

**NESTING OF THE CALIFORNIA LEAST TERN AND
WESTERN SNOWY PLOVER AT
OCEANO DUNES STATE VEHICULAR RECREATION AREA,
SAN LUIS OBISPO COUNTY, CALIFORNIA
2012 SEASON**

**Prepared for
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**Prepared by
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Off-Highway Motor Vehicle Division
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TABLE OF CONTENTS

SUMMARY	1
INTRODUCTION	2
SITE DESCRIPTION	3
MONITORING AND MANAGEMENT ACTIONS	6
MONITORING	6
MANAGEMENT ACTIONS.....	11
RESULTS AND DISCUSSION	16
CALIFORNIA LEAST TERN	16
WESTERN SNOWY PLOVER	27
FACTORS INFLUENCING LEAST TERN AND SNOWY PLOVER REPRODUCTIVE SUCCESS	40
RECOMMENDATIONS	49
NOTES	58
LITERATURE CITED	61
APPENDICES	63
APPENDIX A. CALIFORNIA LEAST TERN NESTS AT ODSVRA IN 2012.....	63
APPENDIX B. SNOWY PLOVER NESTS AT ODSVRA IN 2012.	67
APPENDIX C. MAPS OF ALL CALIFORNIA LEAST TERN AND SNOWY PLOVER NEST LOCATIONS AT ODSVRA IN 2012.	84
APPENDIX D. BANDED LEAST TERNS AND SNOWY PLOVERS.....	93
APPENDIX E. ADDENDUMS TO SNOWY PLOVER NESTING SUCCESS.	110
APPENDIX F. HABITAT ENHANCEMENT ACTIONS IN 6, 7, AND 8 ENCLOSURES AT ODSVRA AND SUBSEQUENT SUBSTRATE USE BY NESTING LEAST TERNS AND SNOWY PLOVERS AND THEIR SUCCESS.....	112
APPENDIX G. PREDATOR SUMMARY TABLES AND FIGURES.	125
APPENDIX H. DOCUMENTED MORTALITY OF CALIFORNIA LEAST TERN AND SNOWY PLOVER CHICKS, JUVENILES, AND ADULTS AT ODSVRA FROM 1 MARCH TO 30 SEPTEMBER 2012.	132

List of Tables

Table 1. Nesting success of California least terns at ODSVRA from 1991-2012.....	17
Table 2. Nesting success of California least terns at different sites within the Southern Enclosure at ODSVRA in 2012.	17
Table 3. Causes of California least tern nest loss at ODSVRA from 2002-12.....	19
Table 4. Number of fledglings counted at ODSVRA from 2006-11 using two methods: three-week interval daytime counts and identification of individuals in the mostly color-banded population of juveniles.....	20
Table 5. 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 eight-year period, 2005-12.....	21
Table 6. California least tern reproductive success reported for current or recent breeding sites in San Luis Obispo and Santa Barbara counties from 2004-12.	25

Table 7. 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 2004-12.	26
Table 8. Number of snowy plover breeding adults, breeding males, fledglings, and chicks fledging per breeding male for the 11-year period, 2002-12.	27
Table 9. Number of adult snowy plovers counted on USFWS breeding season window surveys versus calculated minimum number of breeding adults at ODSVRA from 2005-12.	28
Table 10. Snowy plover nest distribution and success at ODSVRA in 2012.	29
Table 11. Nesting success of snowy plovers at ODSVRA from 2001-12.	30
Table 12. Attributed causes of snowy plover nest loss at specific locations at ODSVRA in 2012.	31
Table 13. Attributed causes of snowy plover nest loss in Southern Exclosure and Oso Flaco at ODSVRA from 2002-12.	32
Table 14. Number of chicks hatching in early season (prior to 20 June) and late season (20 June or later) and subsequent fledging rate at ODSVRA from 2007-12.	33
Table 15. Snowy plover brood movement at ODSVRA in 2012.	36
Table 16. Snowy plover nest depredation rate in specific areas at ODSVRA in 2012.	41
Table 17. Coyote presence in the Southern Exclosure and Oso Flaco at ODSVRA from 2009-12.	44
Table 18. Sightings of large owl spp., northern harrier, peregrine falcon, and red-tailed hawk in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA in 2012.	46
Table 19. Sightings of peregrine falcon in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA from 2008-12.	47
Table D.1. Banded least terns recorded at ODSVRA in 2012.	93
Table D.2. Banded snowy plovers with known origins seen at ODSVRA 1 October 2011 to 29 February 2012.	95
Table D.3. Banded snowy plovers with known origins seen at ODSVRA 1 March to 30 September 2012.	98
Table D.4. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2011 to 29 February 2012.	104
Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2012.	107
Table E.1. Nesting success of snowy plovers at ODSVRA from 2001-12.	110
Table E.2. Nest protection used at ODSVRA in 2012.	111
Table F.1. Nest numbers and fates (hatched, depredated, abandoned) for different substrates (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA from 2008-12.	119
Table F.2. The percentage occurrence of random points, snowy plover, and least tern nests for all substrates except bare sand for the 6, 7, and 8 exclosures in 2012.	122
Table F.3. The mean, median, mode, standard error, and standard deviation for all random points, snowy plover nests and least tern nests in the woodchip distribution area in 2012.	123

Table G.1. Summary of predators detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.	125
Table G.2. Mammalian and avian predators removed under predator management actions for least terns and snowy plovers at ODSVRA in 2012.	127
Table H.1. Documented predation of least terns.....	132
Table H.2. Documented predation of snowy plovers.	132
Table H.3. Mortality, other than predation, of least terns.....	133
Table H.4. Mortality, other than predation, of snowy plovers.....	133

List of Figures

Figure 1. ODSVRA site map.	14
Figure 2. ODSVRA Southern Exclosure and Oso Flaco seasonally protected areas for breeding California least terns and snowy plovers in 2012.	15
Figure 3. Number of California least tern nests, pairs, and fledglings at ODSVRA from 1991-2012.....	18
Figure 4. Distribution of least tern nests as a percent of total nests at ODSVRA from 2004-12. 18	
Figure 5. Number of days California least tern juveniles that hatched at ODSVRA in 2012 continued to be seen on-site after reaching fledge age (21 days old).	22
Figure 6. Number of California least terns counted at the ODSVRA 6 exclosure night roost in 2012.....	24
Figure 7. Number of snowy plover breeding males, nests, nests hatched, chicks, and chicks fledged at ODSVRA from 2001-12.	28
Figure 8. Number of snowy plover nests at ODSVRA from 1993-2012.....	29
Figure 9. Number of known location and known fate snowy plover nests with known initiation date (n=197).....	31
Figure 10. Fledging rate of chicks hatching in early season (prior to 20 June) and late season (20 June or later) at ODSVRA from 2003-12.	34
Figure 11. Number of snowy plover chicks hatching per 10-day period and number subsequently fledging at ODSVRA in 2012.....	34
Figure 12. Loss of snowy plover chicks by age and location last seen in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.....	35
Figure 13. 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 2005-12.	38
Figure 14. Monthly average number of snowy plovers observed during nonbreeding season surveys at ODSVRA from October 2011 to February 2012.....	39
Figure 15. Number of days coyote, opossum, skunk, and raccoon were detected in the Southern Exclosure and Oso Flaco at ODSVRA from 2007-12.	43
Figure 16. Number of days large owl spp., northern harrier, peregrine falcon, and red-tailed hawk were detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2007-12.	46
Figure 17. Monthly average number of gulls at ODSVRA for March to October, 2009-12.....	48
Figure C.1. All California least tern and snowy plover nest locations at ODSVRA in 2012.....	84
Figure C.2. California least tern nest locations at ODSVRA in 2012 (6 exclosure).	85

Figure C.3. California least tern nest locations at ODSVRA in 2012 (7 exclosure).	86
Figure C.4. Snowy plover nest locations at ODSVRA in 2012 (6 exclosure).....	87
Figure C.5. Snowy plover nest locations at ODSVRA in 2012 (7 exclosure).....	88
Figure C.6. Snowy plover nest locations at ODSVRA in 2012 (8 exclosure).....	89
Figure C.7. Snowy plover nest locations at ODSVRA in 2012 (Boneyard exclosure).	90
Figure C.8. Snowy plover nest locations at ODSVRA in 2012 (North Oso Flaco exclosure).	91
Figure C.9. Snowy plover nest locations at ODSVRA in 2012 (South Oso Flaco exclosure).	92
Figure F.1. Map of seeding and planting locations for 2012.....	114
Figure F.2. Photos taken at the beginning and at the end of the 2012 breeding season of an experimental seed plot located on the shoreline of southern 6 exclosure.....	115
Figure F.3. Photos taken at the beginning and at the end of the 2012 breeding season of an experimental plant plot located on the shoreline of 6 exclosure.....	116
Figure F.4. Total number of snowy plover nests established in each substrate (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA in 2012.	117
Figure F.5. Number and percentage of snowy plover nests hatching per the total number of nests in each substrate (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA in 2008-12.....	118
Figure F.6. Nest substrates of least terns and snowy plovers in 6, 7, and 8 exclosures at ODSVRA in 2012.....	120
Figure F.7. Total number of least tern nests established in each substrate (woodchips, assorted debris, and bare sand) in 6 and 7 exclosures at ODSVRA in 2012.	121
Figure F.8. Number and percentage of least tern nests hatching per the total number of nests in each substrate (woodchips, assorted debris, and bare sand) in 6, 7, and 8 exclosures at ODSVRA from 2008-12.....	121
Figure F.9. The mean of the value for bare sand coverage in the one meter by one meter area centered around the random points, snowy plover nests, and least tern nests in 2012.....	123
Figure F.10. Field sheet for substrate collection at nests and random points, 2012.....	124
Figure G.1. Mammalian occurrences documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.....	128
Figure G.2. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.....	130

Attachments

U.S. Department of Agriculture Wildlife Services. Oceano Dunes State Vehicular Recreation Area 2012 Predator Management Report

Ventana Wildlife Society. Avian Predator Management Project: Trapping and Relocation of Problem Predators at Oceano Dunes State Vehicular Area in 2012

Necropsy examination results: one snowy plover chick and one snowy plover adult

SUMMARY

Staff of Oceano Dunes State Vehicular Recreation Area (Oceano Dunes SVRA, ODSVRA) and PRBO Conservation Science (PRBO) 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 2012.

All least tern nests were inside a large seasonally fenced enclosure in the southern portion of the vehicle riding area. There was a minimum of 41 breeding pairs, an increase of 24.2% from 33 breeding pairs in 2011, and slightly above the average of 38.8 pairs (range=20-55) from 2002-11. There were 46 known nesting attempts. Of the 40 nests with known location and fate, 33 hatched, for a nest hatching rate of 83%. Of the seven nests that failed, one was abandoned pre-term (prior to the expected hatch date), two were abandoned post-term (after the expected hatch date), three were abandoned unknown if pre- or post-term, and one failed due to an unknown cause. Fifty-two chicks hatched and 45 were color-banded to individual. Forty-two of the 52 chicks (including six unbanded chicks) are known to have fledged (seen when 21 days old or older), for a chick fledging rate of 81% and 1.02 chicks fledged per pair. Predation of chicks or juveniles was documented for, but not necessarily limited to, three terns. The maximum known number of juveniles produced that may have survived to leave the site was 40.

There was a minimum of 190 breeding snowy plovers (105 males and 85 females), compared to 160 in 2011. Eighty-five banded birds were documented as breeding, 76 of these were banded as chicks and fledged from ODSVRA from 2003-11. There were 216 known nesting attempts, 194 were in the southern riding area seasonal enclosure (Southern Enclosure), 14 in Oso Flaco, three in the open riding area, and five from unknown locations (nesting known only by detection of brood). Of the 203 nests with known location and fate, 152 hatched, for a nest hatching rate of 74.9%. Fifty-one nests failed, attributed to the following causes: abandoned pre-term (16), abandoned post-term (2), abandoned suspected due to wind (7), abandoned unknown pre- or post-term (3), unknown cause (3), unidentified predator (3), unidentified avian predator (6), corvid (3), northern harrier (5), peregrine falcon (1), coyote (1), and flooded (1). Of the 386 hatching chicks, 341 were color-banded to brood, and the fate of 45 unbanded chicks is known (three fledged). Of the 386 chicks with known fate, 96 fledged for a chick fledging rate of 24.9% and predation is suspected as the primary cause for the low 2012 chick survival rate. One chick fledged per breeding male is the estimated number needed to prevent the population from declining (assuming approximately 75% annual adult survival and 50% juvenile survival) (U.S. Fish and Wildlife Service 2007). In 2012, an estimated 0.91 juveniles fledged per male at ODSVRA. For the 11-year period 2002-12, average productivity was 1.31 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 1.4 million people in 2011 for a variety of recreational opportunities, including driving vehicles on the beach and dunes.¹ In 2011, an estimated 265,815 street-legal vehicles and 153,514 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 2012 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, California Department of Fish and Game (CDFG) Memorandum of Understanding (MOU), and CDFG Scientific Collecting Permits. Predator removal activities are conducted under USFWS Depredation Permit MB25976A-0. PRBO conducts monitoring and banding activities under USFWS permit 10(a)(1)(A) TE-807078-14.1, Federal US Geological Survey Bird Banding Laboratory Banding Permit 09316, CDFG Scientific Collecting Permit SC-006691, and a CDFG Letter of Authorization.

¹ ODSVRA 2011 Annual Attendance figures (source ODSVRA)

² ODSVRA 2011 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 (formerly ConocoPhillips 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 Game in 2007. 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. The Pismo Lake property is currently closed to the public.

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 2012 was approximately 296 acres, compared to a range of 271-294 acres (and an average of 284 acres) between 2004 and 2011. 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, north of 7 enclosure (approximately 0.5 miles of shoreline and approximately 60 acres), first incorporated into the Southern Enclosure for a full season in 2004. Vegetation within the enclosure is very sparse.

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 61 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 (7.4 acres) has been closed year-round since 2005 due to the presence of a cultural resource area. This area has developed small vegetated hummocks. Straw bales, placed within the protected cultural area, 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 44 acres in the western portion (contiguous with 6, 7, and 8 enclosures) and 49 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 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 Enclosure. 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 Enclosure. 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 (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 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) offers an estimate.

Nest substrates: Monitoring staff documents substrate of each nest with a known location in 6, 7 and 8 enclosures. Staff analyzes nest substrate information to assess the benefits of ongoing habitat enhancement activities. See Appendix F for more information.

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 given the category of “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 abandoned suspected due to wind category. 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.

Banding chicks: In 2012, least tern chicks received a single blank size 1A aluminum band (covered with blue over white vinyl tape) on the right leg, and a size 1A numbered aluminum federal band on the left leg. Colored 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.

Chick monitoring: Searching for broods occurs multiple times each week from vehicle surveys on the shoreline of the Southern Exclosure 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 and Pismo Lagoon) 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 2006-12 almost all 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 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 from known location nests divided by total number of nests with known location and fate.

Productivity: Number of least tern fledglings per breeding pair (consistent with the annual statewide California least tern report produced by CDFG). 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 provides 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 minimum number of breeding pairs equals the maximum number of concurrently active nests and broods. Banding 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 were 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 regional 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) 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 measured inconsistently by hand-held 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 PRBO) 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 (castings), 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 40.

Gull monitoring: Gulls depredate snowy plover and least tern eggs, chicks, and juveniles. Gulls are of particular concern because they are a subsidized predator often responding to human activity. Conducting daily and more detailed weekly surveys, in addition to general predator monitoring, documents flock locations and numbers within the park.

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 (the California Health and Food Safety Laboratory at the University of California, Davis) 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, seasonally closes areas to visitors, and posts signage. Staff augments existing habitat with branches, woodchips, wrack, 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, referred to as 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 chooses 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 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, Pismo Creek area, and areas north of Grand Avenue).

