a 15 mm noisemaking pyrotechnic called a "Bird Whistler[®]" manufactured by Zink-Feuerwerk for Sutton Agricultural Enterprises. They were fired from a Model RJ 1 "Scare Away Launcher[®]" manufactured by Reed-Joseph International". "Bird Whistlers[®]" emit a high pitched whistle, bright light, and a trail of smoke when fired (Appendix 2).

Trapping was the most commonly used method for predator management. Trapping methods included the use of Bridger #3 padded jaw leg-hold traps for mammalian predators such as coyotes. Traps were baited with commercially available lures made from different scents, glands and meat based baits as well as dry and canned cat food. Calling and shooting was another method used for predator management, mainly coyotes. Calling is most effective at dawn or dusk. Calling is done by producing a sound that imitates a wounded prey animal and entices the predator to seek out the source of the noise. Once the coyote was

positively identified, it would be lethally removed by shooting. The type of call most commonly used was a “Wildfire® model WF1” manufactured by FOXPRO Inc. The type of rifle used to remove the coyotes was a Browning A-bolt Medallion chambered in .25-06 caliber firing 90 grain Hornady Superformance® non-lead ammunition.

Spotlighting is a common method of predator management. It is usually done while driving a vehicle and shining a high powered spotlight looking for the reflective eye shine of the predator caused by light reflecting off the tapetum lucidum layer in the back of the predator’s eyes. Once eye shine has been located, positive identification of the predator can then be made with the use of binoculars. Once positive identification is made, removal can take place if the animal is a target predator. The spotlight used to locate predators was a one million candle power SL 70 Styker® by Lightforce Optics. Binoculars used in identifying predators were 10 X 42mm Goldring® by Leupold Optics.

Results of Predator Management Methods

When predator management efforts by Wildlife Services began in 2015, the SNPL nesting season was just beginning. The main mammalian predation concern was coyote presence along the shoreline near SNPL and CLTE habitat. Coyotes appeared to be hunting and scavenging along the shoreline looking for food sources in areas where SNPL chicks often fed. Coyotes have been documented taking SNPL eggs and chicks at ODSVRA. In 2012, four coyote scats were found to contain a total of 11 bands (representing a minimum of one plover chick, two unknown age plovers, and one unknown age tern). Scat surveys were conducted during the 2015 nesting season, but no SNPL bands were discovered in coyote scat. Initial trapping efforts during the 2015 nesting season were focused in the Oso Flaco boardwalk area where coyote tracks originated that were traveling along the shoreline.

Coyotes presented a predation threat to CLTE and SNPL nesting success in 2015. One concern stemmed from predation problems during past nesting seasons. Chicks had been missing with no direct evidence to suggest why. It was suspected that coyotes could have been responsible for predation since coyote tracks were observed along the shoreline each morning. Scat surveys were conducted during the 2015 nesting season, but no SNPL bands were discovered in coyote scat. Initial trapping efforts during the 2015 nesting season were focused in the Oso Flaco boardwalk area where coyote tracks originated that were traveling along the shoreline.

Five coyotes were lethally removed during the 2015 season (Table 1). Two of the coyotes were removed from the Oso Flaco Creek area where coyotes had been traveling from the fore dunes to the shoreline. One coyote was removed from the Maidenform area. The other two coyotes were removed from the Boy Scout area, where it was determined they were traveling to, after exiting the shoreline in the

mornings. The first coyote was trapped on April 21st near the mouth of Oso Flaco Creek. The second coyote was called in and removed on May 15th near the east fence of the Boy Scout area. On May 26th, a coyote was trapped in the dunes north of the Oso Flaco Boardwalk. The fourth coyote was called in and removed on June 1st in the Maidenform area. The fifth and last coyote was called in and removed from a small stand of trees in the middle of the Boy Scout area on June 2nd after being tracked there from the shoreline. While trapping coyotes two bobcats were inadvertently captured near the Oso Flaco boardwalk and were released unharmed.

Avian predators were also a major concern to CLTE and SNPL chicks in 2015. Many raptors, as well as ravens and gulls posed a threat to a successful nesting season.

Early in the season, raven predation of multiple SNPL nests was documented at the Chevron Guadalupe Restoration Project and Rancho Guadalupe Dunes County Park located south of ODSVRA and in the same dune complex. In past seasons, ravens that have been observed on neighboring properties have made the short flight to the ODSVRA to forage for food. On May 22, 2015 two ravens was observed flying over the ODSVRA nesting exclosures and predated four SNPL nests. WSS Lowry responded to the call but was unable to get in position to remove the ravens. Working with the Rancho Guadalupe Dunes County Park and the Chevron Guadalupe Restoration Project WSS Lowry was able to pattern the ravens hunting path and set #1 ½ padded leg hold traps around fake nest sets under their normal flight pattern. On June 1st, WSS Lowry was successful at lethally removing one of the ravens with a 12 gauge shotgun while checking traps at the Rancho Guadalupe Dunes Preserve. Raven sightings substantially decreased at all sites after the one raven was removed.

Predation by gulls of SNPL chicks of all ages, as well as young fledglings, has been documented at ODSVRA, and gull surveys and monitoring were conducted during the entire 2015 nesting season. On June 5th, a western gull was observed picking up and dropping a small plover chick. The gull flew to the waterline with the chick where it is suspected to have eaten the chick. Adult plovers were observed harassing and displaying in front of gulls foraging higher on the beach. Additionally a California gull was observed scavenging a likely dead plover chick on the 6 exclosure shoreline. WSS Lowry responded but was unsuccessful in relocating the western gull suspected of eating the plover chick. There were no other gull predation sightings during the 2015 nesting season.

Peregrine Falcons and Northern Harriers were periodically observed in and around SNPL and CLTE exclosures. Peregrine Falcons were observed perched on exclosure fences and inside the exclosures on many occasions. WSS Lowry often located avian predators and assisted Park Staff and Paul Young, with Ventana Wildlife Society, in hazing efforts. WSS Lowry also assisted Young with raptor trapping efforts throughout the season.

Table 1: Predator Removal Summary

Date	Species	Sex	Location
4/21/2015	Coyote	Female	Oso Flaco Creek
5/15/2015	Coyote	Male	Boy Scout
5/26/2015	Coyote	Female	Oso Flaco Creek
6/01/2015	Coyote	Female	Maidenform
6/01/2015	Raven	Unknown	Rancho Guadalupe Dunes
6/02/2015	Coyote	Female	Boy Scout

Future Recommendations

WS recommends educating the public about the importance of not feeding wildlife to help reduce attracting predators.

WS recommends that all garbage containers have reinforced lids to prevent garbage consumption by wildlife.

WS recommends the State Park continues to maintain the height and strength of the perimeter fence surrounding the enclosures during the nesting season. Maintenance of fencing, where sand has shifted to create low spots or places where mammalian predators can go over, should be conducted on a regular basis to prevent predators from entering enclosures.

WS recommends the State Park continues to enforce the leash law for pets on the beach, which is crucial during nesting season.

WS recommends the State Park continues to remove dead animal carcasses from the beach to eliminate alternate food sources that serve as a lure to scavenging predators such as coyotes.

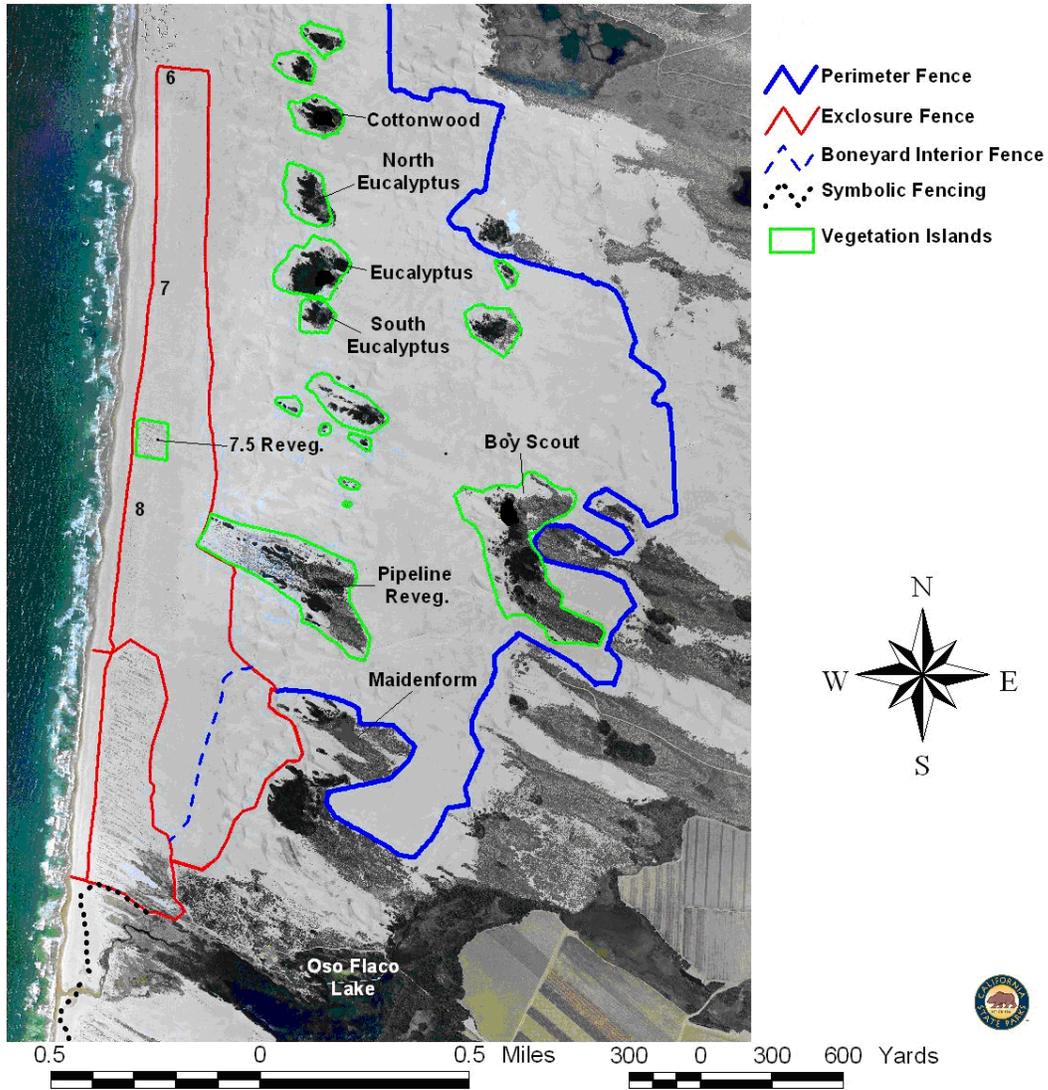
WS recommends the selective removal of predators that are a potential or known threat to the CLTE and SNPL breeding population at ODSVRA. Removal of problem predators prior to predation should be the goal to protect CLTE and SNPL nesting and chick rearing areas.