10 foot by 10 foot, circular, and mini-enclosures: Staff selectively uses a small circular or two small square nest enclosure (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 in 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-enclosures (used since 2010) are three feet by three feet by three feet with a wire mesh top and buried four to eight inches when appropriate. Of the three types, mini-enclosures take the least amount of time and staff to install.

Bumpout: A nest in the Southern Enclosure located within a minimum of 100 feet to 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.

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 Enclosure. This recreational use results in large areas of flattened terrain and barren sand with very limited scattered natural debris and vegetation.

Staff place material in 6, 7, and 8 enclosures 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 (surf-cast kelp) are added to the enclosures, including to the shore, 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 Enclosure shoreline following five months of recreational vehicle use.

OSDVRA collects wrack in the open riding area and disperses it in the Southern Enclosure. Heavy equipment aides in this process if available, but most 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 Enclosure 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 enclosures 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 enclosures to the west fence and upper shoreline west of the enclosure. Staff collects the branches and driftwood from the enclosures at the end of each season and stores them for use in the following season.

Plants and seeds: Prior to expected rain, staff broadcasts locally collected seed and installs container plants grown from seed of locally collected native foredune species in an effort to provide scattered plants in 6 and 7 enclosures. Scattered plants, and the associated development of small hummocks, can benefit plovers and terns during the breeding season. See Appendix F for more details.

Least tern chick shelters: Staff places tern chick shelters in the 6 and 7 enclosures in areas of historical tern nesting and chick rearing. Tern chicks and juveniles use these shelters during high winds, typically sheltering on the leeward side. These simple structures are two or three pieces of plywood attached together to form either an A-shape shelter (typically six inches high by 12 inches long by 11 inches wide), L-shape shelter (typically seven inches high by 19 inches long by 14 inches wide), T-shape shelter (12 inches by 12 inches flat roof with a center support partially buried in sand), or a double-T-shape shelter (16 inches by 22 inches flat roof with two supports eight inches deep and five inches apart buried in the sand).

Predator management

In addition to preventative measures such as fencing, individual nest enclosures, and cover provided by habitat enhancement, OSDVRA park staff and contractors consistently 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. 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 40 for additional information.

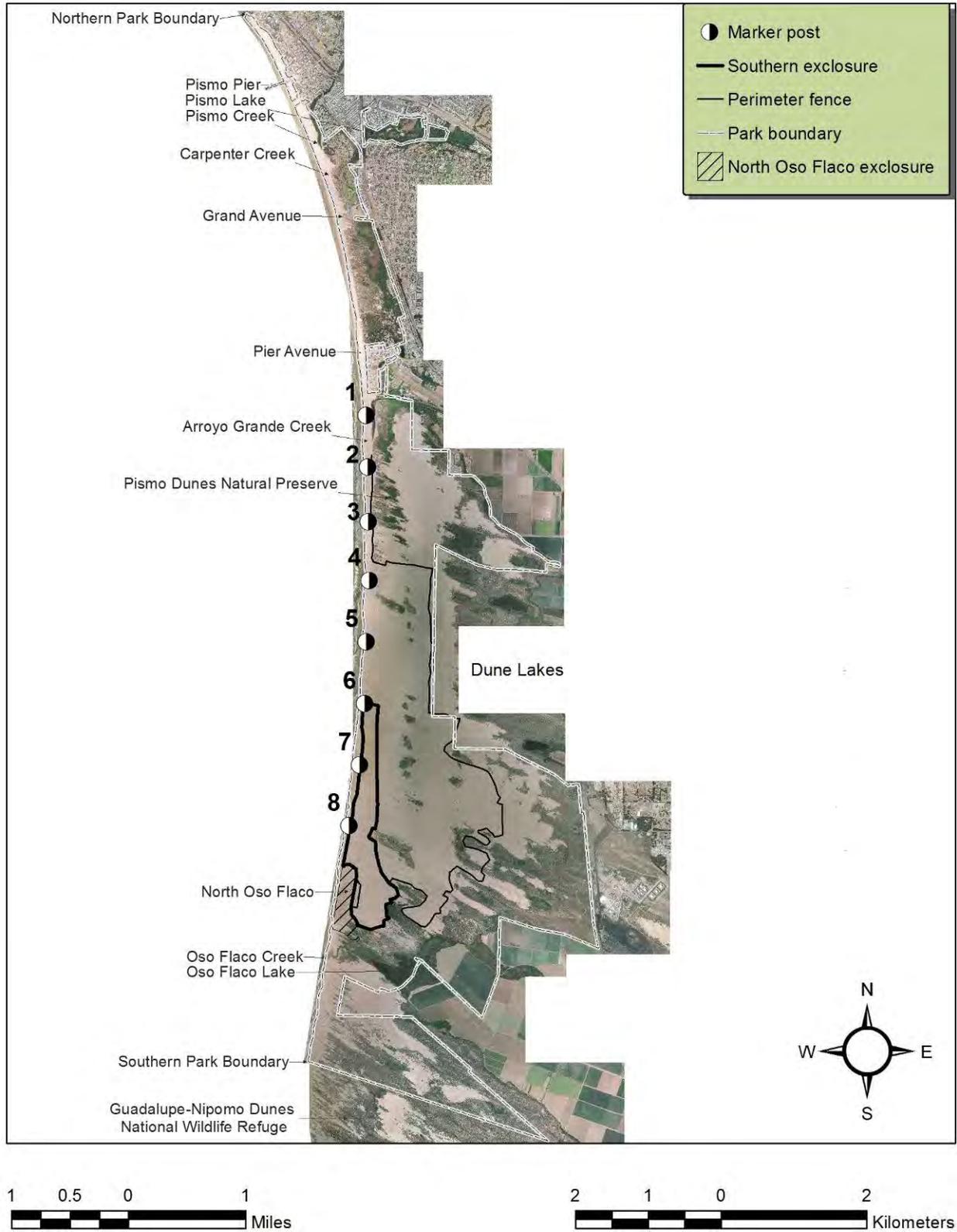


Figure 1. ODSVRA site map.

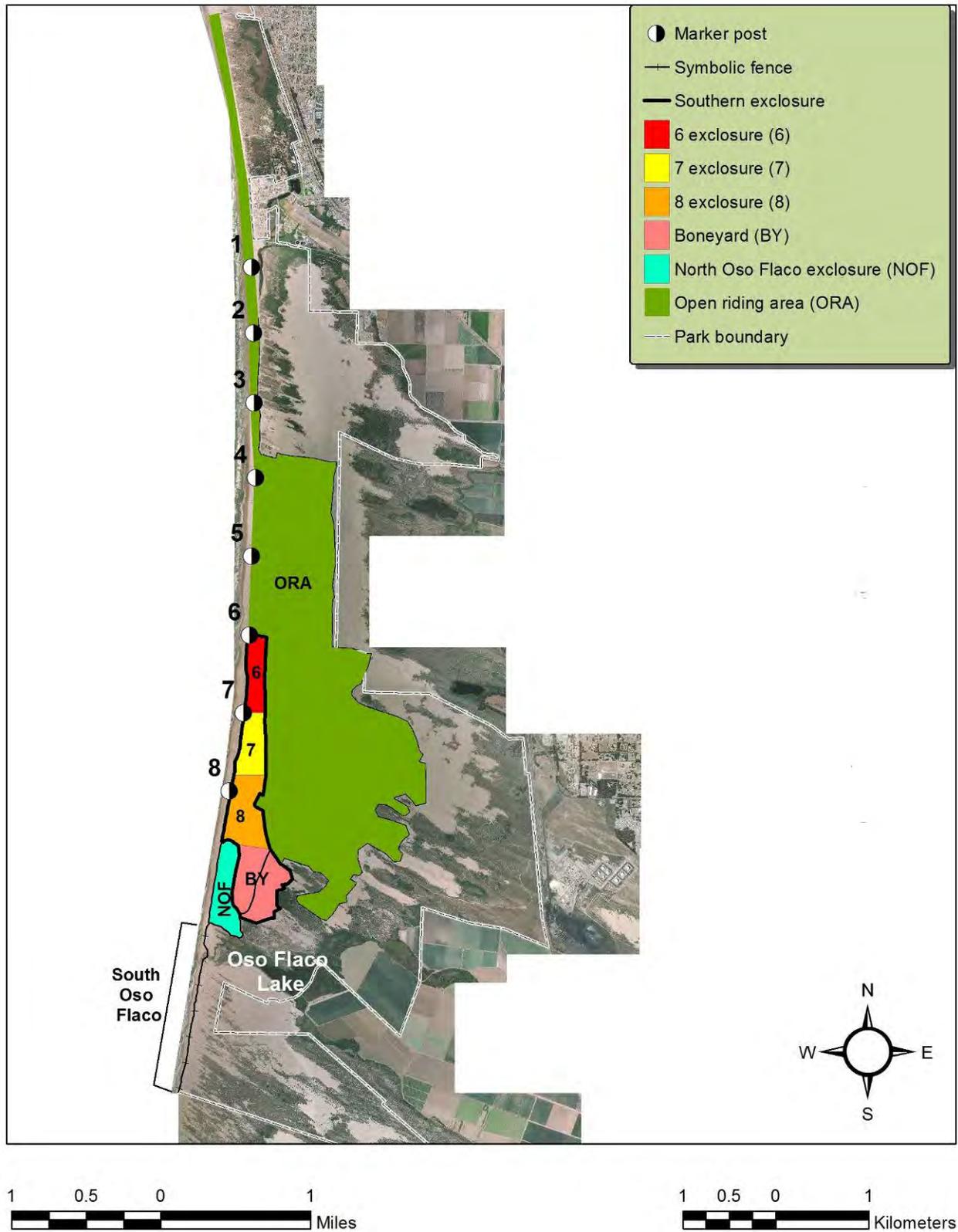


Figure 2. ODSVRA Southern Enclosure and Oso Flaco seasonally protected areas for breeding California least terns and snowy plovers in 2012.

RESULTS AND DISCUSSION

CALIFORNIA LEAST TERN

Number of breeding pairs

In 2012, least terns were first seen at ODSVRA on 6 May with two flying over the enclosure and from 8 May onward, terns were seen or heard daily. Terns were last seen on 29 August with three adults and two juveniles at Oso Flaco Lake. During the previous 10 years, first sightings occurred between 8 April and 15 May (median=9 May) and last sightings occurred between 20 August and 28 September (median=4 September). There was a minimum of 41 breeding pairs in 2012, a 24.2% increase from 33 breeding pairs in 2011, and slightly above the average of 38.8 pairs (range=20-55) from 2002-11 (Table 1, Figure 3).

Number of nests

There were 46 nesting attempts documented, with the first nest initiated approximately 27 May and the last 12 July (Appendix A). During the ten-year period 2002-11, there was an average of 47 nests per year (range=22-79) with initiation dates for first nests ranging from 26 May to 8 June (median=4 June). In 2012, a high count of 34 nests were active at the same time on 21 and 24 June. Of the 39 nests with known complete clutch size, six had one egg, 31 had two eggs, and two had three eggs. The average number of eggs in completed clutches was 1.90. This compares to an average of 1.85 for 2002-11 (range=1.55-2.10), and statewide averages of 1.62, 1.75, 1.76, 1.82, and 1.75 in 2007-11, respectively (Marschalek 2007, 2008, 2009, 2010, 2011). All nests were located in 6 enclosure (36 nests) and 7 enclosure (10 nests). Since 2005, the percent of total nests at ODSVRA in 8 and Boneyard enclosures decreased from 69% in 2005 to 12% in 2009, when nesting last occurred in these enclosures (Table 2, Figure 4).

Clutch hatching rate

For six of the 46 nests, the nest fate (hatch or fail) was unknown. Of the 40 nests with known fates, 82.5% hatched and 17.5% failed. This compares to an average clutch hatching rate of 80% (range=66-89%) during the period 2002-11 (Table 1). The hatching rate for known fate and known location nests in 6 enclosure was 86.7% (26/30) and in 7 enclosure was 66.7% (6/9) (specific enclosure location for one hatching nest not determined) (Table 2). Of the seven nests that failed, one was abandoned pre-term, two were abandoned post-term, three were abandoned unknown if pre- or post-term, and one failed to unknown cause (Table 3). The two nests abandoned post-term were observed incubated a minimum of 43 and 51 days.

Table 1. Nesting success of California least terns at ODSVRA from 1991-2012.

Year	Estimated minimum no. breeding pairs	No. nests (no. known fate)	No. hatched nests	Percent nests hatched	No. chicks	Percent chicks fledged	No. juveniles	Juveniles fledged per known fate nests	Juveniles fledged per pair
1991	4	6 (6)	2	33	4	50	2	0.33	0.50
1992	3	4 (4)	1	25	2	50	1	0.25	0.33
1993	0	0 (0)	0	0	0	0	0	0.00	0.00
1994	2	2 (2)	0	0	0	0	0	0.00	0.00
1995	1	1 (1)	0	0	0	0	0	0.00	0.00
1996	0	0 (0)	0	0	0	0	0	0.00	0.00
1997	16	21 (10)	3	30	6	67	4	0.40	0.25
1998	33	40 (32)	26	81	40	60	24	0.75	0.73
1999	28	34 (30)	21	70	38	45	17	0.57	0.61
2000	4	5 (5)	4	80	8	50	4	0.80	1.00
2001	12	18 (18)	13	72	22	55	12	0.67	1.00
2002	20	22 (19)	15	79	27	37	10	0.53	0.50
2003	53	79 (77)	60	78	101	37	37	0.48	0.70
2004	47	63 (60)	44	73	69	36	25	0.42	0.53
2005	47	59 (59)	39	66	66	30	20	0.34	0.43
2006	31	38 (38)	28	74	45	80	36	0.95	1.16
2007	54	66 (66)	51	77	90	78	70	1.06	1.30
2008	55	56 (56)	50	89	99	71	70	1.25	1.27
2009 ¹	25	26 (26)	23	88	43	77	33	1.27	1.32
2010 ²	23	23 (23)	20	87	35	83	29	1.26	1.26
2011 ²	33	35 (35)	31	89	55	91	50	1.43	1.52
2012 ³	41	46 (40)	33	83	52	81	42	1.05	1.02

¹ Six unbanded chicks, four were identified as fledging and are included.

² One unbanded chick identified as fledging and is included.

³ Six unbanded chicks identified as fledging and are included.

Table 2. Nesting success of California least terns at different sites within the Southern Exclosure at ODSVRA in 2012.

Southern Exclosure	No. nests (no. known location and fate)	No. eggs	No. nests hatching	Percent nests hatching	No. chicks	No. chicks fledging	Percent chicks fledging	Juveniles fledged per known fate nests
6 exclosure	36 (30)	62	26	86.7	41	33	80.5	1.10
7 exclosure	10 (9)	19	6	66.7	10	8	80.0	0.89
TOTAL¹	46 (40)	82	33	82.5	52	42	80.8	1.05

¹Six chicks from four known hatching nests were not banded (one of these found dead at nest). In addition, there were seven nests identified with unknown fate (unknown if hatched or failed). A total of six unbanded fledglings were seen in 6 exclosure on 4 August. Five are assumed to be from the five known unbanded chicks and the sixth from an unknown fate nest that did hatch in 6 or 7 exclosure. This sixth fledgling is accounted for in the total number of eggs, hatching nests, chicks, and fledglings for ODSVRA.