WS recommends the State Park continues to train WS Specialists so they can be added to permits that allow entrance into areas where predators are threatening the productivity of CLTE and SNPL as well as areas where predators travel, such as the shoreline and South Oso Flaco Dunes. The ability to capture the problem predators where they are located without having to be escorted by ODSVRA staff increases WS efficiency in removing problem predators.

Barry Lowry, Wildlife Specialist
San Luis District
CA Wildlife Services

Eric Covington, District Supervisor
San Luis District
CA Wildlife Services

Appendix 1: Map of ODSVRA SNPL and CLTE Nesting Enclosures and Adjacent Areas



Appendix 2: Photo of “Scare-Away Launcher”, “Bird Whistler” and Percussion Caps



**Avian Predator Management Project:
Trapping and Relocation of Problem Avian Predators
At Oceano Dunes State Vehicular Recreation Area in 2015**

Department of Parks and Recreation – Oceano Dunes District / Ventana Wildlife Society

Agreement Number – CO853004

Submitted to:

Ronnie Glick
Senior Environmental Scientist
California Department of Parks and Recreation
Oceano Dunes State Vehicular Recreation Area
340 James Way, Suite 270
Pismo Beach, CA 93449

Submitted by:

Paul Young
Ventana Wildlife Society
19045 Portola Drive, Suite F-1
Salinas, CA 93908

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Avian Predator Management Project: Trapping and Relocation of Problem Avian Predators at Oceano Dunes State Vehicular Recreation Area in 2015

Introduction

Oceano Dunes State Vehicular Recreation Area (ODSVRA) contains nesting habitat for California least terns (*Sternula antillarum browni*) and western snowy plovers (*Charadrius nivosus nivosus*) along approximately nine miles of coastline and 4,900 acres of coastal sand dunes in southern San Luis Obispo County, California. Contiguous nesting habitat continues to the south for approximately nine miles in the Guadalupe-Nipomo Dunes Complex. California least tern (hereafter, least tern or tern) is a federal and state-listed endangered species. Western snowy plover (hereafter, snowy plover or plover) is a federal-listed threatened species.

Due to human activities that alter the coastal environment, modern California coastal bird communities are often limited to habitat “islands” consisting of native or partially-native habitat surrounded by areas of farmland, housing tracts, recreational areas, marinas, or other developed areas. This fragmentation of habitat has resulted in concentrations of rare or declining bird species in remnant natural areas that act as refuges. It also may result in concentrations or localizations of predators, because the prey they hunt is restricted to these small islands of habitat. In most predator-prey relationships, predator pressure is not severe enough to cause prey populations to decline. However, intense predation of adults or young at small, isolated breeding colonies can cause severe population declines. In response, many agencies have initiated programs to reduce predation pressure.

Avian predator translocation is a program initiated at ODSVRA to protect nesting terns and plovers. Because not every avian predator living in the vicinity of nesting terns and plovers will prey on those species, avian predator removal and translocation is designed to selectively address certain individuals that are actually targeting, or are likely to target, terns or plovers. In 2001, before a predator management plan was in effect at ODSVRA, loggerhead shrikes (*Lanius ludovicianus*) were regularly observed hunting within the plover and tern nesting enclosure fencing, and ODSVRA resource staff discovered at least seven snowy plover bands in loggerhead shrike castings (i.e., masses of undigested food parts). California Department of Parks and Recreation contracted with the UC Santa Cruz Predatory Bird Research Group in 2002 to monitor avian predator activities near plover and tern nesting areas, evaluate the threat of avian predators to these nesting birds, determine which individual avian predators posed an unacceptable threat to the reproductive success of the terns and plovers, and capture, band, and relocate the predatory birds. For the last six years, Ventana Wildlife Society has replaced the UC Santa Cruz Predatory Bird Research Group as the fiscal agent for this project, with the objectives of monitoring avian predator activity, and live trapping, banding, and relocating avian predators. This report presents results of these activities for 2015.

Methods

Surveying, Monitoring, and Trapping

Surveying for raptors and other avian predator species (e.g., shrikes) at ODSVRA is a continual process throughout the tern and plover nesting season. Raptor populations are a combination of resident birds, transients, and later in the season juvenile birds dispersing into ODSVRA from natal territories that are mostly outside the park’s boundaries. Raptor movements within the park are dynamic, and areas need to be repeatedly surveyed throughout the breeding season to document the behavior of resident birds and recognize the arrival of new avian predator individuals. Days that are not spent trapping are usually spent surveying or monitoring.

Surveys were conducted from February to September by Paul Young (Ventana Wildlife Society), the primary avian predator specialist at ODSVRA since 2002. Because there are no paved roads in the areas where terns and plovers nest at ODSVRA, a four-wheel drive vehicle was essential to navigate within the park. In 2008, Young was federally permitted to conduct supervised predator control activities within the plover and tern nesting areas that are closed to the public. This included the use of a vehicle along the shoreline area, which greatly facilitated survey, monitoring, and trapping efforts. Surveys consisted of moving slowly on foot or in a vehicle through a selected area, recording sightings of raptors and other predators, and searching for nocturnal avian predator tracks in the sand. In 2015, Young focused surveys on the following areas (Table 1, Fig. 1): the enclosure shoreline area, the north portion of the park from Arroyo Grande (AG) Creek south to the Maidenform Revegetation Area, the South Oso Flaco (SOF) Foredunes, the North Oso Flaco (NOF) Foredunes, and the Oso Flaco (OF) Area. Areas outside of the park were surveyed and monitored as needed, including the Phillips 66 (formerly ConocoPhillips) refinery and the historical peregrine falcon (*Falco peregrinus*) nest site at Shell Beach, approximately three miles north of ODSVRA. The Dune Lakes area, beyond the park’s east boundary, was usually monitored for northern harrier (*Circus cyaneus*) activity at the same time the north portion of ODSVRA was surveyed. Because we did not gain access to this privately-owned area, Dune Lakes was monitored from high dunes within the park’s boundaries.

Table 1. The number of days during which avian predator activity was surveyed at Ocean Dunes State Vehicular Recreation Area in 2015.

Survey Location	Number of Days Surveyed in 2015
Enclosure Shoreline Area	60
Arroyo Grande Creek to Maidenform Revegetation Area	33
South Oso Flaco Foredunes	42
North Oso Flaco Foredunes	12
Oso Flaco Area	39
Shell Beach Peregrine Falcon Nest	8
Phillips 66 Refinery Area	2

Great horned owls (*Bubo virginianus*) were surveyed at ODSVRA by regular visits to all the revegetation areas surrounding the plover and tern nesting habitat. In 2015, Young surveyed the Pipeline, Maidenform, Eucalyptus, and Tabletop revegetation areas, along with the OF Area, the NOF Foredunes, and the SOF Foredunes for large owl tracks left in the sand. In addition to surveys conducted by Young, careful

attention was paid to large owl tracks observed by resource ecologists and Doug George (Point Blue Conservation Science) inside the 6, 7, and 8 exclosures, which were generally off limits during the active portion of the tern and plover nesting season. When large owl tracks were observed inside the exclosure area, they were reported over the resource radio immediately so that all necessary parties were aware of them. Heavily vegetated thickets surrounding the exclosure area were sometimes walked during the day with the intent of flushing any roosting owls. Because predatory behavior of great horned owls is not easily observed at night, the decision to trap a great horned owl was influenced by the regularity and abundance of owl activity in a sensitive area, as indicated by track sign, and the proximity of this track sign to concentrations of nesting plovers and terns, or their chicks.

Monitoring consisted of observing areas for extended periods with binoculars and a spotting scope from a single location, usually a parked vehicle or a prominent observation point. Monitoring efforts usually occurred from the shoreline, focusing on gulls, or the OF Area near the south end of the NOF Foredunes. The OF Area is a sensitive area where avian predators, particularly shrikes, harriers, and American kestrels (*Falco sparverius*) funnel through the NOF Foredunes and into the 8 Exclosure.

In addition to surveys and monitoring, observations of avian predators were gathered from the ODSVRA predator sighting logbook. The logbook contained observations from Young, Doug George, Barry Lowry (United States Department of Agriculture Wildlife Services, hereafter Wildlife Services), and ODSVRA park staff. Young instructed ODSVRA ecologists in raptor identification and behavior. Frequent field visits and meetings with Young helped keep resource ecologists, contractors, and management involved and up to date with the latest avian predator sightings and concerns. Regular email updates from Young of his sightings, activities, and concerns provided the primary flow of information regarding his daily activities. Observations of avian predators by ODSVRA resource ecologists greatly assisted with efforts to monitor raptor movements within the park. For example, if there was a sharp decline in the number of plover chicks observed on the shoreline, or if a gull was observed to eat a plover, then Lowry and Young would increase their monitoring of the exclosure shoreline area to identify any gulls targeting terns or plovers. Most observations of predators occurred during the morning and early afternoon, when Young and resource ecologists were most likely in the field. In the mid-afternoon to evening, only one or two park ecologists were usually in the field engaged in predator watch or tern and plover monitoring. Therefore, there was an increased chance of missing an avian predator in mid-afternoon or later.

Avian predators that are perched in sensitive areas were almost always flushed or hazed with a bird-whistler device before any trapping attempts were made. A bird-whistler device is a small hand-held gun that when fired propels a loud, small whistling projectile approximately 75 yards. Bird-whistler devices are commonly used at landfills and vineyards to scare birds. They can be bought at farm supply stores without a permit. Most of the avian predators that are flushed or hazed are not immediate candidates for removal, because they have not been observed to target plovers or terns, or have not been seen perched in sensitive areas regularly enough so that their presence constitutes a disturbance. Nevertheless, any avian predator that is perched in a sensitive area might start targeting plovers and terns if they are not discouraged from these areas as quickly as possible. Hazing a perched avian predator at close range with a bird-whistler device does not permanently prevent the bird from returning to the exclosure areas. However, a bird-whistler device might quickly move an avian predator out of a sensitive area because of the noise of the projectile, and it might be safer because it can be employed from a vehicle, avoiding an approach that might disturb the plovers and terns, which would increase the chances they are detected by the predator. Avian predators previously hazed are candidates for removal if they subsequently target, appear likely to target, or appear likely to disturb plovers and terns. In 2014, two bird-whistler devices were purchased by State Parks, and in 2015, additional bird-whistler devices were purchased with the goal that more resource staff in the field would have access to one of these tools in order to more easily move avian predators out of sensitive areas.

When potential predators of terns and plovers, or their eggs or chicks, were identified and targeted for trapping and relocation, Young consulted with the Senior Environmental Scientist at ODSVRA, or his staff, before birds were removed. In addition, avian predator justification forms were submitted to California Department of Fish and Wildlife (CDFW) prior to trapping. When trapping, Young used either Bal-chatri traps, Dho-ghaza nets, bow nets, or mist nets as appropriate for the targeted species. Young and Ventana Wildlife Society were not responsible for removing gulls, common ravens (*Corvus corax*), or non-avian predators at ODSVRA, but contributed observations of these other predators to collaborators, such as Wildlife Services. Young was fully permitted under state and federal laws to band and relocate avian predators. Once birds were trapped, they were put into padded and darkened animal carriers and transported away from ODSVRA. Translocated birds were released as soon as possible, far enough away from ODSVRA that they would be relatively unlikely to return. Trapped birds that could not be released the same day as they were trapped were kept in a 16 x 7-ft mews and fed while they were being held in captivity. Before birds were translocated, they were fitted with an appropriate-sized USGS bird band, and in the case of peregrine falcons, a larger VID band (Appendix A). After a bird was released, an avian predator capture and relocation form was submitted to CDFW.

This report summarizes avian predator observations by species, including the number of birds trapped, descriptions of trapping attempts, and the number of trap days. A trap day is defined as any part of a day or night when traps were deployed. The length of a trapping attempt, or the number of trap days devoted to a predator, varied with the magnitude of the threat, weather conditions, species targeted, and trapping success.

Results and Discussion

Trapping and Predator Concerns

Two raptors were trapped and translocated during 19 trap days at ODSVRA in 2015 (Table 2, Appendix A). Trapped birds included one sub-adult female northern harrier and one sub-adult male peregrine falcon. The harrier was trapped at the south end of the NOF Foredunes Exclosure, and the peregrine falcon was trapped on the shoreline in the SOF Area near Oso Flaco Creek. The number of trapped birds and trap days was the fewest in one season at ODSVRA since predator management began in 2002, even though survey and monitoring effort was consistent with previous years. For comparison, nine avian predators were trapped in each of the 2013 and 2014 seasons, requiring 70 and 64 trap days, respectively. The reduction in trapping effort in 2015 was associated with decreased great horned owl, northern harrier, and loggerhead shrike activity at ODSVRA. Despite fewer trapped birds and trapping attempts, snowy plovers and least terns at ODSVRA experienced relatively robust fledge rates of 55.1% and 82.1%, respectively, in 2015.

Primary concerns in 2015 included an increase in the amount of observed merlin (*Falco columbarius*) activity in the exclosure areas in March and April. At least one banded adult plover was killed by an adult male merlin on 12 March, and merlins probably killed additional plovers without being observed. In mid-March to early April, eight days were spent attempting to trap an adult male and an adult female merlin that were seen often around the exclosure areas at ODSVRA. Young suspected these birds were winter residents and possibly present in previous years. After 4 April, it became difficult to determine which merlins were the target birds and which were new birds migrating north to their nesting grounds. Because of that uncertainty, trapping efforts were suspended, and any merlins seen in or around the plover nesting

areas were hazed with a bird-whistler device. In April, Young spent additional time on the shoreline monitoring for merlin activity in the afternoons and evenings, when resource ecologists were less likely to be in the field.

Table 2. The number of birds trapped and days during which trapping was attempted for the purpose of avian predator translocation at Oceano Dunes State Vehicular Recreation Area in 2015.

Species	Number of Birds Trapped in 2015	Number of Days Trapping Attempted
Great Horned Owl	0	0
Peregrine Falcon	1	1
American Kestrel	0	0
Northern Harrier	1	1
Loggerhead Shrike	0	0
Red-tailed Hawk	0	9
Merlin	0	8
Total	2	19

In February, March and April, a sub-adult female northern harrier was observed by Young to hunt the south end of the NOF Foredunes Exclosure during each day of monitoring. Often, this bird hunted this area multiple times per day. In mid-April, this bird expanded its hunting forays to the north into the 8 Exclosure and was observed perched in this sensitive area on 18 April. The bird was trapped on 23 April at the south end of the NOF Foredunes Exclosure on the first day trapping was attempted. In March and April at ODSVRA, northern harriers were observed on 25 days. After the sub-adult female harrier was trapped, northern harriers were only observed at ODSVRA during 12 days. No additional days were spent attempting to trap northern harriers.

An adult red-tailed hawk (*Buteo jamaicensis*), not one of the familiar resident breeding pair, was regularly seen perch-hunting in the exclosure area in March, April, and May. The resident pair was nesting beyond the park's east boundary and were rarely seen perched in sensitive areas in 2015. This different adult red-tailed hawk flew from the north and perched most often in the NOF Foredunes, but was also seen perched in the 7.5 Revegetation Area, and rarely, in the 6 Exclosure. This bird had a peculiar feather anomaly on the back of its head which appeared as a white spot, making identification in the field possible. Nine days were spent attempting to trap this bird in May. Trapping efforts were suspended when observations of adult red-tailed hawks in sensitive areas dropped precipitously in June and July.

A sub-adult male peregrine falcon was often identified at ODSVRA during the months of March (two days), April (eight days), and early May (three days). One day was spent attempting to trap this bird, and it was captured on 4 May. Before it was trapped, it was flushed from the exclosure area on three different days, and was hazed with a bird-whistler device on five different days. On 28 April, it was observed eating a small prey item in the 8 Exclosure. Prey remains (feathers) were collected and identified by Doug George as a plover. This bird might have killed additional plovers without being observed.

There was an active great horned owl nest in a previously abandoned red-tailed hawk nest beyond the park's east boundary. At least one juvenile fledged from the nest. There were no great horned owls seen during night surveys, and no owls were seen during the day roosting in any of the revegetation areas surrounding the exclosures. Great horned owl tracks in the sand surrounding the exclosure areas or in the exclosure areas were at a historical low this year. As a result, no days were spent attempting to trap great horned owls at ODSVRA in 2015.

In early to mid-March, a male kestrel was seen by Young perch-hunting at the OF area just east of the south end of the NOF Foredunes nearly every day this area was surveyed. This bird was last seen here on 12 March. No days were spent attempting to trap kestrels in 2015, but kestrels were flushed or hazed from sensitive areas on five days.

The sub-adult female northern harrier trapped on 23 April was translocated the same day it was trapped. This bird was fitted with a USGS band and released approximately 295 miles from the park in an area just north of Yuba City, California. The sub-adult male peregrine falcon that was trapped on 4 May was transferred to a large mews located on Young's property. While in his care, the bird was fed and watered. This bird was translocated approximately 467 miles to the Fort Jones area east of Mount Shasta and released on the morning of 8 May. This bird was fitted with a USGS band on its right leg and a VID band on its left leg.

Although translocated avian predators have rarely been documented returning to ODSVRA, the sub-adult male peregrine falcon released at Fort Jones on 8 May was re-sighted at ODSVRA later in the season on 14 August. Identification was confirmed when resource ecologists were able to read the VID band affixed to the peregrine's left leg. Last year, another sub-adult male peregrine falcon was trapped at ODSVRA, released on 24 June at the Sacramento National Wildlife Refuge Complex, approximately 100 miles north of Sacramento, then was re-sighted at ODSVRA on 17 July. The silver USGS band on this peregrine was colored with a blue marker. We did not see a peregrine with this band in 2015, although the bird could have been overlooked if the band was faded or obscured. Since 2002, only one other translocated raptor has been documented returning to ODSVRA. This was an adult male American kestrel captured in 2008 near the Phillips 66 refinery, released near San Jose, California, and recaptured back near the Phillips 66 refinery in 2009. In 2010, Young recaptured a juvenile female peregrine falcon at ODSVRA that had been trapped by Wildlife Services that summer near San Diego, California, where its presence constituted an unacceptable threat to a local least tern colony.