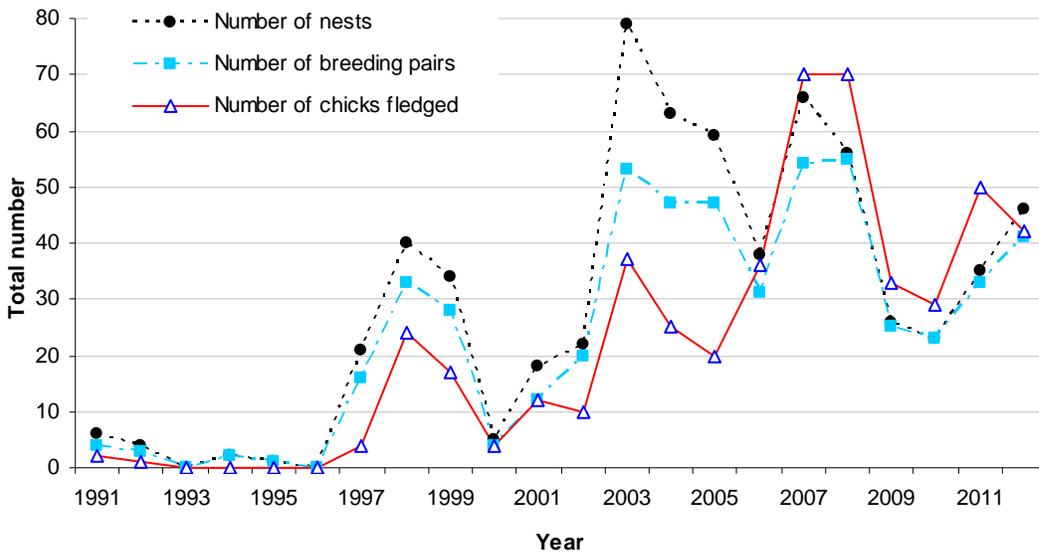


Figure 3. Number of California least tern nests, pairs, and fledglings at ODSVRA from 1991-2012.

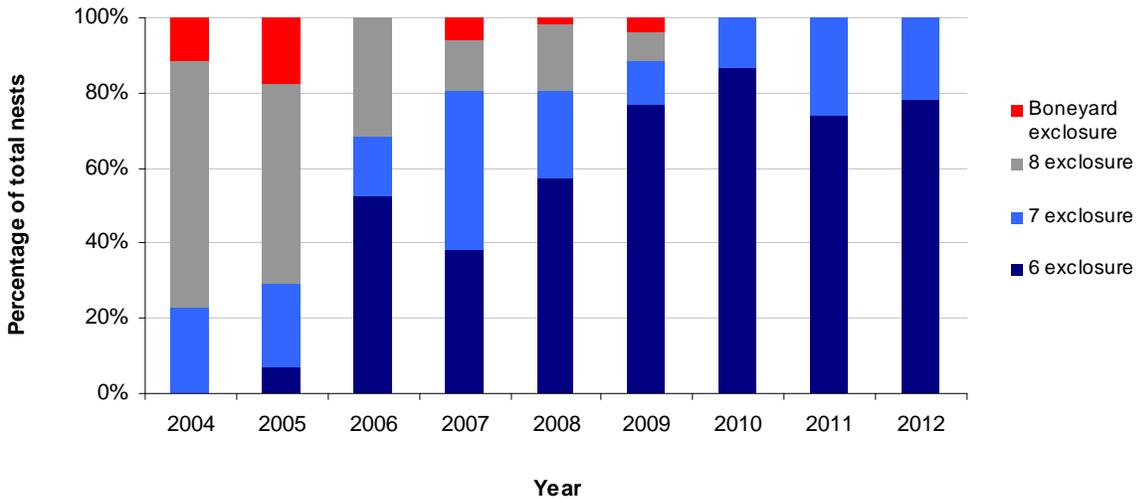


Figure 4. Distribution of least tern nests as a percent of total nests at ODSVRA from 2004-12.

6 enclosure was first incorporated into the Southern Enclosure for a full season in 2004.

Table 3. Causes of California least tern nest loss at ODSVRA from 2002-12.

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	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 ¹	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
Total 2002-12	36 (37.1%)	23 (23.7%)	4 (4.1%)	9 (9.3%)	12 (12.4%)	5 (5.2%)	1 (1%)	1 (1%)	5 (5.2%)	1 (1%)	97

¹ Ab. pre-term and Ab. unknown if pre- or post-term numbers for 2006 were incorrectly reported as three and three, respectively, in 2006-09 reports (CDPR 2006, 2007, 2008, 2009). The fates were listed correctly in Appendix A of the 2006 report.

Chick fledging rate and juveniles

Forty-five of the 52 known hatching chicks were banded with a unique color combination. Forty-two of the 52 chicks were seen when 21 days old or older for a fledging rate of 81% (36 fledglings were banded and six were unbanded) (Appendix A). This compares to an average fledging rate of 80% (range=71-91%) during the previous six years when most chicks were also banded to individual. Of 19 two-chick broods, 53% fledged both young; this compares to an 86% fledging rate for 22 two-chick broods in 2011 and an average of 64% (range=54-80%) for 131 two-chick broods during the period 2006-10. In 2012, the number of fledglings produced per pair was 1.02. This is 21.5% lower than the average for the previous six years (mean=1.3, range=1.16-1.52), but well above the statewide range of 0.17-0.25 for 2011. (Table 1). Statewide, the reported number of least tern fledglings per pair (given in a range) was 0.35-0.52, 0.33-0.39, 0.29-0.37, 0.24-0.30, 0.29-0.35, and 0.17-0.25 in 2006-11, respectively (Marschalek 2006, 2007, 2008, 2009, 2010, 2011).

There were three documented predation events involving least terns. On 31 July, a peregrine falcon was observed eating a fledgling or near-fledgling tern in 6 enclosure (identification confirmed with collected feather remains). On 9 August, a tern band was present, along with snowy plover bands, in a coyote scat found east of the southern portion of North Oso Flaco. On 11 August, the fresh feather remains of an avian predator's prey were collected from 6 enclosure. The feathers were those of a least tern (likely a juvenile), and found along with the feathers was a least tern band. This band, and the one found in the coyote scat, were not the federal numbered bands and did not provide information on the identity of the depredated terns.

On 7 July, an unbanded chick, approximately one to two days old, was found dead at the nest from unknown cause. This chick was observed alive earlier in the day (observed by spotting scope from outside the enclosure).

During the last three years, 2010-12, there have been three occurrences of a least tern chick moving east of the enclosure into the open riding area (zero in 2012; one in 2011; and two in 2010, by the same chick on the same day). These chicks were being monitored closely and documented moving a few feet east of the enclosure fence before being directed back into the enclosure.

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. In the absence of such banding, one method used to estimate the number of juveniles produced at least tern sites in California is to add together high counts of juveniles that are seen on dates at intervals of three weeks or more (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. A juvenile count using the three-week count method is not available for 2012 at ODSVRA. For the previous six-year period 2006-11, the three-week count method 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 total number (Table 4).

Table 4. Number of fledglings counted at ODSVRA from 2006-11 using two methods: three-week interval daytime counts and identification of individuals in the mostly color-banded population of juveniles.

Data not available for 2012. Chicks banded to individual for all years.

Year	Three-week interval daytime count	Identification of individuals in the mostly color-banded population of juveniles	Percent of documented juveniles identified by three-week interval daytime count
2006	17	36	47.2
2007	38	70	54.3
2008	30	70	42.9
2009	22	33	66.7
2010	13	29	44.8
2011	19	50	38.0
Average for 2006-11			49.0

Color banding chicks to brood in 2005 and to individual since 2006 has also provided information on juvenile length of stay at ODSVRA. In 2012, 33.3% (12/36) of the color-banded juveniles were documented remaining at ODSVRA for 21 days or longer post-fledging. Over the eight-year period 2005-12, 333 color-banded fledglings were tracked at ODSVRA with 36.9% remaining 21 days or longer (Table 5, Figure 5). This is in contrast to the premise of the three-week count that most fledglings depart the colony site prior to three weeks after fledging. Similar findings are reported from a two-year study of three least tern colony sites in the eastern United States which found that methods dependent upon counting non-individually identified fledglings tend to underestimate fledgling production and residency time as compared to information available from counting individually banded fledglings (Bailey and Servello 2008).

Table 5. 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 eight-year period, 2005-12.

During this period, 333 color-banded fledglings (21 days old or older) were tracked at ODSVRA (sightings outside the park are not included). A minimal number of juveniles identified as becoming permanently unable to fly (e.g. broken wing) are included up to (but not including) the day first noted as injured. Numbers in parentheses are percentages of all fledglings for the year.

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%)
TOTAL 2005-12	42 (13%)	82 (25%)	86 (26%)	107 (32%)	16 (5%)

Least tern use of nearby small freshwater lakes

During the chick-rearing period, adult least terns are noted foraging over the ocean, but can 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 first monitored for tern presence in 2010 with one day of recorded observations. Terns were also noted in 2011 flying over Pismo Lake on one day. Tern use of this lake is suspected to be minimal. There were no observed sightings in 2012; however, this area was not actively monitored by staff. Oso Flaco Lake is more accessible to monitors and in 2012 there were 26 surveys (lasting an average of 57 minutes) conducted between 30 July and 4 September. The high count of least terns seen at Oso Flaco Lake on one day was 13 on 9 August. Over the season, a total of 13 individually banded fledglings and a minimum of 12 banded adults were seen at Oso Flaco Lake, including 11 adults identified as banded as chicks at ODSVRA. Adults were observed foraging and roosting, while juveniles were observed flying and roosting, but not foraging. 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 with fish flying into the enclosure from the east (the direction of Dune Lakes). In 2007, monitors first documented terns foraging at Cypress Ridge Lake, located approximately 3.2 miles from the tern colony site. This lake had moderate levels of foraging in 2007-10, none in 2011, and minimal use in 2012.

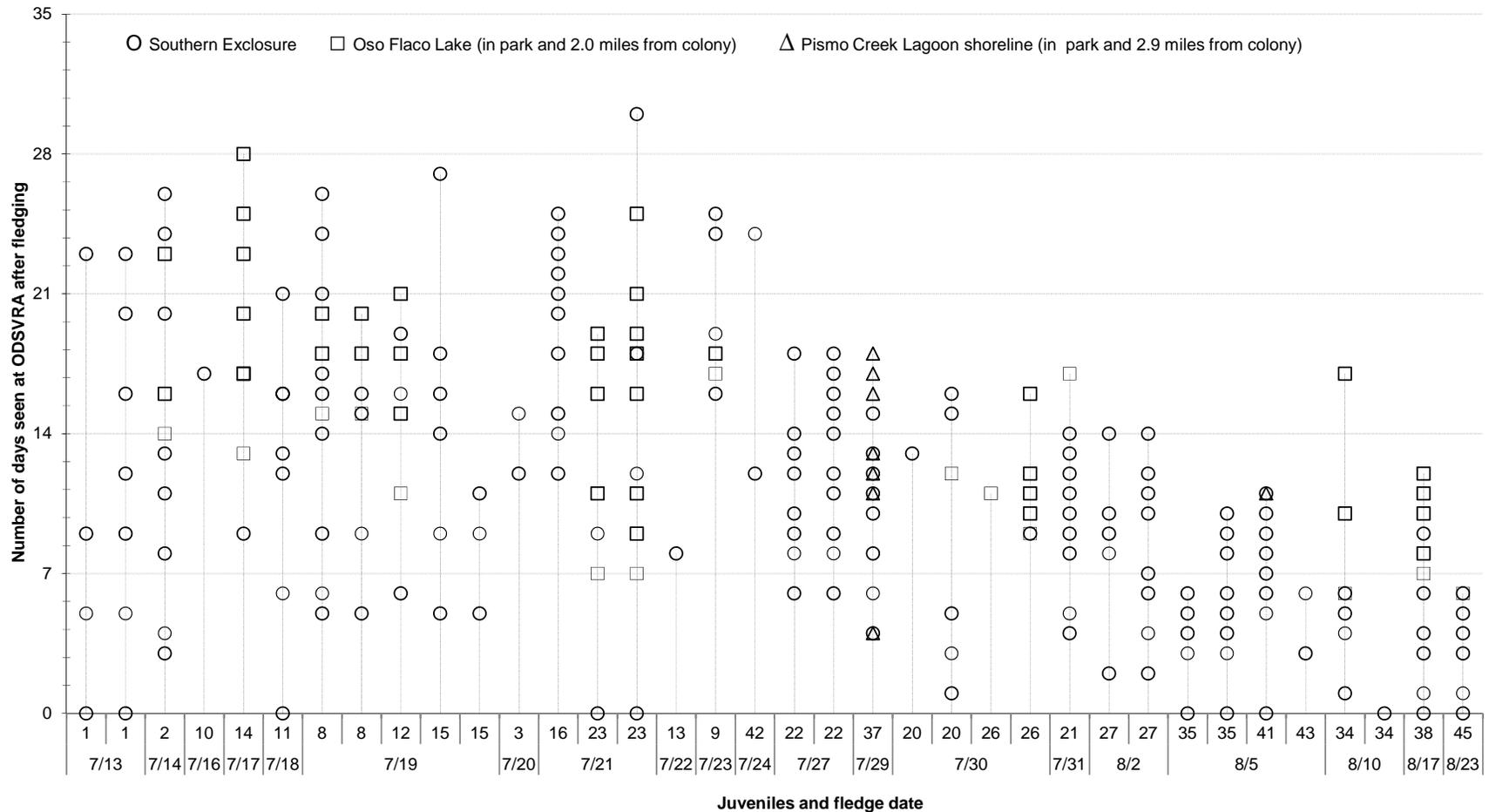


Figure 5. Number of days California least tern juveniles that hatched at ODSVRA in 2012 continued to be seen on-site after reaching fledge age (21 days old).

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.

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. Of the 38 banded adults documented at ODSVRA in 2012, 33 were banded as chicks at the site from 2006-11. Five adults had only a federal aluminum band and may or may not have been banded at ODSVRA. Breeding was documented for eight of the 38 banded adults (all banded at ODSVRA from 2006-10) (Table D.1 in Appendix D).

ODSVRA banded least terns seen away from vicinity of colony

In 2012, six color-banded least terns from ODSVRA were seen in southern San Diego County on their southward migration. Four were juveniles and two were adults. All were banded at ODSVRA when chicks.

Two sibling juveniles from nest LT23 (O/G:B/W and Y/G:B/W) were observed. The O/G:B/W juvenile (last observed at ODSVRA on 17 August) was at Chula Vista Wildlife Reserve (CVWR) on 21 and 28 August and 4 September. The Y/G:B/W juvenile (last observed at ODSVRA on 20 August) was at the mouth of the Tijuana River on 23 August.

One juvenile from nest LT27, O/R:B/W (last observed at ODSVRA on 16 August), was observed at CVWR on 28 August and 4 September.

One juvenile from nest LT38, Y/B:B/W (last observed at ODSVRA on 29 August), was observed at CVWR with an associated adult, Y/W:W/B/W, banded in 2008 (last observed at ODSVRA on 25 August with Y/B:B/W). While at ODSVRA, this adult was identified as a parent of this juvenile.

O/A:W/B adult was observed at CVWR on 28 August (last observed at ODSVRA on 15 August). This bird was banded while a chick at ODSVRA in 2009.

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. In 2012, the night roost continued in the same area of northern 6 enclosure used since 2004 (when 6 enclosure first became available as protected habitat for a complete season) (Figure C.2 in Appendix C). Counts at the night roost are minimums, as some or all birds would often arrive after it was too dark to count individuals. In 2012, there was a high count of 62 birds at the night roost on 14 June (Figure 6). This compares to night roost high counts of 95, 63, 37, 35, and 52 in 2007-11, respectively. Both adults and juveniles were seen but it typically was too dark to distinguish plumage and age class.