Predator Management by Species

Gulls and Ravens

Problem gulls and ravens are primarily dealt with by Wildlife Services. However, predator management at ODSVRA is a team effort including park resource ecologists, Point Blue Conservation Science, Ventana Wildlife Society, and Wildlife Services, all working together to protect plovers and terns. Young assisted in these efforts by notifying Wildlife Services of any common raven sightings or observations of gulls suspected as predators of terns and plovers on the enclosure shoreline.

Gulls at ODSVRA are a prominent concern during the plover and tern nesting season. Gulls have been observed killing and eating plover chicks at ODSVRA during seven of the 14 years since predator management became a part of conservation efforts. For example, four gulls were removed by Wildlife Services during the 2011 tern and plover nesting season; plover remains and bands found inside of these gulls indicated that a minimum of 16 plovers had been consumed, some of them juveniles. A single gull has also been observed to eat four plover chicks from multiple broods in less than 30 minutes at ODSVRA (Young, personal observation). Despite the fact that there are thousands of gulls at the park, relatively few gulls exploit plover or tern chicks as a food source each year. In previous years, the removal of one or a few gulls, which were observed eating plover chicks, coincided with the stabilization

of a precipitous decline in plover chick numbers on the shoreline. Gulls were usually not removed unless they were observed to catch, eat, or pursue a plover or tern.

In 2015, no gulls were removed by Wildlife Services at ODSVRA although monitoring remained a priority throughout the season. On the evening of 5 June, resource ecologists observed an adult plover aggressively displaying towards a western gull (*Larus occidentalis*) on the 6 Enclosure shoreline. Later, in the same area, a western gull was seen to pick up a plover chick and fly a short distance to the ocean and wet the chick in the water while adult plovers displayed. It could not be determined if the gull ate the chick at this time, but a resource ecologist onsite suspected that it did. At dusk the same day, a California gull (*L. californicus*) was observed to repeatedly pick up and drop a banded plover chick. This may have been the carcass of a chick seen repeatedly attacked and believed killed by an adult plover earlier in the day. Poor visibility prevented confirmation that the chick was consumed. Young and Lowry concentrated their efforts over the next week looking for suspicious gull activity on the enclosure shoreline, but no gull depredation of plover chicks was observed. Over the next several months, no suspicious gull activity was observed on the enclosure shoreline, nor was there a precipitous decline in plover chick numbers that might have indicated a gull problem.

At least four plover nests were depredated by ravens this year at ODSVRA, necessitating the removal of one raven by Lowry. Ravens were observed foraging at ODSVRA during six days in late May. On 22 May, ravens depredated two plover nests in SOF, a plover nest on the NOF shoreline and a plover nest in the 8 Enclosure. Because these ravens were a shared concern with management authorities at other plover nesting sites to the south, information was shared among sites in order to expedite the removal of these predators. For example, if the ravens were seen at the Chevron site, personnel could let us know, real time, that ravens might be heading towards ODSVRA. This communication allowed Lowry time to position himself accordingly, and for resource ecologists to look for ravens and have bird-whistler devices ready. Ravens were hazed with a bird-whistler device on two days in 2015. On 26, 27, and 28 May, ODSVRA was notified by biologists at the Chevron site that ravens were present and might be heading our way. On 26 May, two ravens were seen at ODSVRA shortly after they were seen at the Chevron site. From 18 May to 27 May the Chevron site lost eight nests to raven and one additional nest possibly lost to raven. During this time raven sightings increased, and ravens were also observed depredating plover nests and broods at the Rancho Guadalupe County Park. In order to expedite removal of these birds, Lowry was given permission by the ODSVRA senior environmental scientist and Santa Barbara County Parks to reposition himself to the Rancho Guadalupe County Park, where the ravens were seen more often. Here on 1 June, Lowry observed two ravens flying south together near the shoreline, and he removed one of them. After the removal of this bird, there was only one additional raven sighting at ODSVRA, a single raven in the SOF area on 4 July.

American Kestrel

No American kestrels were trapped at ODSVRA during the 2015 plover and tern nesting season, and no days were spent attempting to trap kestrels.

In previous years, we attempted to trap adult kestrels prior to their nesting at the Phillips 66 refinery, approximately 1.5 miles east of the 8 Enclosure. The Phillips 66 refinery traditionally provided the nearest suitable nesting habitat for kestrels, prompting the need to preemptively remove kestrels from this area to prevent them from feeding at ODSVRA. However, relatively few kestrels have been found here since 2010, when refinery management removed many of the old structures at the south end that had

provided the preferred nesting sites. Early surveys in February and March of 2015 documented only one pair of kestrels near the refinery.

Although the refinery provides the nearest suitable kestrel nesting habitat to ODSVRA, there are other suitable kestrel nesting habitats near the park. Along Highway 1, from Oso Flaco Lake Road near the town of Guadalupe, extending north to Pier Avenue, in the city of Oceano, large eucalyptus groves and various man-made structures also provide potential nesting sites for kestrels. Young has observed kestrels here during the spring and summer months. In 2007, Young observed an adult male kestrel catch prey at the east end of the Pipeline Revegetation Area and fly with this item approximately 1.5 miles east where it was lost to view in the eucalyptus groves north of the refinery. In 2008, park ecologists again observed a kestrel catch a small prey item from this same area at ODSVRA and immediately fly to the east where it was lost from view. These birds were likely delivering prey to nests in this area.

In 2015, kestrels were observed at ODSVRA on 16 days, less than the 27 days each in 2013 and 2014. Observations occurred in March (six days), May (one day), June (two days), July (two days), and August (five days). In early March, Young saw a male kestrel perch-hunting at the OF area nearly every day he surveyed. During two days in early March, another kestrel (unknown sex) was seen at the same time perch-hunting east of the SOF Foredunes. After 12 March, these birds vacated those areas. On 24 August, a male and female kestrel were seen perched together on the 7 Enclosure fencing. This was the only sighting of two kestrels together in 2015. A day later, there were four separate kestrel sightings, but some of these sightings may have been of the same bird. In August, with the exception of the one male kestrel sighting, all of the kestrels that could be identified by sex were identified as females. Most, if not all, of the kestrel sightings in July and August were probably juveniles dispersing from natal territories east of ODSVRA. This conclusion is based on the timing of their arrival, a historical perspective of kestrel sightings during July at this site for the last 14 years, the observations of two or three kestrels perched or flying together (juvenile sibling group dispersal), behavior as a group (playful and interactive), and plumage.

Kestrels were hazed from the enclosure area on four occasions. Kestrels were hazed with a bird-whistler device twice as they perched on the west fence of the 6 Enclosure, once as they perched on the west fence of the 7 Enclosure, and once when a kestrel flew over the NOF Foredunes. One day, a kestrel was flushed unintentionally from the west fence of the 6 Enclosure with a vehicle before it could be hazed with a bird-whistler device.

Loggerhead Shrike

No shrikes were observed at ODSVRA in 2015. The number of shrikes trapped and relocated was nine in 2012, four in 2013, and one in 2014.

Loggerhead shrikes have been observed to depredate least tern and snowy plover chicks at ODSVRA in previous years. Shrikes have also been strongly suspected in the deaths of several adult plovers killed in previous years inside small single nest enclosures with net tops.

Tern and plover chicks are particularly vulnerable to attacks from diurnal avian predators such as loggerhead shrikes, American kestrels, and red-tailed hawks that might perch-hunt near the shoreline of the enclosure area. Shrikes are of particular concern because of their perch-hunting tactics. The typical plover chick defense response to an avian predator, after the predator is spotted, is to crouch and freeze. This response can be effective provided that the avian predator does not stay in the area for an extended

period of time. The response is less effective with prolonged exposure to the predator. Perch-hunting can prolong that exposure. Unlike kestrels or red-tailed hawks, shrikes are exclusively perch-hunters, and have the smallest hunting territories of any avian predators found at ODSVRA. Because their territories are small, a shrike whose territory coincides with plover and tern territories can have relatively easy access to plover and tern chicks. These characteristics, combined with their aggressive predatory nature and their slow and methodical hunting style, make them a species of considerable management concern at ODSVRA.

Great Horned Owl

No great horned owls were trapped at ODSVRA in 2015, and no days were spent attempting to trap owls. Five great horned owls were trapped during the 2014 tern and plover nesting season at ODSVRA.

Great horned owls are common residents at the park. Although great horned owl predation on incubating adult plovers and terns at night has been documented at other sites, relatively little is known about owl predation on plover and tern chicks at the ODSVRA shoreline and inside the nesting exclosures.

During the 2015 plover and tern nesting season at ODSVRA, large owl tracks were observed on seven days either inside the exclosure areas or in and around adjacent revegetation areas. This continues a decline in observations from 2013 and 2014, when large owl tracks were observed on 50 and 37 days, respectively. Large owl tracks in the sand were observed on five days in the open riding area adjacent to the plover and tern nesting exclosures, and on five days inside the plover and tern nesting exclosures closed to the public. These observations do not include the Dune Preserve Area or other areas to the north which are somewhat removed from the core plover and tern nesting areas.

In 2015, surveys of suitable nesting habitat at ODSVRA, including historical nesting areas, revealed one active great horned owl nest. This nest was found on 17 April, beyond the park's east boundary along the sand road between the Boy Scout area and the Phillips 66 refinery. This nest was an old red-tailed hawk nest, and we observed two large young with both adults present. We visited on two subsequent occasions, and at least one great horned owl fledged from the nest.

Peregrine Falcon

One sub-adult male peregrine falcon was trapped at ODSVRA during the 2015 plover and tern nesting season (Appendix A). This bird was trapped on the shoreline in the SOF area near the mouth of Oso Flaco Creek. One day was spent attempting to trap peregrine falcons.

Peregrine falcons are a common resident at ODSVRA. There is a peregrine falcon nest site on a sea cliff in the Shell Beach area approximately three miles north of the park. There is also a peregrine falcon nest site near Avila Bay to the north, and another near the small town of Edna to the northeast. To the south, there is a peregrine falcon nest site at Point Sal, and another near the Lions Head area on Vandenburg Air Force Base. All of the adults associated with these nests could possibly be seen at ODSVRA. However, the adults from the Shell Beach nest site are the closest and are probably seen more often than adult peregrine falcons associated with these other sites. Peregrine falcon observations each year during the

plover and tern nesting season at ODSVRA usually include a mix of resident adults, transient adults, sub-adults, immatures, and juveniles.

The peregrine falcon is a California Fully-Protected Species, and trapping is conducted even more judiciously than other species. CDFW issued a Memorandum of Understanding as an attachment to Paul Young's Scientific Collecting Permit providing authorization and provisions for managing peregrine falcons. Because peregrine falcons are afforded considerable legal protection, it is important to keep track of individuals at ODSVRA by sex and plumage, so that trapping efforts, when needed, target the correct individual and avoid nesting pairs. It was sometimes a challenge to determine the age and sex of peregrine falcons that were observed at ODSVRA. Factors contributing to this challenge were visibility (distance, heat shimmer, and fog), the mobility of the falcon (flying or perched), the plumage gradient between different ages, the sex of the bird (indicated by size), and the experience of the observer in the field. Male peregrines are one-third smaller than females, but their plumages can be similar, and determining the relative size of a peregrine at a distance is difficult. The challenge of identifying individual falcons was simplified by photographing birds when possible and comparing plumage characteristics and head markings. Photographs taken by resource ecologists, with cameras affixed to spotting scopes, and emailed to Young, helped inventory individual peregrine falcons that were regularly seen. We placed a high priority on monitoring the status of the Shell Beach nest site to avoid trapping a peregrine falcon that might be associated with an active nest there. Peregrine falcons at the Shell Beach nest site can be closely observed, and head markings and plumage characteristics noted, so that these individuals might be recognized when they are seen at ODSVRA.

In 2015, the Shell Beach peregrine nest site was active for the third straight year, and Young documented fledging of four falcons. The pair was present in early March, and the adult male and female appeared to be the same individuals as the birds observed in 2014, based on plumage characteristics. On 12 March, Young observed the pair entering the nest cavity on the rocky point just west of the tennis courts. An incubation exchange was seen on 24 March. Four juveniles were observed perching and flying near the nest on 1 June. On 22 July, one juvenile was observed by Young still at the nest site. Neither of the adults associated with this nest was banded. Adult peregrine falcons have been observed flying south from this nest towards ODSVRA on many occasions and can reach the park after only several minutes of flying.

Peregrine falcons were observed during 73 days at ODSVRA in 2015 (Table 3), fewer than the 100 days they were observed in 2014. On many days, there were several peregrine falcon sightings and more than one individual seen. Despite the challenges of determining peregrine falcon age and sex, most identifications were reliable enough to include in a breakdown of age and sex-specific sightings. At least six different individual peregrine falcons were seen at ODSVRA during the 2015 plover and tern nesting season. This is a conservative estimate and includes one adult male, two adult females, one sub-adult, and at least two juveniles. During the 2013 and 2014 seasons, at least seven individual peregrines were seen per year. An adult male peregrine falcon was observed during at least four days in 2015, whereas adult female peregrine falcons were observed during at least 18 days. All of the sightings of an adult male were of a bird with an entirely black head. This was a different bird than the adult male associated with the Shell Beach nest site, based on plumage characteristics. At least two different adult female peregrine falcons were identified. One adult female was banded with a VID band (17-D) and was the same sub-adult seen during 13 days in 2014. The second, unbanded, adult female had plumage characteristics that were different from the resident adult female attached to the Shell Beach nest site. In July and August, some of the observations of adult female peregrine falcons at ODSVRA were inconclusive and may have been of the resident female at Shell Beach. There was probably only one individual sub-adult peregrine falcon seen at ODSVRA in 2015. This was a sub-adult male that was eventually trapped on 4 May. In March, this bird was misidentified as an immature on several occasions, but with additional sightings, some adult feathers could clearly be seen on the back of this bird. Unique head markings made this bird easily recognizable in the field when viewed through a spotting scope. After being translocated

approximately 467 miles from the park, it was not seen in June or July. However, the bird returned to the park and was identified by its VID band on 14 August as it perched on the shoreline. On 3 and 8 August, a VID-banded adult peregrine falcon killed three elegant terns (*Sterna elegans*). The numbers and letters on the VID band could not be read, but the VID band was on the right leg of the falcon. It is likely that this bird was the adult female that had a VID band (17-D) affixed to its right leg. The sub-adult male that was trapped, and returned to ODSVRA, had a VID band affixed to its left leg. On 3 September, 17-D banded peregrine was observed eating an elegant tern on the shore north of AG Creek.

Table 3. The number of days per month peregrine falcons of different age categories were observed at Oceano Dunes State Vehicular Recreation Area in 2015. *Note that birds from multiple categories could be seen on the same day.

Age/Sex Category	Estimate #	March	April	May	June	July	August	Total
	Individuals							
Adult	3	9	7	4	2	5	4	31
Sub-Adult	1	2	8	3	0	0	2	15
Juvenile	≥2	0	0	1	3	5	5	14
Unknown	-	6	3	1	6	7	2	25
# Days Peregrines Observed*	-	15	13	9	10	15	11	73

Peregrine falcons were observed catching or consuming birds at ODSVRA on 22 occasions in 2015, similar to the 23 observations of such behavior in 2014. Observations this season included four sanderlings (*Calidris alba*), two Heermann's gulls (*Larus heermanni*), one California gull, three adult snowy plovers, one whimbrel (*Numenius phaeopus*), one western grebe (*Aechmophorus occidentalis*), one brown creeper (*Certhia americana*), one mourning dove (*Zenaida macroura*), one Eurasian collared-dove (*Streptopelia decaocto*), three elegant terns, three unidentified medium-sized birds, and one unidentified small bird. Two of the medium-sized birds were likely black-bellied plovers (*Pluvialis squatarola*).

Adult peregrine falcons were responsible for 12 of these predation events. The banded adult female peregrine (17-D) was responsible for six and the unbanded adult female was responsible for two predation events. The adult male was responsible for three events and an unidentified adult was associated with one. The sub-adult male was observed with prey on seven occasions, and juvenile peregrines were observed with prey on two occasions. On one occasion, a peregrine of unknown age was seen with prey.

In addition to these real-time observations of peregrine falcons eating prey, there were bird carcasses or feather piles of many species found by resource ecologists in the field throughout the season at ODSVRA. Most of these carcasses were gulls and appeared to be depredated by an avian predator. Many of these avian depredations were probably peregrine falcon kills.

During the 2015 plover and tern nesting season at ODSVRA, at least three snowy plovers were captured and consumed by peregrine falcons. On 28 April, a sub-adult male peregrine falcon was observed eating a small prey item in the 8 Enclosure. Prey remains (feathers) were collected and identified by Doug George as belonging to an adult snowy plover. A decision to trap this bird was made because it killed at least one plover (and possibly others); it was a male (males are smaller and more agile and therefore more likely to take plover and tern-sized prey); it was a sub-adult (more likely to remain for the season); it was still early in the year (prudent to remove this bird before the terns arrive and before plovers hatch on the shoreline); and it was the individual most often identified from March to early May (and hazed with a bird-whistler device on five occasions). This bird was trapped on 4 May and released in northern California near Fort Jones east of Mount Shasta. The bird returned to ODSVRA and was seen on 14 and 28 August. On 28 August, it was observed eating a sanderling on the 6 Enclosure shoreline, and later the same day, it was seen catching and consuming a banded plover on the 6 Enclosure shoreline. No attempts to recapture this

bird were made. On 18 August, a juvenile male peregrine was observed eating a small prey item on the 8 Exclosure shoreline. After it was hazed, prey remains were collected (feathers) and identified by Doug George as belonging to an adult snowy plover.

Peregrine falcons were flushed from sensitive plover and tern nesting areas during 30 days in 2015, 22 of which involved a bird-whistler device. Peregrine falcons were sometimes flushed and hazed numerous times before they finally moved out of sensitive habitat. Peregrines of a variety of ages were flushed or hazed, including adults (during nine days), sub-adults (10 days), and juveniles (eight days). Unidentified peregrines were flushed or hazed on two days. Sometimes, several different individual peregrine falcons needed to be flushed or hazed on the same day. Flushing or hazing a raptor can disturb nesting plovers and terns. Therefore, flushing a raptor required coordination with the entire resource staff in the field to prevent plovers and terns from suspending incubation, chicks from running into the open riding area, and chicks becoming separated from attending adults. Resource staff also monitored peregrine falcons after they were flushed or hazed to see if they settled in another sensitive location in the exclosure area.

Northern Harrier

One sub-adult female northern harrier was trapped at ODSVRA and translocated in 2015 (Appendix A). This bird was trapped on 23 April, at the south end of the NOF Foredunes Exclosure. One day was spent attempting to trap harriers.