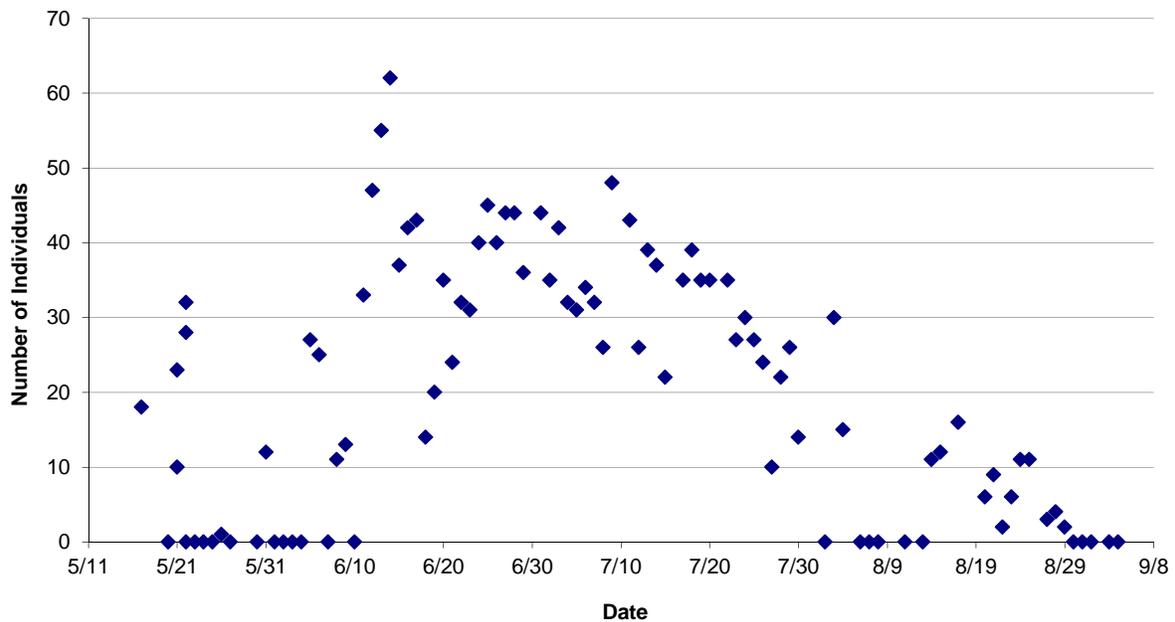


Figure 6. Number of California least terns counted at the ODSVRA 6 enclosure night roost in 2012.

On occasions when zero terns were observed prior to 30 August, vocalizations were often heard as terns arrived after dark.

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 2004-12, ODSVRA produced a minimum of 375 juvenile terns while RGDCP, VAFB, and COPR combined produced 129 juveniles (Table 6, Table 7).

Table 6. California least tern reproductive success reported for current or recent breeding sites in San Luis Obispo and Santa Barbara counties from 2004-12.

Note that chicks are not banded at RGDCP, VAFB, and COPR. In this table, ODSVRA calculations for number of juveniles per nest are made using all nests (known and unknown fates) in order to compare with method used for other sites. Sources: RGDCP (pers. comm. managers), VAFB (pers. comm. Dan Robinette for all years), and COPR (pers. comm. C. Sandoval).

ODSVRA=Oceano Dunes SVRA
VAFB=Vandenberg Air Force Base

RGDCP=Rancho Guadalupe Dunes County Park
COPR=Coal Oil Point Reserve

Year	Site	No. pairs	No. nests	No. nests hatching	No. chicks	No. juveniles	No. juveniles per total no. nest	No. juveniles per pair
2004	ODSVRA	47	63	44	69	25	0.40	0.53
	RGDCP	8	8	3	7	0	0.00	0.00
	VAFB ¹	1	1	0	0	0	0.00	0.00
	COPR	6	6	0	0	0	0.00	0.00
2005	ODSVRA	47	59	39	66	20	0.34	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	38	28	45	36	0.95	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	66	51	90	70	1.06	1.30
	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	50	99	70	1.25	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	23	43	33	1.27	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	35	31	55	50	1.43	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	46	33	52	42	0.91	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

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 7. 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 2004-12.

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	
	No. breeding pairs	No. juveniles	No. breeding pairs	No. juveniles
2004	47	25	15	0
2005	47	20	48	1
2006	31	36	7	7
2007	54	70	23	17
2008	55	70	19	19
2009	25	33	32-33	40
2010	23	29	34	31
2011	33	50	33	4
2012	41	42	18	10
Total juveniles produced		375		129

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 2012, there was a minimum of 190 breeding adults (85 females and 105 males), an increase of 18.8% from 160 breeding adults in 2011, and the fifth consecutive year of increase in the breeding population size (Table 8, Figure 7).

Beginning in 2005, 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 2012, the survey at ODSVRA counted 145 plovers (48 males, 59 females, and 38 of unknown sex), 76% of the minimum number documented by breeding activity. In seven of the eight years from 2005-12, the window survey count at ODSVRA was lower than the calculated minimum number of breeding birds (54-86% of calculated minimum number). It was higher (107%) than the calculated minimum number in 2008 (Table 9) (CDPR 2011).

Table 8. Number of snowy plover breeding adults, breeding males, fledglings, and chicks fledging per breeding male for the 11-year period, 2002-12.

Year	Min. no. breeding adults	Min. no. breeding males	No. fledglings	No. fledglings per breeding male
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
Average for 11-year period 2002-12	112	64	80	1.31
Average for 5-year period 2008-12	139	79	102	1.29
Average for 3-year period 2010-12	162	92	118	1.30

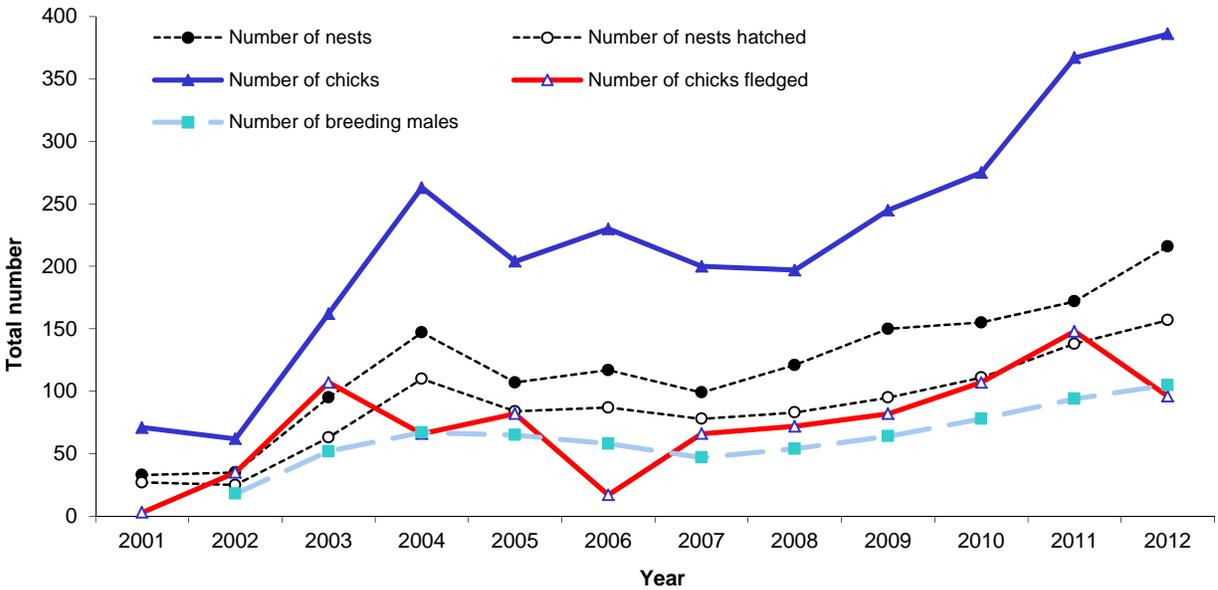


Figure 7. Number of snowy plover breeding males, nests, nests hatched, chicks, and chicks fledged at ODSVRA from 2001-12.

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

Table 9. Number of adult snowy plovers counted on USFWS breeding season window surveys versus calculated minimum number of breeding adults at ODSVRA from 2005-12.

Year	Calculate minimum number of breeding adults	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%

Number and distribution of nests

There were 216 known nesting attempts, including five identified only by detection of brood (unknown nest location) and eight with nest fate (hatch or fail) unknown. Of the 211 nests from known locations, 194 (91.9%) were in the Southern Enclosure, five (2.4%) in North Oso Flaco, nine (4.3%) in South Oso Flaco, and three (1.4%) in the open riding area. More specifically for the Southern Enclosure, there were 97 nests in 6 enclosure, 57 in 7 enclosure, 31 in 8 enclosure, and nine in Boneyard enclosure. In 2012, three nests were initiated in the open riding area; one was found east of 6 enclosure and two were found north of the Southern Enclosure with the northernmost nest approximately 3,000 feet north of 6 enclosure and northeast of marker post 5 (Appendix C). The maximum number of known location nests active at one time was 79 on 26 June, with the highest number in 6 enclosure (49 nests, 62% of total active nests). (Table 10, Table 11, Table E.1 in Appendix E).

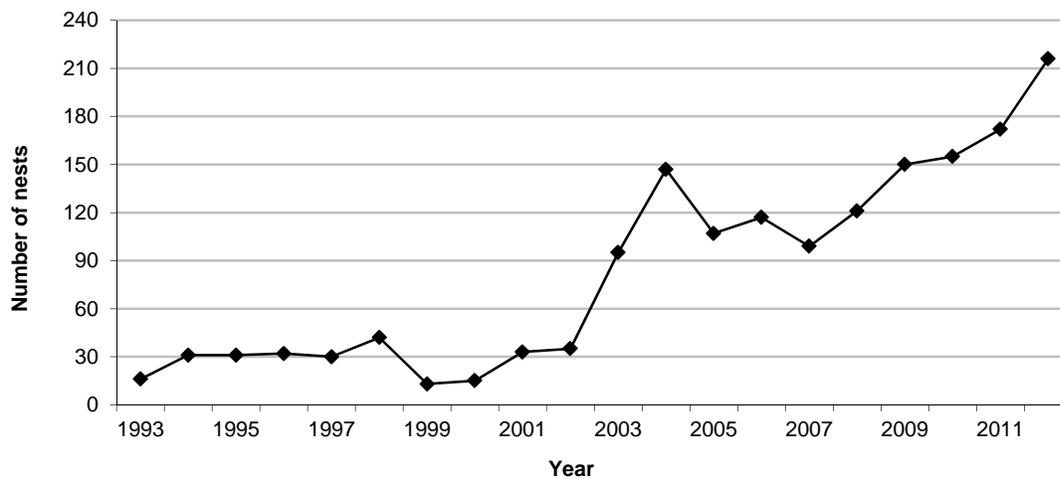


Figure 8. Number of snowy plover nests at ODSVRA from 1993-2012.

Table 10. Snowy plover nest distribution and success at ODSVRA in 2012.

Area	No. nests (no. known location and fate)	No. eggs laid	No. nests hatching (no. known location)	Percent hatching	No. chicks (no. known fate)	No. known fate chicks fledged (percent fledged)	No. fledglings per nest
6 enclosure	97 (92)	275	78 (78)	84.8	190 (190)	41 (22)	0.45
7 enclosure	57 (55)	159	41 (41)	74.5	99 (99)	24 (24)	0.44
8 enclosure	31 (30)	88	21 (21)	70.0	57 (57)	19 (33)	0.63
BY enclosure	9 (9)	21	3 (3)	33.3	7 (7)	1 (14)	0.11
TOTAL SOUTHERN ENCLOSURE	194 (186)	543	143 (143)	76.9	353 (353)	85 (24)	0.46
North Oso Flaco	5 (5)	15	5 (5)	100.0	11 (11)	2 (18)	0.40
South Oso Flaco	9 (9)	25	4 (4)	44.4	10 (10)	2 (20)	0.22
TOTAL OSO FLACO	14 (14)	40	9 (9)	64.3	21 (21)	4 (19)	0.29
Open riding area	3 (3)	8	0 (0)	0	0 (0)	0 -	0.00
Unknown location	5 (0)	12	5 (0)	-	12 (12)	2 (17)	-
Unassigned broods	7 (0)	19	7 (0)	-	19 (19)	5 (26)	-
2012 GRAND TOTAL	216 (203)	603	157 (152)	74.9	386 (386)	96¹ (25)	0.46¹

¹ Includes five fledglings from seven broods that could not be assigned to a specific nest and enclosure.

Table 11. Nesting success of snowy plovers at ODSVRA from 2001-12.

A more detailed table of nesting success for 2001-12 is included as Table E.1 in Appendix E.

For 2001: NA=not available and the number of fledglings per nest is an estimate.

Year	No. nests (no. known location and fate)	No. eggs laid	No. nests hatching (no. known location)	Percent hatching	No. chicks (no. known fate)	No. known fate chicks fledged (percent fledged)	No. fledglings per nest
2001	33 (30)	NA	27 (27)	90	71-74 (69)	2 (3)	0.07
2002	35 (35)	99	25 (25)	71	62 (62)	35 (56)	1.00
2003	95 (93)	254	63 (62)	67	162 (159)	108 (67)	1.16
2004	147 (140)	415	110 (105)	75	263 (263)	66 (25)	0.47
2005	107 (103)	290	84 (80)	78	204 (204)	82 (40)	0.80
2006	117 (114)	336	87 (87)	76	230 (230)	17 (7)	0.15
2007	99 (91)	290	78 (70)	77	200 (198)	66 (33)	0.73
2008	121 (119)	341	83 (81)	68	197 (197)	72 (37)	0.61
2009	150 (147)	418	95 (94)	64	245 (245)	81 (33)	0.55
2010	155 (150)	431	111 (109)	73	275 (275)	107 (39)	0.71
2011	172 (160)	487	138 (131)	82	365 (365)	152 (42)	0.95
2012	216 (203)	603	157 (152)	75	386 (386)	96 (25)	0.46

Nest hatching rate

There were 216 identified nesting attempts initiated between 29 March – 17 July (Figure 8, Figure 9). An average of 2.94 eggs per clutch was calculated from the total number nests from known location with known complete clutch size (n=200) (Appendix B). Excluding 13 nests (eight with unknown fate and five detected by brood only), the clutch hatching rate was 74.9% (152/203). This compares to 81.9% in 2011 and an average of 73.1% (range=64-82%) from 2002-11 (Table 10). The nest hatching rate in 2012 was higher in the Southern Exclosure (76.9%) compared to Oso Flaco (64.3%), as has been the case in nine of the previous 11 years (Table E.1 in Appendix E). Fifty-one nests failed, with losses attributed to abandoned pre-term (16), abandoned post-term (2), abandoned suspected due to wind (7), abandoned unknown pre- or post-term (3), cause unknown (3), unidentified predator (3), unidentified avian predator (6), corvid (3), northern harrier (5), peregrine falcon (1), coyote (1), and flooded (1) (Table 12, Table 13).

While the percentage of nests with unknown fate was low in 2012, there has been an increase over the last five years: 2008 (0.0%), 2009 (1.3%), 2010 (2.0%), 2011 (3.0%), and 2012 (3.8%). This is primarily due to an increasing number of nests with nearby young tern and plover broods, resulting in limited access to examine these nests.

Table 12. Attributed causes of snowy plover nest loss at specific locations at ODSVRA in 2012.