Harriers were observed during at least 36 days at ODSVRA in 2015, down from the 61 days in 2013 and 40 days in 2014. Many of the harrier sightings in March and April at ODSVRA were of a sub-adult female in the OF area and the south end of the NOF Foredunes exclosure. During these months, there were also many “brown” harrier sightings by resource ecologists throughout the park. Northern harriers that are seen in March, April, and May and are brown in appearance could be sub-adult males, sub-adult females, or adult females. Sub-adult harriers have a chestnut-colored wash on their chest and a slightly darker brown on the dorsal surface of their wings, whereas adult females are lightly streaked against a white background on their chest and a lighter brown dorsal wing color. These plumage differences are sometimes difficult to discern and depend on distance, lighting, and the experience of the observer. In March and April, Young observed harriers at ODSVRA on 12 days, and all of these observations were of a sub-adult female northern harrier. It is suspected that most of the “brown” harrier sightings during these months were also of this sub-adult female. After 23 April, when the sub-adult female was trapped, harriers were observed on only 12 days at ODSVRA. On 20 May, an adult male harrier and a “brown” harrier were both seen. An adult male northern harrier was seen on two days in May, one day in June, and one day in July. Adult male harriers are light gray overall with black wing tips, and are easily distinguished from adult females, sub-adults, and juveniles. Juvenile harriers were positively identified on one day in late June, three days in July, and one day in August. It is suspected that some of the “brown” harrier sightings in these months were of juvenile birds.

Factors contributing to the decision to trap the sub-adult female northern harrier included the frequency with which bird was seen hunting over the south end of the NOF Exclosure, the age of the bird (sub-adult, therefore more likely to remain for the season), and observations indicating this bird might move north and start hunting the 6 and 7 exclosures in the future when plover and tern chicks were present. After it was trapped, it was released the same day just north of Yuba City, California.

Red-tailed Hawk

No red-tailed hawks were trapped at ODSVRA in 2015. Nine days were spent attempting to trap red-tailed hawks.

Red-tailed hawks are a common local resident at ODSVRA. In 2012 and 2013, a pair nested near Oso Flaco Lake and were often seen perch-hunting in or around the exclosure areas. These nests failed in both years. In 2014, no nesting occurred here, and it was rare to see two adult red-tailed hawks at the same time near the exclosure areas at ODSVRA. We suspect that one of the hawks died sometime between the 2013 and 2014 season. In 2015, a pair of red-tailed hawks nested just east of the park. These birds could be seen flying from the revegetation areas adjacent to the plover and tern nesting exclosures toward the nest site. In April, red-tailed hawks were seen incubating here, but in May the nest was reported to have failed.

There was also a resident pair of red-tailed hawks that probably nested east of AG Creek. Adult and immature red-tailed hawks were seen perched at the AG Creek and Dune Preserve areas regularly.

Red-tailed hawks have not been observed to take plovers or terns at ODSVRA over the last 14 years, but they have been observed to depredate plover and tern nests at other sites. Red-tailed hawks and peregrine falcons have been the most commonly observed raptors at ODSVRA in recent years. In 2015, most red-tailed hawk sightings were of resident adults that attempted to nest east of the park, and a different single adult that was often perched inside the exclosure areas. The latter flew from, and returned to, the AG Creek and Dune Preserve areas to the north of the exclosure areas, and was the red-tailed hawk most often seen perched in the 6 Exclosure, the 7.5 Revegetation Area, the NOF Foredues, and the SOF Foredues in March, April, and May. The resident pair was regularly observed perch-hunting the revegetation areas east of the exclosures, but was seen perched inside the exclosure areas on many fewer days than in previous years. Young observed several territorial disputes between the resident pair and the single adult. The last of these occurred on 28 May, when one of the resident adults drove the single adult out of the NOF Foredues and chased it to the north. In past years, there were sometimes immature or sub-adult red-tailed hawks seen at ODSVRA earlier in the season. These birds were usually driven off by the resident adults as the season progressed. This year, there were no sightings of sub-adults, and immatures were only seen on a limited number of days at ODSVRA, and not in sensitive areas. Juveniles were observed perched in the NOF Foredues on at least four days in July and August. The resident pair has not been trapped in recent years because these individuals have not been seen to take plover or tern chicks, and they drive off other red-tailed hawks that might target plover and tern chicks. Prior to 2012, when resident adult red-tailed hawks nested successfully and raised young, they were infrequently observed perched inside of the exclosure areas.

Red-tailed hawks were observed perched inside the exclosure in March (six days), April (11 days), and May (24 days). These were all adults. Nine days were spent in May attempting to trap the adult red-tailed hawk with the feather anomaly on the back of its head, and that was seen most often perch-hunting in sensitive areas. Trapping this bird was justifiable because its presence constituted a disturbance to the nesting terns and plovers. These trapping efforts were suspended when adult red-tailed hawks were seen on fewer days in June (six days), July (three days), and August (nine days).

In 2015, red-tailed hawks were observed during 59 days perched either at the 7.5 Revegetation Area, the 8 Exclosure, the NOF Foredues, the SOF Foredues, or the west end of the Pipeline Revegetation Area. Most often, an individual red-tailed hawk would perch-hunt in several of these sensitive areas on a single day before it was flushed or it just moved on. Red-tailed hawks were perched at the 7.5 Revegetation

Area (12 days), the NOF Foredunes (46 days), the SOF Foredunes (14 days), the west end of the Pipeline Revegetation Area (two days), and the 8 Exclosure (four days). A red-tailed hawk was observed perched in one of these sensitive areas in each month from March through August. Red-tailed hawks were flushed or hazed on 17 days at ODSVRA in 2015.

Merlin

No merlins were trapped despite eight trap days at ODSVRA in 2015.

Merlins are small, highly migratory falcons that spend the fall and winter months in California and typically migrate out of ODSVRA by mid-April to their nesting grounds to the north. Merlins and peregrine falcons are the diurnal raptor most likely to take adult snowy plovers at ODSVRA. Merlins have usually migrated north before plover chicks have hatched, and are almost always gone before least terns arrive to begin nesting. However, merlins depredated adult plovers once each year in 2004-2006 at ODSVRA, and an adult female merlin was observed eating a small shorebird that might have been a snowy plover in 2011.

Merlins were again documented as a predator of snowy plovers at ODSVRA in 2015. On 12 March, an adult male was observed eating a small prey item in the 7 Exclosure. After this bird had flown to the east, Young collected the prey remains (two banded plover legs and feathers) and turned them over to resource ecologists. On 19 March, a larger brown merlin caught an unidentified small shorebird north of the exclosure areas but flew out of the area with its prey and was not re-sighted. On 1 April, an adult female merlin killed and ate a small shorebird inside the 6 Exclosure. Prey remains (feathers) were collected and the prey identified as a probable western sandpiper (*Calidris mauri*).

Merlins were seen during at least 17 days in 2015, compared to 14 days in 2014, eight days in 2013, and three days in 2012. In 2015, they were seen during 11 days in March, five days in April, and one day in May. On two of the days, there was more than one merlin sighting. These observations included adult males (12, 16, 17, and 18 March), adult females (19 and 23 March, and 1 April) and individuals that could not be identified by age or sex (range 15 March to 17 May).

In March and April, there was a relatively high number of plover nest abandonments, possibly the result of the death of one of the breeding adults. Merlins were suspected in the deaths of some adult plovers during this time. Merlins were observed in 2015, and in previous years, hunting low over the exclosure shoreline, perching occasionally, and flying several feet off the ground in a coursing manner, not in a sustained straight flight. This low, coursing hunting behavior by falcons might be a speculative hunting technique employed to flush birds, whose main defense is to remain crouched and not try to out-fly the falcon.

Five days in March and three days in early April were spent attempting to trap an adult male or an adult female merlin. After 4 April, trapping efforts were suspended when it became difficult to determine which merlins were the target birds and which were new birds just migrating through on their way to their nesting grounds.

In 2015, merlins were flushed or hazed from sensitive areas during six days.

Other Raptors

Red-shouldered hawks (*Buteo lineatus*) were seen regularly at the campgrounds near Pier Avenue and probably nested in this area. They were also seen near AG Creek. A juvenile red-shouldered hawk was seen near the Pismo lagoon later in the season.

Cooper's hawks (*Accipiter cooperii*) were observed on one day at ODSVRA. This was a bird seen near Oso Flaco Lake.

Sharp-shinned hawks (*A. striatus*) were not seen at ODSVRA during the 2013-2015 seasons. There were two sightings of this species in 2012.

Ospreys (*Pandion haliaetus*) were regularly seen at ODSVRA. These fish-eating raptors were occasionally flushed by resource ecologists when their presence constituted a disturbance to the plovers and terns.

Golden eagles (*Aquila chrysaetos*) were not seen at ODSVRA during the 2013-2015 seasons. A golden eagle was seen on one day in 2012.

Bald eagles (*Haliaeetus leucocephalus*) were not seen at ODSVRA in 2015. On 13 August 2014, an immature bald eagle was seen flying over the 8 Enclosure and then disappearing to the northeast. This bird had a blue wing tag on the left wing. There was one bald eagle sighting in 2013 at ODSVRA.

Burrowing owls (*Athene cunicularia*) were not seen at ODSVRA during the 2013-2015 seasons. Burrowing owls were seen on one day in 2012.

Barn owls (*Tyto alba*) were not seen at ODSVRA during the 2013-2015 seasons. Large owl tracks observed at ODSVRA that were distinctly different from great horned owl tracks may have been a barn owl. In 2012, two barn owls were trapped at ODSVRA and translocated.

White-tailed kites (*Elanus leucurus*) were observed at ODSVRA on three days, less than the five days they were seen in 2014 and the 18 days they were seen in 2013. They were most often seen in the SOF Area.

Prairie Falcons (*Falco mexicanus*) were not seen at ODSVRA during the 2013-2015 seasons. A prairie falcon was seen on one day in 2012.

Recommendations

Ventana Wildlife Society encourages ODSVRA management to continue the practice of depositing wood chips and other substrates into the 6, 7, and 8 enclosures early in the season. This substrate probably makes it harder for avian predators to locate incubating plovers and terns and their chicks. In addition, the larger pieces of wood can provide a hiding place for tern and plover chicks should an avian predator suddenly appear. The process of depositing wrack on the enclosure shoreline, while designed to create an invertebrate food supply for the plovers, also provides cover from predators for the tern and plover chicks.

In 2012, a large portion of the west fence on the 6 and 7 enclosure shoreline was moved 100 feet to the east to increase the size of the shoreline area and allow natural wrack deposition to increase on the shoreline habitat. This probably provided more available food resources for the plovers, but also created a larger, more complicated topography on the shoreline that was more difficult for mammalian and avian predators to hunt thoroughly. We recommend that the west fence stay in its present location and not be moved back to the west where it would functionally create a narrower shoreline with less food and cover.

It is important to maintain the current size of the fenced tern and plover nesting exclosures. One of the most basic advantages nesting terns and plovers enjoy at ODSVRA is the considerable size of the exclosure area. If the exclosure area were to be reduced in size, the nesting terns and plovers would be more concentrated and probably more easily discovered, and then targeted, by mammalian or avian predators.

Acknowledgments

We thank Ronnie Glick and all ODSVRA resource ecologists for their invaluable assistance with this project. In addition, we thank Doug George (Point Blue Conservation Science), and Barry Lowry and Eric Covington (USDA Wildlife Services). Thanks also to California Department of Fish and Wildlife in Sacramento (Randi Logsdon, Carie Battistone, and Lyann Comrack), Shasta Valley Wildlife Area (Richard Callas), and San Luis Obispo (Bob Stafford), for making the permit and relocation aspect of this project proceed as smoothly as possible. Thanks also to Dave Clendenen and the Wind Wolves Preserve.

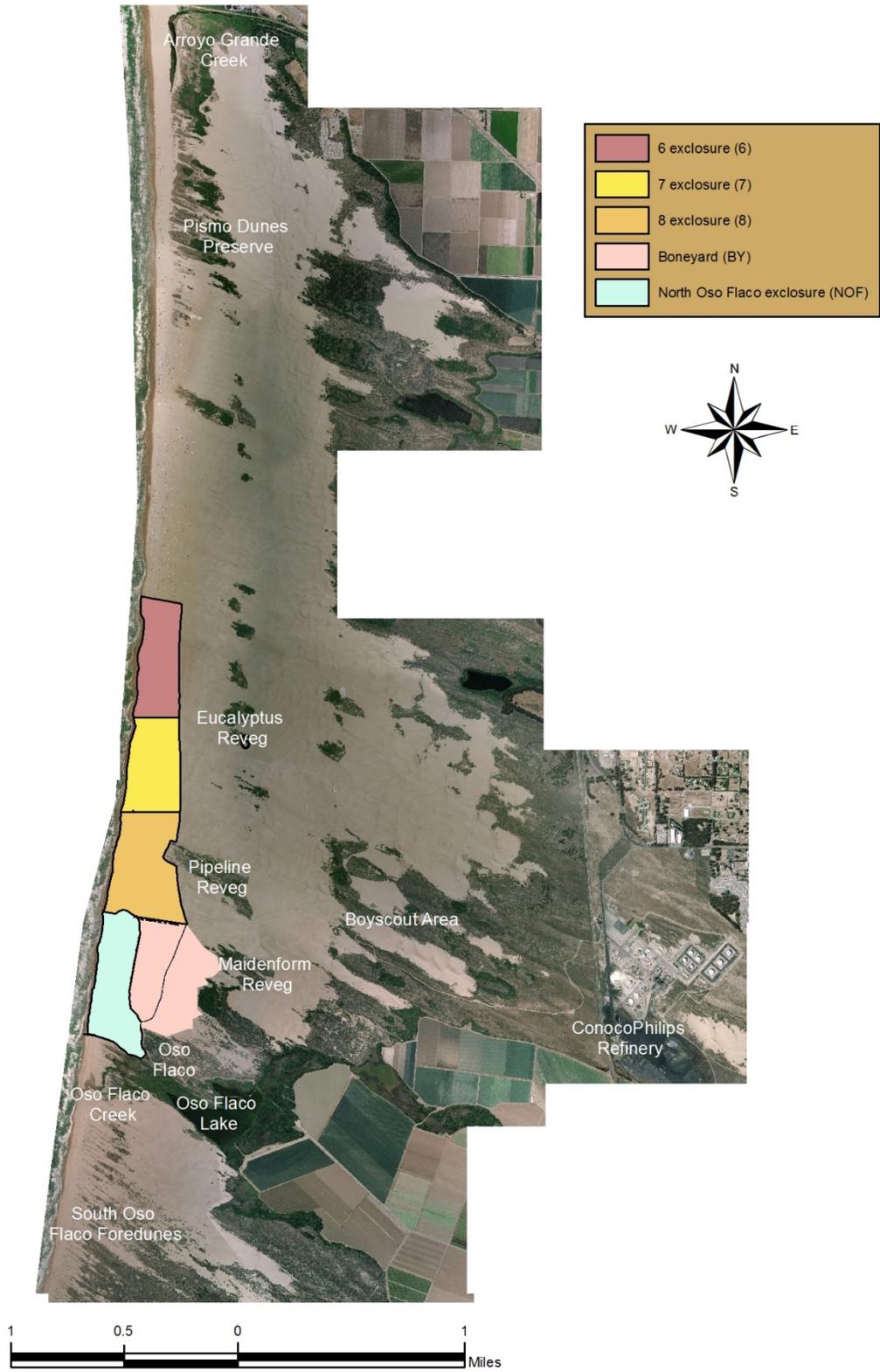


Figure 1. Location of avian predator management activities at Oceano Dunes State Vehicular Recreation Area in 2015.

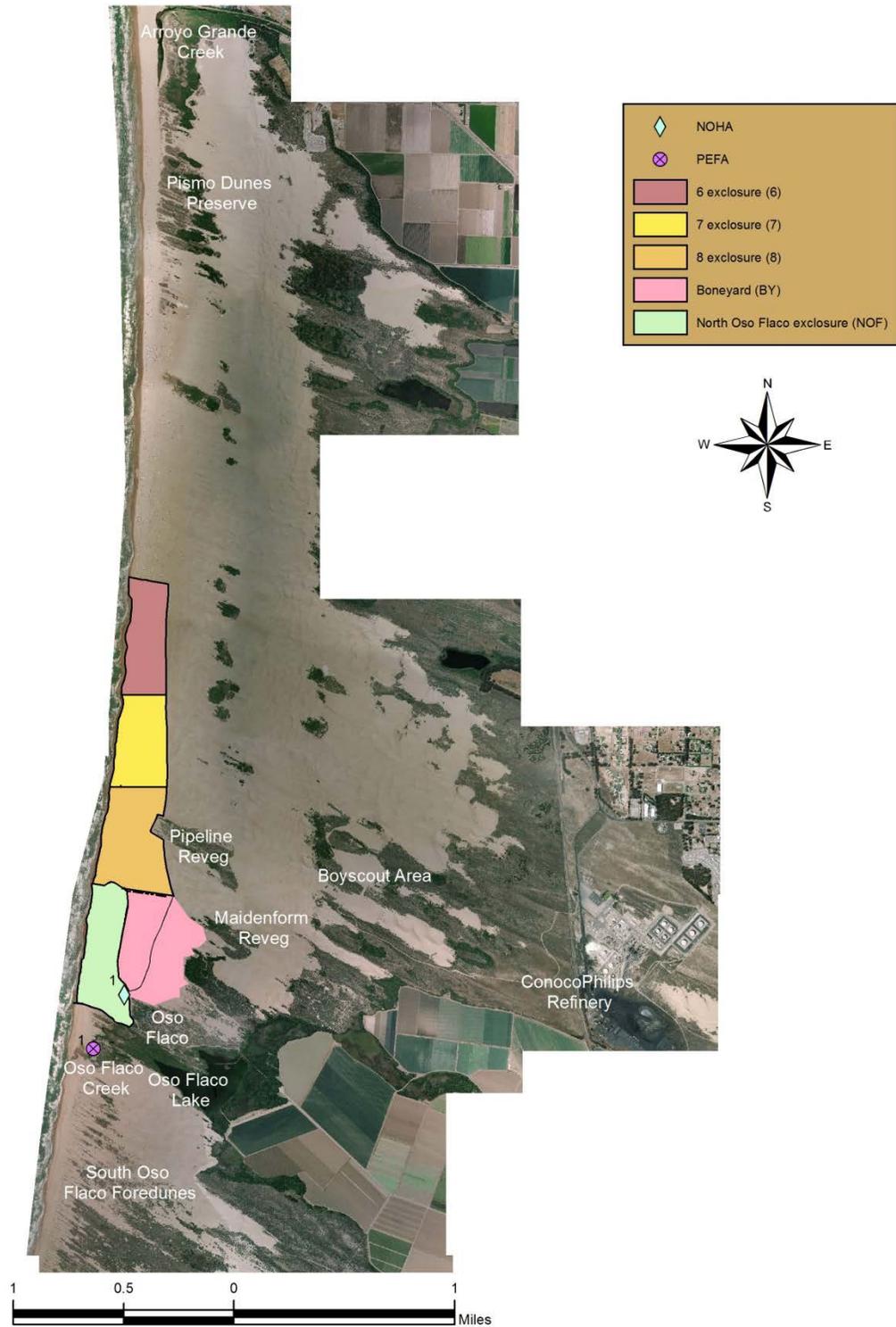


Figure 2. Avian predator trapping locations at Oceano Dunes State Vehicular Recreation Area in 2015.

Appendix A. Avian predators trapped at Oceano Dunes State Vehicular Recreation Area, San Luis Obispo County, California, and relocated in 2015.