Area	Abandoned pre-term	Abandoned post-term	Abandoned, suspected wind	Abandoned unknown pre- or post-term	Failed, cause unknown	Unidentified predator	Avian predator	Corvid	Northern harrier	Peregrine falcon	Coyote	Flooded
Southern Enclosure												
6 enclosure	2	1	2	3		1	2		1	1		1
7 enclosure	2		2		2	1	2	1	4			
8 enclosure	5				1	1	1	1				
Boneyard enclosure	2		2					1			1	
TOTAL SOUTHERN ENCLOSURE	11	1	6	3	3	3	5	3	5	1	1	1
Oso Flaco												
North Oso Flaco												
South Oso Flaco	3	1	1									
TOTAL OSO FLACO	3	1	1	0	0	0	0	0	0	0	0	0
Open Riding Area	2						1					
ODSVRA TOTAL	16	2	7	3	3	3	6	3	5	1	1	1

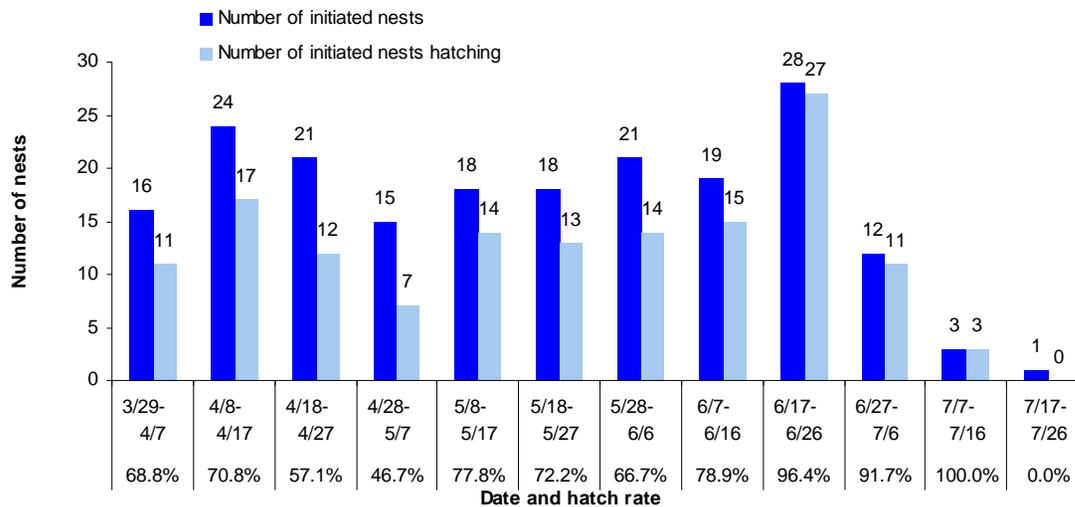


Figure 9. Number of known location and known fate snowy plover nests with known initiation date (n=197) initiated per 10-day period and number known to hatch at ODSVRA in 2012.

Table 13. Attributed causes of snowy plover nest loss in Southern Enclosure and Oso Flaco at ODSVRA from 2002-12.

So. Excl. = Southern Enclosure. The percentage of total loss for each cause is shown for the 11-year period 2002-12. In 2003, both Oso Flaco nests were abandoned pre-term due to death of adult(s). In 2004, one Oso Flaco nest was abandoned pre-term due to death of adult(s). Prior to 2010, nests abandoned suspected due to wind were included with nests abandoned pre-term; these causes of nest loss are shown separately for 2010-12.

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	Peregrine falcon	Coyote	Raccoon	Skunk	Flooded
2002	So. Excl.				6		1								1			
	Oso Flaco				2													
2003	So. Excl.	17	2					3				1						
	Oso Flaco	2					1	1				4						
2004	So. Excl.	12					7	2				2			1			
	Oso Flaco	4					2	3										1
2005	So. Excl.	9	3				7											
	Oso Flaco	2	1					1										
2006	So. Excl.	5	4				2	1		3					4			
	Oso Flaco				1			1		3								2
2007	So. Excl.	4	1				9					1						
	Oso Flaco	2					2					1			1			
2008	So. Excl.	10			3		7	4		1			1					1
	Oso Flaco	3			1			5										2
2009	So. Excl.	9				3	1	8	13	2			1					1
	Oso Flaco	4					2	2	4								1	1
2010	So. Excl.	3	2	11				4	6									2
	Oso Flaco	1		2					2							1	2	1
2011	So. Excl.	6	3	1	1		2	1	5		3							
	Oso Flaco							2			2					1	2	
2012	So. Excl.	11	1	6	3		3	3	5		3		5	1	1			1
	Oso Flaco	3	1	1														
2002-12 Total failed nests	So. Excl.	86	16	18	13	3	39	26	29	6	6	4	7	1	7	0	0	5
		32.3%	6.0%	6.8%	4.9%	1.1%	14.7%	9.8%	10.9%	2.3%	2.3%	1.5%	2.6%	0.4%	2.6%	0.0%	0.0%	1.9%
	Oso Flaco	21	2	3	4	0	7	15	6	3	2	5	0	0	1	2	5	7
		25.3%	2.4%	3.6%	4.8%	0.0%	8.4%	18.1%	7.2%	3.6%	2.4%	6.0%	0.0%	0.0%	1.2%	2.4%	6.0%	8.4%
2002-12 Grand Total So. Excl. and Oso Flaco		107	18	21	17	3	46	41	35	9	8	9	7	1	8	2	5	12
		30.7%	5.2%	6.0%	4.9%	0.9%	13.2%	11.7%	10.0%	2.6%	2.3%	2.6%	2.0%	0.3%	2.3%	0.6%	1.4%	3.4%

Chick fledging rate

Of the 386 snowy plover chicks hatched, 341 were banded and the fate of 45 unbanded chicks is known (three fledged) (Table 10, Table 11, 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. Unbanded chicks were tracked by a combination of the following: chicks observed with a banded adult, with banded sibling(s), and near-daily monitoring attempts 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 23 June and 6 August, seven unbanded broods (19 chicks) were observed on the shore and are assumed to be from known hatched nests whose chicks were not banded while at the nest. Six of the seven 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 chick fledging rate in 2012 was a relatively low 24.9% (96/386). This compares to 41.6% (152/365) in 2011 and an average rate of 37.9% (range=7-67%) for the nine-year period 2002-10. Predation is the suspected cause for the majority of chick loss (Table 10, Table E.1 in Appendix E) (CDPR 2007, 2008, 2009, 2010, 2011).

The dates when chicks first and last hatch, as well as the number of days between these events, can vary every season. To provide for a comparison between years, a common date separating early and late season was derived by determining the midpoint between dates of the first and last chick hatching for each year during the four-year period 2007-10. There was a 13-day span between these midpoints with a median date of 20 June; the following full day was used for both midpoints and median if they contained a fraction (e.g., median of 19.5 June became 20 June). Early season for chick production is defined as prior to 20 June and late season as 20 June or later (same separation periods also applied to years prior to 2007 and after 2010 when comparisons are made). Similar to nine of the previous ten years, chick survival in 2012 was lower in the late season compared to the early season. The early season fledging rate (36%) was third lowest of the previous ten years (range=8-84%, mean=46%), while the late season fledging rate (15%) was third lowest for the same period (range=7-54%, mean=26%). Chick survival was particularly poor in the latter portion of the late season. Of the 141 chicks hatching on or after 13 July, only seven fledged for a fledging rate of 5.0%. (Table 14, Figure 10, Figure 11).

Table 14. Number of chicks hatching in early season (prior to 20 June) and late season (20 June or later) and subsequent fledging rate at ODSVRA from 2007-12.

Year	Date first chick hatched	Date last chick hatched	No. of days between first and last chick hatched	Date of midpoint between first and last chicks hatched	Early season (chicks hatched on or before 19 June)		Late season (chicks hatched on or after 20 June)	
					No. chicks	Percent fledged	No. chicks	Percent fledged
2007	29 Apr	20 Aug	114	17 Jun	88	43%	110	25%
2008	20 Apr	4 Aug	107	22 Jun	94	46%	103	28%
2009	20 Apr	22 Aug	125	13 Jun	106	55%	139	17%
2010	27 Apr	6 Aug	102	25 Jun	143	34%	132	45%
2011	22 Apr	12 Aug	113	17 Jun	145	58%	220	31%
2012	4 May	14 Aug	103	24 Jun	174	36%	212	15%

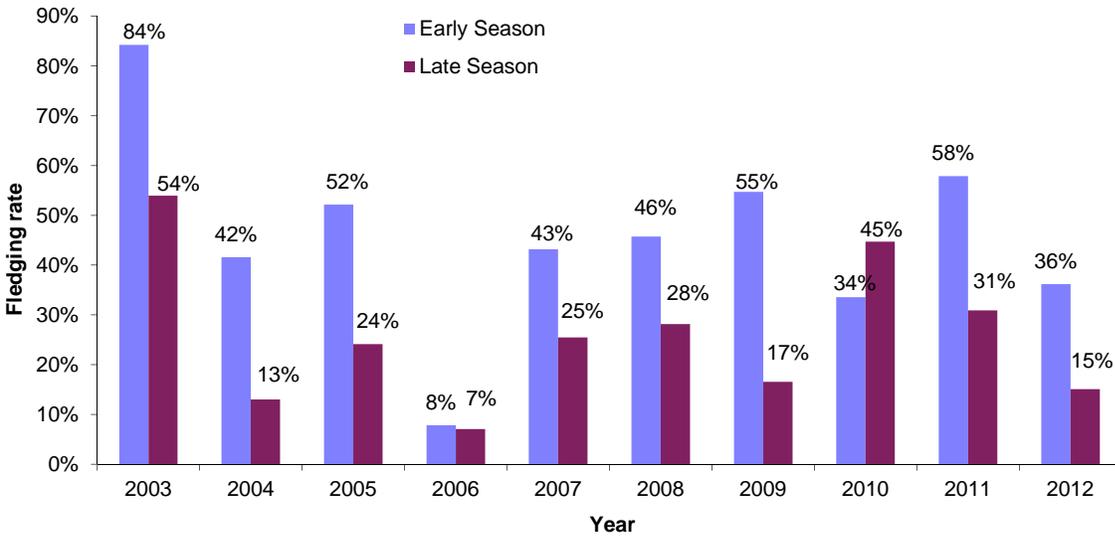


Figure 10. Fledging rate of chicks hatching in early season (prior to 20 June) and late season (20 June or later) at ODSVRA from 2003-12.

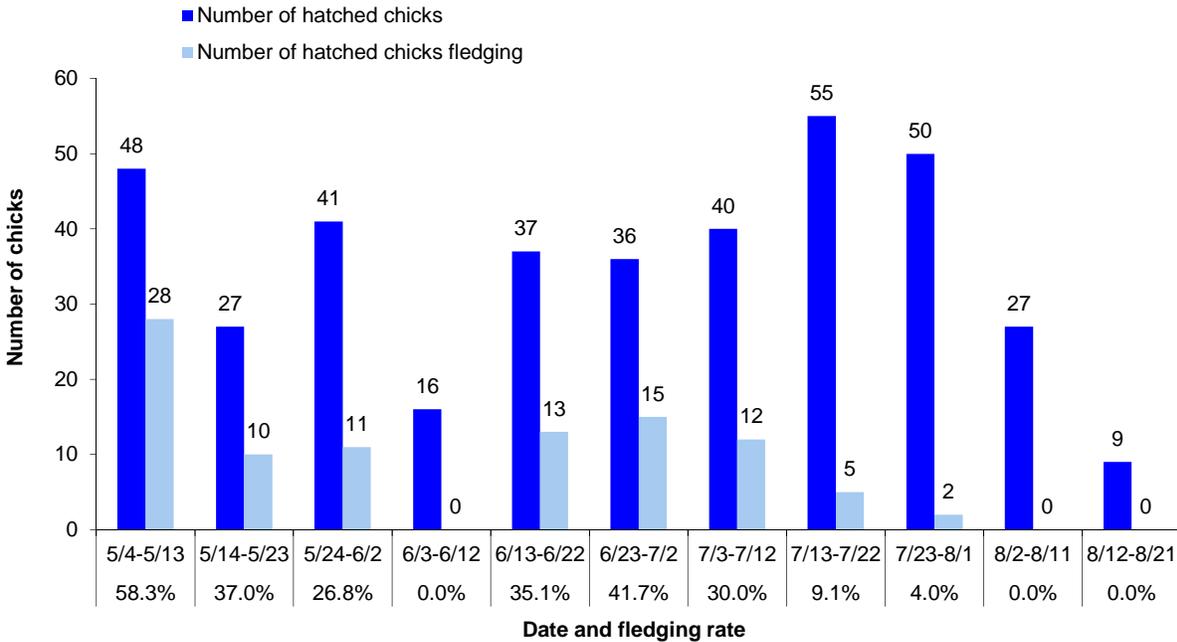


Figure 11. Number of snowy plover chicks hatching per 10-day period and number subsequently fledging at ODSVRA in 2012.

For five broods originating from unknown location, a hatch date was estimated based on chick size (all chicks were very young when first seen).

Brood movement and age of chick loss

Close proximity of quality shoreline habitat for raising chicks can benefit productivity, as mortality rates are typically highest for young chicks. At ODSVRA, most snowy plover broods are initially led from the nest by the parent(s) to the nearest shore to forage. In 2009-12, the majority of broods (75%, 76%, 78%, and 65%, respectively) were not known to move beyond the individual beach section (6, 7, and 8 exclosures, North Oso Flaco and South Oso Flaco) nearest to where they hatched. Sites south of ODSVRA in the contiguous coastal dune system also manage and monitor snowy plovers and report any sightings of broods banded at ODSVRA.

Of the 96 fledglings produced in 2012, 77 were from broods remaining in the same general area where hatched. Chick loss was highest for very young chicks (0-4 days of age), accounting for 51% of total loss, which compares to 38%, 39%, and 49%, in 2009-11, respectively (Figure 12) (CDPR 2011). 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 further movement outside of that area could occur (Table 15). For 136 chicks reaching 16 days of age in 2012, the fledge rate was 71%. This compares to 73% (111 chicks reaching 16 days of age), 76% (141 chicks), and 80% (190 chicks) in 2009, 2010, and 2011, respectively. This is lower than 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).

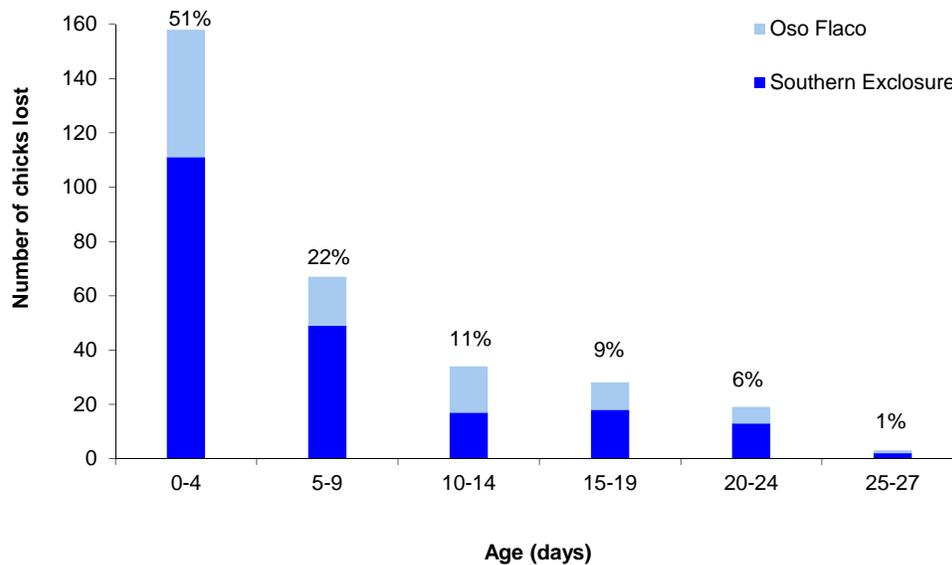


Figure 12. Loss of snowy plover chicks by age and location last seen in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.

Number and percentage of total chicks lost shown for each age group. Of the 386 chicks whose fate was tracked, 290 were lost. Three live chicks were removed from site by monitors (Notes section). These chicks are considered lost on the day they were removed.

Table 15. Snowy plover brood movement at ODSVRA in 2012.

Three broods hatched from Boneyard enclosure are included in North Oso Flaco (Boneyard enclosure is located directly east of North Oso Flaco). The five broods from unknown location were very young when first observed and are included in area first seen (one in 7 enclosure, three in North Oso Flaco, and one in South Oso Flaco). Seven unassigned broods are included in the area where first seen (one in 6 enclosure, two in 8 enclosure, and four in North Oso Flaco). Eleven broods were known to cross back and forth over shoreline boundaries in area hatched and adjoining area; they are assigned to the area observed most frequently.

Area	Shoreline length	Total no. broods	Broods remaining in area hatched			Broods leaving area hatched		
			No. broods	No. broods that fledged at least one chick	No. chicks that fledged (chicks fledged per brood)	No. broods	No. broods that fledged at least one chick	No. chicks that fledged (chicks fledged per brood)
Southern Enclosure								
6 enclosure	0.52 mile	79	46	21	33 (0.72)	33	6	8 (0.24)
7 enclosure	0.42 mile	42	23	9	13 (0.57)	19	10	11 (0.58)
8 enclosure	0.45 mile	23	20	12	24 (1.20)	3	0	0 (0.00)
TOTAL SOUTHERN ENCLOSURE	1.39 miles	144	89	42	70 (0.79)	55	16	19 (0.35)
Oso Flaco								
North Oso Flaco	0.54 mile	15	14	4	5 (0.36)	1	0	0 (0.00)
South Oso Flaco	1.16 miles	5	3	1	2 (0.67)	2	0	0 (0.00)
TOTAL OSO FLACO	1.70 miles	20	17	5	7 (0.41)	3	0	0 (0.00)
GRAND TOTAL	3.09 miles	164	106	47	77 (0.73)	58	16	19 (0.33)

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 allowing for moderate population growth (assuming approximately 75% annual adult survival and 50% juvenile survival) (USFWS 2007). In 2012, the number of chicks fledging per male was 0.91, the second lowest in the 11-year period 2002-12. During this same period, the number of fledglings produced per male has exceeded 1.2 in eight of the 11 years (Table 8). (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 25 documented snowy plover mortalities (other than eggs) at ODSVRA in 2012. Fifteen of these were the result of depredation of chicks, adults, and a least one juvenile. Predation was observed or documented by prey remains (clipped wings of adults) or presence of bands in scats or regurgitated pellets (castings). Predators involved were coyote, gull, peregrine falcon, northern harrier, and unidentified avian predator (see section titled Predators and predator management on page 40 for additional information). Mortality other than predation included the intact and often desiccated carcasses of seven chicks and three adults (Appendix H).

Use of 10 foot by 10 foot exclosures, circulars, and mini-exclosures

In 2012, there were 196 nests from known locations and with known fate receiving one or more types of seasonal wire fence protection in the Southern Exclosure and Oso Flaco. Fates of an additional eight nests with only symbolic rope fence included six hatching nests, one abandoned pre- or post-term and one with unknown fate. The majority of nests from known location with known fate (154, 76%) were within the large seasonal exclosure, 21% of these received additional small exclosures in areas of high predation. Nests protected only by the seasonal exclosure had a 90% hatch rate, and nests in the seasonal exclosure with additional small exclosures had an 82% hatch rate. In 2012, 10 foot by 10 foot exclosures with a net top were used on nine nests (55% hatch rate), circulars were used on eight nests (38% hatch rate), and mini-exclosures were used on 52 nests (87% hatch rate). Compared to 2011, the use of 10 foot by 10 foot exclosures decreased and the use of mini-exclosures increased (CDPR 2010, 2011) (Appendix B and Table E.2 in Appendix E).

Banded snowy plovers breeding at ODSVRA in 2012

Monitoring efforts include identifying banded birds breeding at ODSVRA. In 2012, 90% (169/190) of documented breeding adults were checked for the presence or absence of bands. Of these, 50% (84/169) were banded, with the majority (89%, 75/84) representing recruitment from chicks banded and fledging from ODSVRA from 2003-11. One bird banded as a chick at Reservation Road, Monterey County, was the only breeding bird identified that hatched north of ODSVRA, and six birds were banded as chicks south of ODSVRA (one banded in 2002 at the adjoining Guadalupe-Nipomo Dunes NWR and five from Vandenberg Air Force Base, Santa Barbara County). An additional two birds were missing bands or tape and were from unknown locations and years. Monterey Bay is the closest site north of ODSVRA where banding occurs (almost all chicks are banded). To the south of ODSVRA, banding has not occurred at the Guadalupe-Nipomo Dunes NWR for several years, but occurs annually at Vandenberg Air Force

Base (varying percentage of chicks banded), and at several sites in San Diego County (Table D.3 in Appendix D).

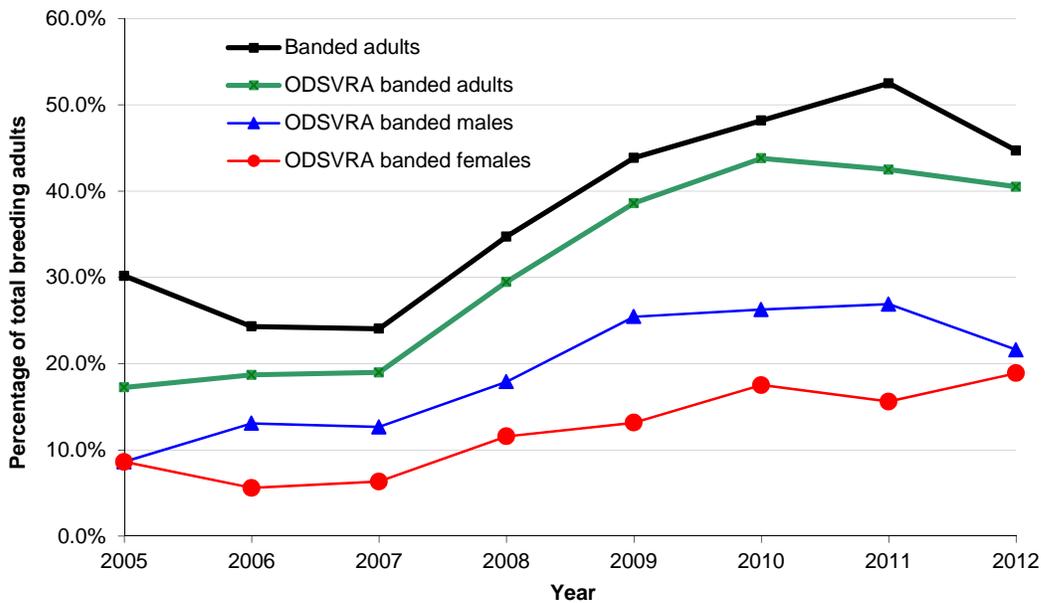


Figure 13. Percentages over the total calculated breeding population at ODSVRA of all verified banded adults and the sum of males and females originally banded at ODSVRA breeding from 2005-12.

Snowy plover surveys at ODSVRA during the nonbreeding season

Surveys for wintering plovers were conducted at weekly intervals (see Monitoring and Management Actions for survey details). Between October 2011 and February 2012, wintering snowy plover counts ranged from 104 to 247 (single day high count on 16 November 2011) at ODSVRA. Monthly averages were taken from three to five weekly surveys for each beach section. From 0.5 miles north of Pismo Pier to Grand Avenue, the monthly average ranged from five to 57 plovers (no plovers were observed north of Pismo Pier). The majority of plovers observed during the surveys were located between Grand Avenue and marker post 2, where off-highway vehicle use is prohibited, but street-legal vehicles are allowed. Within this area, the monthly average ranged from 50 to 129 plovers, with foraging birds and roosting flocks most often encountered on the relatively narrow beach between Grand and Pier Avenues. For the section of beach to the south (marker post 2 to marker post 6), the monthly average ranged from three to 26 plovers. Continuing south, the area from marker post 6 to the southern riding area boundary had a monthly average for of 11 to 47 plovers. For Oso Flaco, (southern riding area boundary to the southern property boundary), the monthly average ranged from 28 to 39 plovers (Figure 14).

Eighty banded snowy plovers were recorded during surveys from 1 October 2011 to 29 February 2012. These birds were banded at the following locations: 68 from ODSVRA; three from Vandenberg Air Force Base in Santa Barbara County; and nine from the Monterey Bay area in Monterey County, including Fort Ord (1), Reservation Road (1), Salinas River State Beach (1), Salinas River NWR (2), Moss Landing State Beach (3), and Pajaro Spit (1) (Table D.2 in Appendix D).

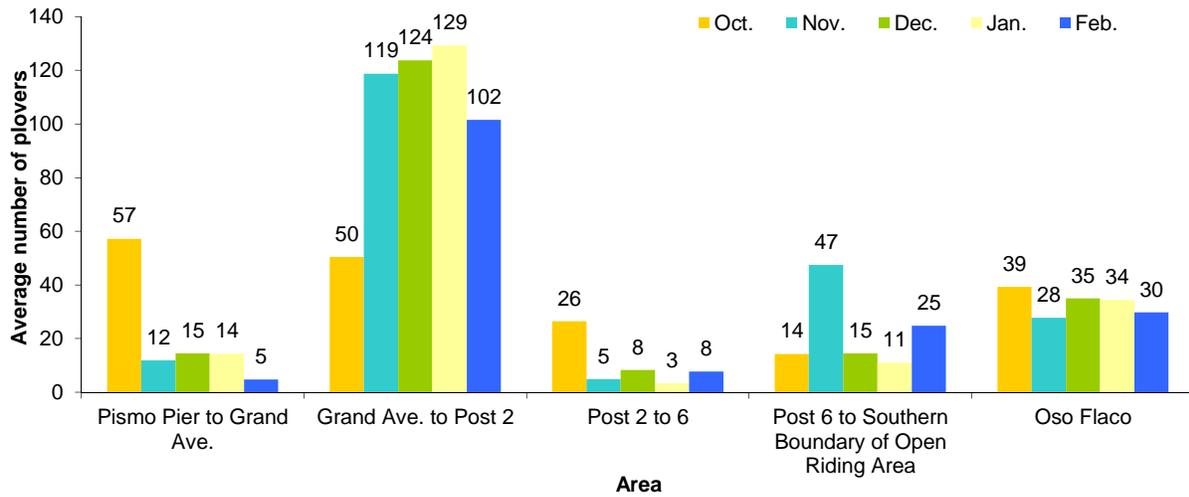


Figure 14. Monthly average number of snowy plovers observed during nonbreeding season surveys at ODSVRA from October 2011 to February 2012.
 Surveys conducted three to five times a month.

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. 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, woodchips, seeds of coastal foredune plants, and a limited number of small container plants (see Appendix F for more detail).

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. Depredation of an adult tern or plover may result in egg abandonment or loss of dependent chicks. 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 unable 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.

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 and scat 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 Exclosure (6, 7, 8, and Boneyard exclosures) 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.

Selective live-trapping and relocation of avian predators was conducted by Ventana Wildlife Society and selective live-trapping and lethal removal of both mammalian and avian predators was conducted by USDA Wildlife Services. Eleven coyotes (*Canis latrans*), six raccoons (*Procyon lotor*), and one northern harrier (*Circus cyaneus*) were lethally removed. Three great horned owls (*Bubo virginianus*), two barn owls (*Tyto alba*), one northern harrier, two American kestrels (*Falco sparverius*), one peregrine falcon (*Falco peregrinus*), and nine loggerhead shrikes (*Lanius ludovicianus*) were live-trapped and relocated (Table G.2 in Appendix G).

Documented Predation

In 2012, no tern nests were known to be depredated. From 2002-12, 2.4% (12/499) of all tern nests were known to be lost to predators (6 mammalian, 1 avian, and 5 unidentified).

For snowy plovers, 19 of 203 (9.4%) nests with known fate and location were depredated (Table 16). Predators associated with nest loss included corvid (3), coyote (1), northern harrier (5), peregrine falcon (1), unidentified avian predator (6), and unidentified predator (3). From 2002-12, 8.7% (126/1454) of all plover nests were documented lost to predators (15 mammalian, 69 avian, and 42 unidentified).

Table 16. Snowy plover nest depredation rate in specific areas at ODSVRA in 2012.

Seven nests from unknown locations (known only by detection of brood) and five nests with unknown fate (hatch or fail) are not included in total number of nests with known location and known fate or in calculating percent nests depredated.

	6 exclosure	7 exclosure	8 exclosure	Boneyard exclosure	North Oso Flaco	South Oso Flaco	Open riding area	Total
No. nests depredated	5	8	3	2	0	0	1	19
Total no. nests with known location and fate	91	56	30	9	5	9	3	203
Percent depredated	5.5	14.3	10.0	22.2	0.0	0.0	33.3	9.4

In 2012, three least tern chicks, juveniles, or adults were documented as depredated by avian or mammalian predators. On 31 July, a peregrine falcon was observed with prey inside 6 exclosure. Feathers collected at this location were identified as belonging to a near-fledgling or fledgling least tern. On 9 August, coyote scat found in the Oso Flaco area contained an ODSVRA least tern band. On 11 August, feather remains of a juvenile least tern and an ODSVRA least tern band were found together in 6 exclosure.

In 2012, there was a minimum of 15 plover chicks, juveniles, or adults documented as depredated by avian or mammalian predators. On 9 May, an adult male northern harrier was observed landing and removing a recently hatched chick from a nest in 7 enclosure. On 23 May, a sub-adult female peregrine falcon was observed taking one chick and possibly a second on the shoreline border of 6 and 7 enclosures. This peregrine was trapped and a pellet removed from the transport carrier contained seven bands, representing a minimum of two plovers. On 3 July, an adult peregrine falcon was observed depredating a juvenile plover (48 days old). Examination of four separate coyote scats revealed eleven plover bands (including three bands with white-adhesive backed red tape, first used in 2012) representing a minimum of one chick and two unknown-aged plovers. On 18 July, a pair of adult-sized plover wings was found five feet west of a mini-enclosure on a nest inside 8 enclosure. On 22 August, an adult-sized wing of a plover was found half-buried in 8 enclosure. On 7 September, a regurgitated pellet from an unknown avian predator was found on 6 enclosure shoreline and contained eleven bands (including two with white-adhesive backed red tape first used in 2012), representing a minimum of one chick and two unknown-aged plovers. On 13 September, a gull pellet found on 6 enclosure shoreline contained nine bands, representing a minimum of three unknown-aged plovers (Appendix H).

Mammalian Predators

Red fox

In 2012, red fox tracks were documented near the Southern Enclosure and Oso Flaco nesting area for the first time. Tracks were present on seven days around Pavilion Hill (revegetation area near marker post 4), three days within the Pipeline revegetation area (adjacent to 8 enclosure), and one day within the Maidenform revegetation area (east of Boneyard enclosure). No red foxes were removed in 2012. In 2011, three red foxes were removed between Grand Avenue and Pier Avenue in an effort to control a nonnative invasive species and to prevent its spread into the plover and tern nesting area to the south.

Opossum

In 2012, no nests were identified as depredated by opossum. Tracks were primarily observed in 6, 7, and 8 enclosure. From 2007-12, the number of days opossum tracks were documented ranged from 5 to 25 days. From 2002-12, known nest loss to opossum was limited to one tern nest in the Southern Enclosure in 2010. In 2012, there was minimal occurrence of opossum tracks in tern and plover chick-rearing areas.