Date	Species	Age	Sex	Banding Site	Banding Zone/UTM	Release Date	Release Site	Release Distance	Band Number
04/23/2015	Northern Harrier	AHY	F	North Oso Flaco	10/716177-3879507	04/23/2015	Yuba City	295 miles	1115-10888
05/04/2015	Peregrine Falcon	AHY	M	South Oso Flaco	10/716047-3880635	05/08/2015	Fort Jones	467 miles	2206-79506 VID 50AB



DEPARTMENT OF FISH AND WILDLIFE
Office of Spill Prevention and Response
Marine Wildlife Veterinary Care & Research Center
1451 Shaffer Road
Santa Cruz, CA 95060

MWVCRC NECROPSY #: 15-0201
SPECIES: LETE
UCD PATH #: None
OWCN INTAKE#: None
BAND #: Left: L; Right: Y/G

AVIAN GROSS NECROPSY REPORT

COMMON NAME: Least Tern	SCIENTIFIC NAME: <i>Sternula antillarum</i>
DATE FOUND: 7/21/2015	COLLECTION LOCATION: Oceano Dunes, San Luis Obispo County
CARCASS CONDITION: Poor	OILED/FOULED: No
AGE: Juvenile	SEX: Unknown
DEATH DATE: Unknown	EUTHANASIA: No
NECROPSY DATE: 7/22/2015	NECROPSY BY: C.Gibble and M. Miller
REPORT DATE: 7/23/2015	REPORT BY: C.Gibble and M. Miller

HISTORY/CLINICAL SUMMARY: Collected by Doug George at Oceano Dune State Vehicular Recreation Area at 11:29 am on 7/21/2015. The carcass was found ventral surface to the ground with wings folded on a sand surface among scattered small sea rocket plants. The carcass was not fresh and the body cavity was open with maggots.

FINAL DIAGNOSES:

- 1) Bird was extensively decomposed and maggots were found throughout. No major organs remained in the body cavity due to decomposition and maggot scavenging.
- 2) Radiograph images show that there was no visual indication of lead due to gunshot (see photos).
- 3) Radiograph images show that there was no visual indication of fractures. External exam confirmed no indication of fractures (see photos).
- 4) Bird did not have evidence of oil or entanglement.
- 5) Bird had a very low lice load.
- 6) Ventriculus – sand grains and small fish bones found in ventriculus (see photos)
- 7) Bird was found with hole in the neck. This was most likely due to scavenging rather than attack (see photos).
- 8) No sex organs remained. Sex of bird is undetermined.

9) Bird was of juvenile plumage.

INCIDENTAL FINDINGS:

No additional incidental findings

GROSS FINDINGS/SUMMARY:

Radiograph showed no visible fractures.

Radiograph showed no visible lead.

No obvious trauma

Hole in the neck (scavenging)

Sand and small fish bones found in ventriculus

No oiling

No entanglement

No fractures

Very low lice load

SAMPLES SAVED: Carcass saved frozen

CAUSE OF DEATH: Undetermined. The carcass was too decomposed to determine cause of death; however, gunshot trauma and other trauma that would have resulted in bone fractures were ruled out as causes of death.

FOLLOW-UP: No follow-up diagnostic testing or histology is warranted, given the carcass condition.



Radiograph image of bird - shows no visible fractures and no visible lead from gunshot.



Ventral and Dorsal view of bird



Hole in neck (left) and internal cavity filled with maggots (right)



External (left) and internal (right) view of ventriculus

15-1628 Species Plover, Snowy

Date Admitted August 4, 2015 at 1:19 pm

Last Update September 30, 2015 at 11:03 am

Intake

Location Found 928 Pacific Blvd., Oceano CA
Date Found August 4, 2015
Rescuer's Observations not moving, appears sick,
What fed by Rescuer
Notes

Initial Exam / Treatment

Dehydration	Mild	Admit Weight	36.70 g
Sex	Female	Admit Age	Adult
Admit Mentation	Depressed	Admit BCS	Reasonable

Head / mouth : Moderate swelling of entire head.

Eyes / ears : Squinting L eye. Blood in posterior chamber OS, obscuring complete view of fundus. Pecten visible and appears WNL. No fluorescein stain uptake. Since cannot see fundus well, difficult to determine if L eye will have normal vision. Will have to wait for some of the blood to resorb.

Wings / arms : Almost all flight feathers missing along L wing. Will not be flighted until feathers regrow on this wing. R wing WNL. Moulting several flight feathers on that wing. No palpable skeletal abnormalities.

Legs : Not standing when arrived, but was shortly after. No abnormalities found.

Feathers / skin : Moulting

Other : Possible predation or HBC. Rx antibiotics as precaution for possible predator interaction.

Initial Treatment : Cephalexin, meloxicam

Medical Record

Date	Treatment
9/30 9:41 AM	BW = 39.50g BAR. Good body condition. Missing several distal primaries and tertials on L wing. No sprouting feathers evident. On fundic, OD, unable to see any normal structures in posterior chamber. Looks like retina probably detached in several places. Scarring in vitreous. Eye appears comfortable. Plan to transfer today. SR
9/29 8:42 PM	BW = 40.00g BAR. Good body condition. FF continuing to grow in on L wing, except distal-most primaries. Might be hitting them against side of enclosure. R eye open and comfortable. No d/c. No redness. Plan for transfer to MBA tomorrow. SR
9/22 7:27 PM	BAR. Good body condition. FF growing in on L wing, but looks like may have broken off most distal. Holding R eye more open today. Paperwork in process for transfer to MBA. SR
9/20 9:38 AM	BW = 39.00g MA
9/19 9:51 AM	BW = 38.60g ES
9/12 8:54 AM	BW = 38.00g ES
9/7 7:51 PM	Globe significantly shrunken OD. Eyelids stay closed over eye, presumably b/c globe sunken and not holding palpebral fissure open. Doesn't appear inflamed. No d/c. Probably OK to transfer to aquarium when paperwork completed. SR
8/28 11:06 AM	BW = 38.00g
8/27 7:25 PM	Seems like R eye might be becoming phthisical. Noticeably less protruding than normal eye. Holding eye closed, but probably a function of eye sinking. Probably a good thing (??). SR
8/24 6:41 PM	Eye seems more comfortable. Definitely blinking w/third eyelid better. Still has ulcer w/stain uptake at center of eye, but smaller. Flight feathers continuing to grow in well. SR
8/24 8:30 AM	BW = 39.00g BAR. Good body condition. MT
8/19 6:17 PM	BW = 39.50g Opacity in R eye seems noticeably smaller than even yesterday. Conjunctiva less hyperemic as well. Ulcer still visible, but seems smaller and more superficial. SR

8/18 6:00 PM Bird is very BAR. Acting as I would assume a normal SNPL would. R eye still has visible ulcer, but opacity becoming more focal. Hyperemia of conjunctiva lessened. Eye appears more comfortable overall. Doesn't appear to be rubbing on wing anymore. SR

8/17 5:27 PM BAR. Acting pretty normal. Continuing to eat well and gain weight. FF starting to emerge L wing. Started optimend on Friday-large ulcer still apparent, but eye appears less swollen. Also seems more comfortable. Third eyelid covers at least half of the globe when bird blinks. Hoping eye will resolve to point where will be comfortable w/o enucleation. SR

8/17 1:34 PM 39.6 (8/14); 39.8 (8/15) JC

8/13 5:16 PM **BW = 39.40g** (morning wt) JC

8/12 6:43 PM Much more BAR, but ulcer on R cornea seems worse. Has been rubbing eye on R carpus-feathers matted. Not sure if able to blink which may lead to exposure ulcer. Tarsorrhaphy may be indicated? Might require enucleation at later time? Other eye does appear at least partially visual. Was running around and more active when placed on floor in SBR. SR

8/10 7:50 PM BAR/QAR. Doesn't move around much. R eye opaque-can't see any posterior chamber structures. Also appears slightly buphthalmic. Suspect lens luxation. Might have some vision in L eye, but don't think it is perfect either. Eye itself appears WNL, but no PLR or dazzle. Eating well, but just kind of catches mealworms at her feet. Very guarded prognosis. Waiting for ODSVRA to see what they want to do. SR

8/9 5:31 PM **BW = 38.00g** BAR. Most mealworms gone. Very thin. Removed heat lamp to see if necessary. MT

8/6 5:19 PM **BW = 34.50g** Bird is eating and little more active today. Eats mealworms when standing in middle of bowl full of them, but not sure if finding by sight. Both pupils dilated today and did not appear responsive to light. Fundus WNL OS, but still large amt blood in posterior chamber OD. Concerned about vision in both eyes at this point. SR

8/6 4:36 PM Seems perkier with heat lamp overhead. Put in some kelp/sand fleas that ODSVRA brought over. Bird is moving around more, cocks head to look up, vocal. Does not seem to peck at anything specific, and seems surprised when it bumps into hanging greenery or the mirror. JC

Disposition

Disposition	Transferred	Enclosure	Monterey Bay Aquarium
Transfer Type	Education or scientific research (institute)	Enclosure History	
Release Type		Holding At	
Disposition Date	September 30, 2015	Criminal Activity?	
Disposition Location	Monterey CA	Carcass Saved?	

Rescuer Contact Information

Organization		Phone	(661)600-3038
Name	Vahid Hamzeinejad	Alt. phone	
Address	108 Mustang Dr. #302 San Luis Obispo CA, 93405	Email	

Notes

Prescriptions

Dose	Prescription	Start date	End date
0.04 ml	Cephalexin 100mg/ml PO BID (100mg/kg)	8/4/2015	8/10/2015
0.05 ml	Meloxicam 1.6mg/ml PO BID (2mg/kg)	8/4/2015	8/6/2015
0.02 ml	Meloxicam 1.6mg/ml PO BID (1mg/kg)	8/7/2015	8/9/2015
	BNP ointment OD BID	8/11/2015	8/14/2015
	Optimend OD TID	8/14/2015	

Lab information

Diagnostic	Date
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