Skunk

In 2012, no nests were identified as depredated by skunk. Tracks were most often documented in 6, 7, and 8 enclosure. Documented skunk activity decreased from a range of 35 to 57 days for 2009-11 to 19 days in 2012 (Figure 15). From 2002-12, known nest loss to skunk was limited to five plover nests in Oso Flaco, occurring from 2009-11. In 2012, there was minimal occurrence of skunk tracks in tern and plover chick-rearing areas.

Raccoon

In 2012, no nests were identified as depredated by raccoon. Similar to 2010 and 2011, raccoon tracks were most commonly observed in North and South Oso Flaco, 8 enclosure, and the 7.5 revegetation area. Tracks and scat indicated that raccoons commonly traveled across the

closure to forage in the intertidal zone on prey that included mole crabs (*Emerita analoga*). Documented raccoon activity has increased from 47 and 68 days in 2007 and 2008, respectively, to a range of 108 to 141 days for 2009-12 (Figure 15). From 2002-12, known nest loss to raccoons was limited to two plover nests in Oso Flaco, occurring in 2010 and 2011. In 2012, six raccoons were lethally removed because they were interfering with coyote trapping. Raccoon tracks were common in some portions of the shore where plover chicks were present.

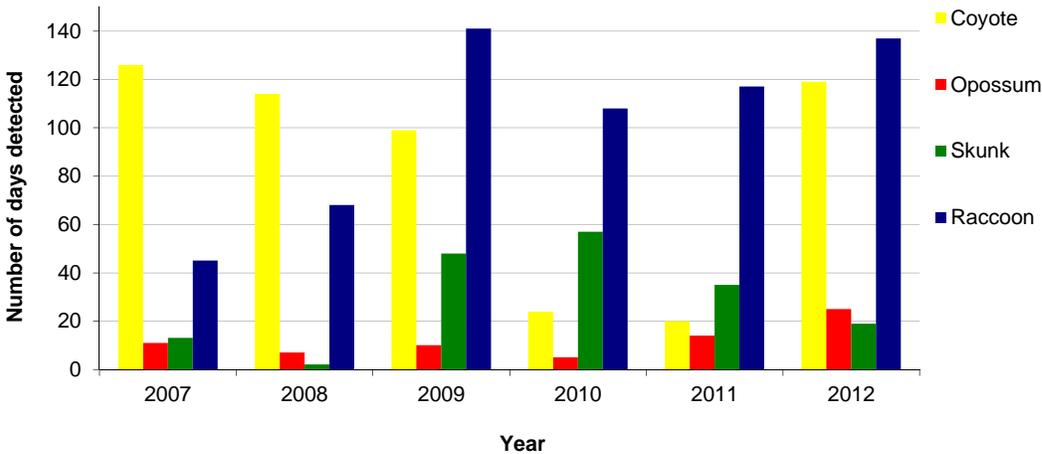


Figure 15. Number of days coyote, opossum, skunk, and raccoon were detected in the Southern Enclosure and Oso Flaco at ODSVRA from 2007-12.

Coyote

Live sightings of coyotes have rarely been documented inside the enclosure 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. As it is difficult to monitor the shoreline on foot due to potential disturbance to plover broods, predator tracks are documented opportunistically and counts are representative of a minimum level of activity that was likely much greater this season. In addition, shoreline accessibility may vary between years making direct comparison difficult. In 2012, there were 78 occurrences of coyote documented inside the predator fencing of the Southern Enclosure (Table 17). This compares to 15, 19, 5, and 10 occurrences in 2008-11, respectively. Number of days coyotes were detected inside the Southern Enclosure and Oso Flaco was 119 in 2012 compared to 20, 24, 99, 114, and 126 in 2011-07, respectively (Figure 15). Coyotes can enter the predator fenced portion of the enclosure by digging under, climbing, or jumping over the fence, as well as entering through areas in disrepair. In 2012, heavy equipment was not available to work on the fence from mid-June through the remainder of the nesting season, resulting in a less secure Boneyard enclosure interior fence. Coyote intrusion inside the Southern Enclosure at this location was high during this time. Tracks indicated that most coyote activity inside the predator fence was in Boneyard and 8 enclosures and not in 6 and 7 enclosures where the majority of nesting occurs. One plover nest was depredated by a coyote in Boneyard enclosure in 2012.

In 2012, there were 100 and 47 occurrences of coyote on the Southern Enclosure and North Oso Flaco shorelines, respectively, which compares to 17 and 20 occurrences in 2011, 24 and 23

occurrences in 2010, and 99 and 94 occurrences in 2009 (Table 17). In 2012, there were less documentations of coyote presence on South Oso Flaco shoreline due to decreased monitor presence in this area. Coyote tracks found on the Southern Exclosure shoreline were noted as having rapidly changing gaits, from walking to running, and changing direction, suggesting hunting behavior. As part of coyote 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. Eleven plastic bands used to band plovers and one bicolor aluminum band used to band terns were retrieved from four coyote scats found throughout the season in 2012, representing a minimum of one plover chick, two unknown-aged plovers, and one unknown-aged tern (Appendix H). There were nine plastic bands found in coyote scat in 2007; no bands were found in scat from 2008-11 (CDPR 2007). The protracted occurrence of coyote on the shoreline in 2012 coincided with a period of high snowy plover chick loss. As concerns of coyote impact on plover chick survival grew, coyotes were trapped in an attempt to decrease activity on the shoreline, however, shoreline activity continued throughout the season. In 2012, 11 coyotes were lethally removed (Table G.2 in Appendix G). This compares to four coyotes removed in 2011, nine in 2010, and five in 2009, 2008, and 2007.

Table 17. Coyote presence in the Southern Exclosure and Oso Flaco at ODSVRA from 2009-12.

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

Year	Inside Southern Exclosure predator fencing	6, 7, 8 exclosure 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)

Avian Predators

American kestrel, merlin, Cooper's hawk, and prairie falcon

The number of days American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), and Cooper's hawk (*Accipiter cooperii*) were documented in the Southern Exclosure and Oso Flaco was limited (range 1-10 days). There was a single observation of a prairie falcon (*Falco mexicanus*) on 20 August in 7 exclosure feeding on a small shorebird.

Loggerhead shrike

Shrikes are known predators of plovers at ODSVRA and in 2005 five plover bands (likely from chicks) were found in regurgitated pellets. In 2012, a minimum of 10 loggerhead shrikes were observed in or adjacent to the nesting area. Shrikes were primarily observed in Oso Flaco and Boneyard exclosures, with fewer sightings in 8 exclosure. Nine shrikes were trapped, including one adult (16 February) and eight juveniles (29 June – 14 August). Additional sightings represent at least one other individual not trapped.

Owl

Owls are a known threat to plovers and terns and predation by owls has been suspected at ODSVRA. 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. Owl tracks may be over 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. In 2012, despite there being fewer monitors on foot in areas where owl tracks are seen, there was an increase in detection (including near the west fence and on the shoreline in ODSVRA). In 2012, owl presence was detected on 53 days with 89 separate sightings (Figure 16, Table 18). In 2010-11, owl presence was detected less frequently on 30 days with 47 separate sightings and 10 days with 10 separate sightings respectively. Great horned owl is the primary species suspected and was the only species trapped and relocated prior to 2012. In 2012, three great horned owls were trapped and relocated between 18 April - 30 May. On 24 July, while attempting to trap a great horned owl, two barn owls were caught in the Pipeline revegetation area and were relocated (Table G.2 in Appendix G). Owl presence continued to be detected within the nesting and chick habitat after trapping. In 8 enclosure, Boneyard, and North Oso Flaco (including the west side), tracks were noted in abundance.

Red-tailed hawk

Red-tailed hawks are a documented or suspected predator of snowy plover eggs, chicks, juveniles, and adults and are documented as a predator of least tern chicks and juveniles (Page et al. 2009; Marschalek 2007). In 2012, red-tailed hawks were primarily observed perching in the North Oso Flaco foredunes, and less frequently in the South Oso Flaco foredunes and 7.5 revegetation area. There were 135 sightings over 74 days (Figure 16, Table 18). This compares with 85 sightings over 45 days in 2011, 48 sightings over 29 days in 2010, and less activity from 2007-09. On several occasions, red-tailed hawks were observed perched in the nesting area and were flushed by monitors when possible. Based on concurrent sightings and age, there was a minimum of four individuals observed in or near the nesting area in 2012: one adult male, one adult female, one sub-adult and one juvenile.

Northern harrier

Northern harriers are a known threat and are documented taking snowy plover eggs, least tern and plover chicks, and a tern fledgling at ODSVRA. From 2 May – 12 May, there were 40 sightings over 10 days of a male northern harrier hunting over the Southern Enclosure. During this same time frame, five nests were documented lost to an adult male northern harrier and five nests were depredated by an unknown avian predator (with northern harrier suspected). Additionally, three nests were depredated by an unknown predator during this same period of time with high northern harrier activity. An adult male northern harrier was also observed landing and grabbing a recently hatched chick near its nest bowl in 7 enclosure on 9 May. Attempts were made to determine the nesting status of the northern harrier and no active nests were located. After trapping efforts were unsuccessful, an adult male harrier was lethally removed on 12 May after it was observed depredating a plover nest in 6 enclosure. Yolk and eggshell fragments were found on the harrier's bill, in the esophagus and stomach, and small feathers were found in the stomach.

There were 132 sightings of northern harriers over 47 days in 2012 (Figure 16, Table 18). Based on age and sex, there was a minimum of seven individuals observed during this season: three adult males, two adult females, and two juveniles (one identified as female). In addition to the adult male lethally removed on 12 May, an adult male was trapped on 6 April at Oso Flaco Lake and relocated (Table G.2 in Appendix G).

Table 18. Sightings of large owl spp., northern harrier, peregrine falcon, and red-tailed hawk in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA in 2012.

Date range is from 1 March to 10 September.

Location	Large owl spp.	Northern harrier	Peregrine falcon	Red-tailed hawk	Total
6 exclosure	4	21	41	2	68
7 exclosure	11	24	37	27	99
8 exclosure	27	21	31	20	99
Boneyard exclosure	19	4	9	6	38
North Oso Flaco	15	11	27	55	108
South Oso Flaco	13	51	11	25	100
TOTAL	89	132	156	135	512

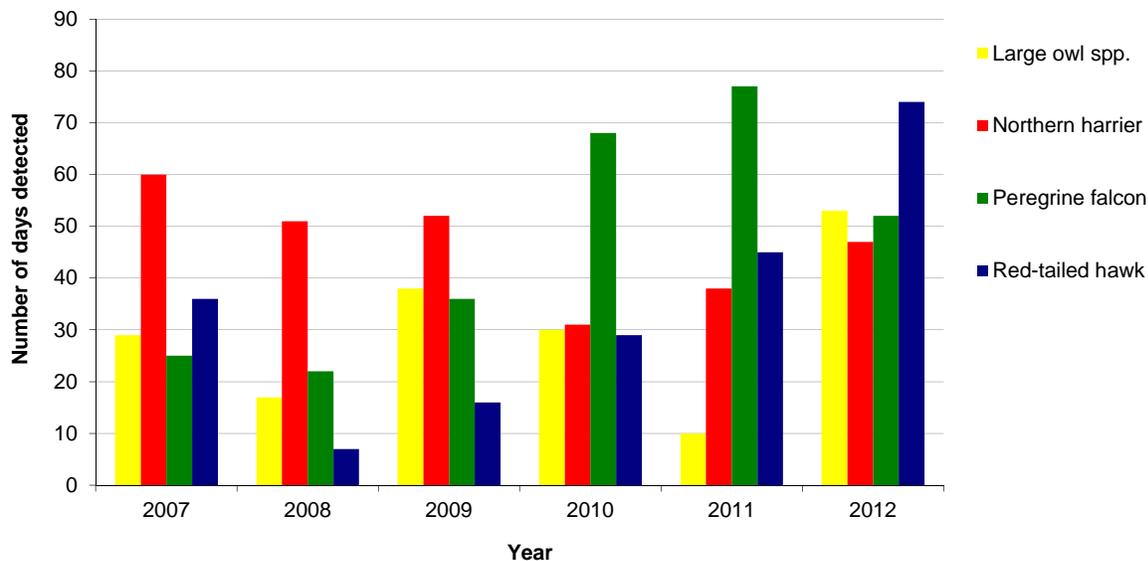


Figure 16. Number of days large owl spp., northern harrier, peregrine falcon, and red-tailed hawk were detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2007-12.

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

Peregrine falcon

Peregrine falcons (*Falco peregrinus*) are documented predators of plovers and terns (Table 19). In 2012, peregrine falcons were frequently observed actively hunting, perching, and eating prey in the Southern Exclosure and Oso Flaco. On multiple occasions, peregrines were perched in the nesting area for an extended period of time and were flushed by monitors when possible (sometimes requiring repeated efforts before the bird exited the exclosure). On 23 May, a sub-

adult female peregrine falcon was observed hunting and eating at least one plover chick on the shoreline at the border of 6 and 7 exclosures (Appendix H). Monitors attempted to flush the falcon after it was observed eating the first chick but the falcon continued to hunt and appeared to catch and eat a second chick (unknown if from the same or a different brood). This same bird was later observed depredating eggs from a distant plover nest before it was live-trapped the same day. After relocating this bird, a regurgitated pellet containing seven plover bands was removed from the transport carrier, representing a minimum of two chicks. On 3 July, a peregrine was inside 6 exclosure with prey, later identified as a banded juvenile snowy plover from ODSVRA (48 days old). On 31 July, a peregrine was observed in 6 exclosure with prey. Feathers were collected from the prey site and confirmed to belong to a near-fledgling or fledgling least tern. Several other depredated remains of snowy plover, least tern, and other shorebirds may have been peregrine kills but could not be confirmed as such. In 2012, there was a minimum of six individual peregrine falcons identified at ODSVRA: one adult male, one adult female, one sub-adult male, one sub-adult female (trapped and relocated), and two juveniles.

Table 19. Sightings of peregrine falcon in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA from 2008-12.

Date range is from 1 March to 10 September (a 194-day period). One, three, and one peregrines were trapped in 2009, 2010, and 2012 respectively; none were trapped in 2008 and 2011.

Location	2008	2009	2010	2011	2012
6 exclosure	11	13	37	39	41
7 exclosure	11	13	29	45	37
8 exclosure	5	13	25	40	31
Boneyard exclosure	6	6	11	32	9
North Oso Flaco	4	9	24	37	27
South Oso Flaco	1	20	18	12	11
Total no. sightings	38	74	144	205	156
No. days detected	22	36	68	77	52

Corvids (American crow and common raven)

American crows (*Corvus brachyrhynchos*) and common ravens (*Corvus corax*) are efficient predators at many tern and plover nesting sites and can have pronounced impacts over a short period of time. In 2012, crows and ravens were typically observed flying over South Oso Flaco, North Oso Flaco, Boneyard, and 8 exclosures (Table G.1 in Appendix G). Crow observations in 2012 were similar to 2008-11 in number of days detected, ranging from one to 10 days. From 2011-12, number of days ravens were detected ranged from 13 to 14 days and number of sightings ranged from 18 to 28. This compares to a range of 2 to 4 for number of days ravens were detected and 2 to 5 for number of sightings in 2007-10. The three nests depredated by corvid (in 7, 8, and Boneyard exclosures) were lost in June and there were crow and raven observations in the nesting area during this month. Due to potential overlap in track size for some individuals, it can, at times, be difficult to determine corvid species in absence of direct observation. From 2002-12, nine plover nests at ODSVRA were lost to raven (in 2003, 2004, and 2007) and eight were lost to corvid (in 2011 and 2012). In 2012, a number of nests were lost to raven at other plover and tern nesting sites within the Guadalupe-Nipomo dune complex. Ravens have been lethally removed periodically at Vandenberg Air Force Base, which may reduce the

presence of some foraging individuals at other sites within the dune complex, including ODSVRA.

Gulls

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 are completed from March to October and weekly surveys of the entire park are completed year-round (see Monitoring and Management Actions section for more detail). In 2012, the number of gulls counted at ODSVRA reached a maximum of 2,898 in September (Figure 17). In 2012, as in previous years, a large gull flock was noted inside northern 6 enclosure during July and mini-exclosures were used to protect nests in this area. No nests were known depredated by gulls in 2012.

Although no gull predation events with plovers were observed in 2012, a gull pellet found on the 6 enclosure shoreline on 13 September contained nine bands, representing a minimum of three unknown-aged plovers taken by gulls (Appendix H). Events happen quickly and can easily go unobserved. In 2011, three gulls were documented taking 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. The chick loss rate during both these four days and the preceding two weeks was much higher than occurred prior to or after this period.

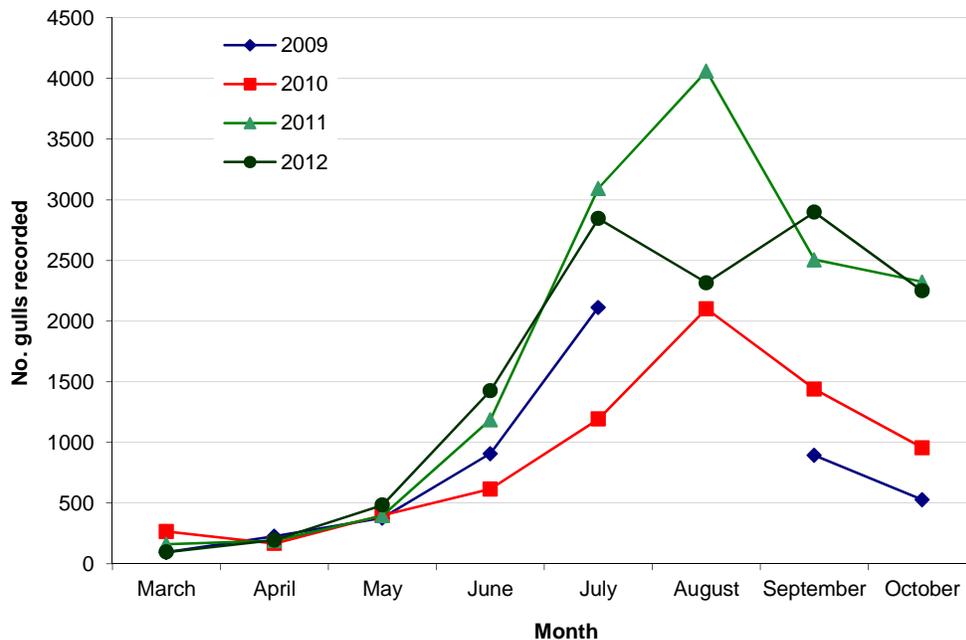


Figure 17. Monthly average number of gulls at ODSVRA for March to October, 2009-12.

Information not available for August 2009. Weekly surveys were conducted between 6 am and 1 pm with 98% of surveys completed before 12 pm. Weekly survey data were only included if the entire park was covered. The number of surveys per month ranged from 1 to 5. See Monitoring and Management Actions section for “weekly gull survey” methodology.

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 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; and
- 5) providing information on the length of stay of individual juveniles at the colony site after fledging.

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 various adults. This would allow monitors to verify if mortality was taking place and possibly identify the causes.

Continue use of motion detector cameras for nest monitoring

There are many hours each day when monitoring staff or predator management specialists are either not present or not in a position to observe nest predation. In addition, predators may leave little or no evidence behind or tracks may be quickly erased by wind-blown sand before nest

fates can be investigated. Photo infrared digital cameras with passive motion detector triggers (Reconyx PC900) were purchased in the latter part of the 2010 season to help identify and document snowy plover nest predators. They were tested and, with permission from USFWS, placed near a small number of plover nests in 2010 and 2011 by staff members permitted by USFWS for this activity. Experimenting with the cameras continued in 2012. One of the challenges has been adapting the cameras that are normally used on large mammals to be sensitive enough to be triggered by movements of a small ground nesting bird. Because snowy plover movement was not triggering the cameras at certain settings, they were programmed to automatically take photos at regular intervals (one to five minutes) in addition to the motion detection setting. In 2012, stakes were used to position the cameras approximately eight to 12 inches above the ground to increase the camera's area of view. During the 2012 nesting season seven snowy plover nests were selected for camera use (to date cameras have only been used on plover nests at this site but the permit does allow for cameras to be placed near least tern nests). No predation events were recorded. However, the nest cameras documented nest fates and fate dates, nest exchanges between male and female, and adult band combinations. It is recommended for 2013 to continue to use motion detector cameras for nest monitoring, continue to experiment with camera settings and placement, and train and permit additional monitoring staff as needed.

Continue to use an anemometer with data logger to record daily wind speeds and direction

A wind tower with wind speed and direction collected at two, seven and 10 meters above the ground (Sonoma Technology, Inc.) has been located east of the 6 enclosure since June 2010. This station is intended to help record changes in wind speed and direction across a large area of the park and the Oso Flaco area and it has provided accurate data that matched the 2011 wind values collected from a smaller portable system owned by Parks (WindLog by RainWise Inc.). This portable system stopped working prior to the 2012 season and could not be repaired. On-site information for daily average and high gust wind speeds aids in understanding the role of wind in nest abandonment. For 2013, it is recommended to continue gathering data using the wind tower.

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 east fence receive temporary additional fencing to create a buffer from recreational activities in the open riding area. These bumpouts connect to the east fence adjacent to the nests and extend eastward into the open riding area. Prior to 2010, only nests found within 75 feet of the Southern Enclosure east 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 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 2012, there were four snowy plover nests given bumpouts to increase the distance from the nest to the open riding area fence to a minimum of 100 feet. Of these nests, three hatched, and one was abandoned pre-term suspected due to wind. Three snowy plover nests were found in the

open riding area and all received single nest enclosures with a minimum radius of 100 feet. One nest was approximately 330 feet east of 6 enclosure and was abandoned pre-term (SP1). Two nests were in the camperline to the north and distant from the 6 enclosure, one was 915 feet away and was abandoned pre-term with mortality of one member of the pair suspected (SP80) and the other nest was approximately 3,000 feet away and was depredated (SP81) (see Appendix B and Notes section for more nest fate details for SP1, SP80, and SP81).

For 2013, it is recommended to continue to install bumpouts for nests close to the east 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 in the Southern Enclosure receiving adjacent bumpouts and nests in the open riding area receiving single nest enclosures 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 east fence, any bumpouts, and single nest enclosures.

Continue option to use least tern chick fencing on the east side of the enclosure

Many sites in California use tern chick fencing to prevent least tern chicks from moving out of protected areas. This fencing is typically a low plastic fence with very small mesh size, often attached to the bottom of a larger and sturdy existing fence. In February 2010, tern chick fencing was installed on the north and east fence of the 6 enclosure and a portion of the east 7 enclosure. The tern chick fencing was monitored on a daily basis. After several periods of high winds there was a significant amount of sand deposition on the eastern side of the enclosure fence and a large portion of the tern chick fence was buried. Attempts to move the sand build-up with heavy equipment were not effective and it was determined that the fence could not be properly maintained throughout the season. The tern chick fencing was removed in March 2010 and not installed in 2011 or 2012. Windy site conditions at ODSVRA are inevitable and, therefore, a method to maintain the tern chick fencing should be further investigated to determine if such fencing may become an option to help prevent least tern chicks from moving into the open riding area.

Discontinue experiment of using four inch by four inch mesh fence size on the lower portion of small sections of the west enclosure fence

The prevailing northwest winds blow sand into the west enclosure fence and the fence causes localized decreased wind speed, resulting in increased sand deposition on the leeward side of the fence. The sand build-up immediately east of the fence can result in areas of bare sand and limited cover inside the enclosure. To exclude coyotes from the enclosure, the fence is a height of six feet with a mesh size of two inch by four inch on the lower portion and larger mesh for the upper layer. USDA Wildlife Services was consulted prior to the 2011 season and indicated that four inch by four inch mesh is the maximum size that is expected to deter coyotes from climbing or crawling through the fence. In 2011, four inch by four inch mesh was used in two 100 foot sections along the west fence of 6 and 7 enclosures as an experiment to see if the larger mesh would help reduce the buildup of sand east of the fence while still excluding coyotes. The experiment was repeated in 2012 with the fence length increased to two 500 foot sections of four inch by four inch fence. In both years, monitoring staff did not note differences in coyote or

other predator behavior in the two experimental areas during the breeding season. The fence was assessed during and at the end of each season and no noticeable difference in sand movement was observed in the experimental areas compared to the remainder of the western fence. The four by four inch fence could only be purchased in a four foot height and the two inch by four inch fence is five feet high; both were effective at excluding coyotes (with a second layer of fencing), but the five foot height is preferable because it would potentially require less maintenance throughout the season. It is recommended in 2013 to only use the two inch by four inch fence for the lower layer of the enclosure fencing.

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

The shoreline west of the enclosure west fence is important snowy plover habitat for rearing chicks. Past 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 brooding area inside the seasonal fence that is 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, 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). The majority of the 8 enclosure shoreline fence was moved up to 50 feet east (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 resource personnel distribute 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 that results in substantial deposition of fine wind-blown 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 any existing or introduced cover).

Shifting the fence eastward allows for a wider area of shore with cover and wrack to be available as plover habitat. Adjusting the fence eastward also 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 (wind-blown 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.

There was an increase in plover and tern nests on the shoreline in 2012 compared to 2011, likely as a result of moving the west fence eastward. In 2012, 18% of plover nests in 6 enclosure and 19% in 7 enclosure were west of the fence; this compares to 12% and 5% in 2011 (numbers exclude nests west of 7.5 enclosure). All least tern nests in 2012 were in 6 and 7 enclosures with eight of 46 nests on the shoreline. No least tern nests were found on the shoreline in the eight previous years that the enclosure was in the current general configuration. The hatch rate for the shoreline nests (west of the west fence) was comparable to the overall hatch rate for the entire enclosure area (both east and west of the west fence). The 6 and 7 enclosure had a plover nest hatch rate of 85% and 75%, respectively, compared to 86% and 100% hatch rate for the shoreline 6 and 7 enclosure plover nests. The overall least tern hatch rate for 2012 was the same as the shoreline hatch rate with known fate (75%) (there were four least tern nests on the shoreline with unknown fate and one was abandoned pre-term). Moving the west fence eastward did not appear to move nesting closer to the east fence or east of the enclosure into the open riding area. There was one nest found east of the enclosure in 2012 compared to two nests in 2011. In 2012, the number of bumpouts for nests found near the east fence was similar to previous years. There were four snowy plover nests and zero least tern nests near the fence bordering the ORA that received bumpouts. This compares to eight plover and tern nests that received bumpouts in 2011.

In 2012, snowy plover chick survival (25%) was lower than eight of the 10 previous years (2002-11, mean=37.9%). To assess if the increased shoreline width impacted chick survival, we analyzed multiple snowy plover broods totaling 135 chicks from various locations along the shoreline. We omitted chicks from broods that moved along the shoreline and any chick that did not survive for a minimum of 10 days. There were 19 ten-day-old or older chicks and 84% of them fledged in the narrower north side of 6 enclosure (500 to 1,000 feet south of marker post 6); there were 15 ten-day-old or older chicks and 80% fledged from south 6 enclosure where the fence was moved in 100 feet; there were 12 ten-day-old or older chicks and 67% fledged from 7 enclosure where the fence was moved in 100 feet; and 31 ten-day-old or older chicks and 81% fledged from 8 enclosure where the fence is mostly unchanged from previous locations. There is not enough information to determine if the increased shoreline left chicks more vulnerable to predation. Overall survival of chicks older than 10 days was high and the sample size was relatively small, especially on the 7 shoreline. We will analyze chick survival in future years to assess if chick survival is impacted in areas with a larger shoreline component.

Predation is believed to have played a large part in the low fledge rate recorded for 2012, with coyote and avian predators suspected for the chick loss; among other evidence, multiple snowy plover bands were found in coyote scat, a gull pellet, and an unidentified avian pellet. Moving the west fence 100 feet to the east improved the shoreline habitat characteristics for chick-rearing habitat. 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. It is unclear if a slightly wider shoreline may make chicks more susceptible to coyote depredation (the west fence is not a barrier to avian and other mammalian predators). Although broods are observed moving east of the fence to take cover in foredune vegetation that is present in North Oso Flaco, parts of 8 enclosure, and 7.5 revegetation area, there is very little vegetation in 6 and 7 enclosures and broods are not often observed moving east of the fence. During early morning monitoring, broods are not observed east of the fence, including during cold, misty, and wet mornings when many young chicks are brooded for protracted periods and not feeding. Broods

were observed on the shoreline at night during the few overnight shoreline surveys. Therefore, it is thought that the chicks are likely to be on the shoreline at night when coyotes are present. The reaction of chicks to coyote on the shoreline at night is unknown. The chicks may take cover in the closest wrack pile, plant, or other debris west or east of the fence which would support the idea that improving the shoreline habitat was valuable since the area immediately east of the fence is mostly bare. Or it is possible that instead of taking cover, the broods react to coyotes by running east of the fence and moving the fence 100 feet east may make the chicks more susceptible to coyote depredation.

It is recommended for 2013 to repeat the shoreline configuration as was present in 2012, with a large portion of the shoreline fence approximately 100 feet to the east of the typical shoreline fence location and to continue to gather further information. 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 work to address water quality issues at Oso Flaco Lake

There is concern that activities occurring outside the park increase sediment and contaminants in Oso Flaco Lake, degrading water quality, which could impact least tern adults, chicks, and juveniles that consume fish from the lake. The Central Coast Regional Water Quality Control Board is currently considering a Total Maximum Daily Load (TMDL) regulation for a host of contaminants that impact water quality in Oso Flaco Lake. In 2010, fish tissue samples from the lake showed high levels of pesticides that exceed recommended human consumption levels. OSDVRA is currently working with the Coastal San Luis Resource Conservation District, regulatory agencies, and neighboring landowners to address water quality conditions in Oso Flaco Lake. If restored to a healthy system with available fish suitable for least terns, Oso Flaco Lake could be an important supplement to the near-shore ocean waters where prey availability may vary significantly within and between years. The number of least terns utilizing the lake varies from year to year. There was a single day high count of 13 least terns seen at Oso Flaco Lake for the 2012 season and there was a high of 29 and 10 terns seen in 2011 and 2010, respectively.

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 285 cubic yards of wrack were distributed on the enclosure shoreline throughout the 2012 season as habitat enhancement. Greater efficiencies can be achieved 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. In 2013, it is recommended that heavy equipment be available throughout the season to assist in loading large piles of wrack collected in the open riding area to then be distributed into the

seasonal enclosure 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. Wrack collected from the riding area was experimentally distributed in a few large piles at the beginning of the 2011 and 2012 seasons in areas east of the shoreline fence. In both years, these piles persisted to the end of the season helping to create temporary hummocks within the enclosure and, in some cases, provided a favorable area for plants to grow. As time permits, it is recommended to continue 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 habitat enhancement. 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 the Southern Enclosure with sea rocket (*Cakile maritima*), beach bur (*Ambrosia chamissonis*), and other on-site available seed is recommended to continue in 2013. 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 2013. 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. Management actions intended to reduce nesting near the east fence and north end of the seasonal enclosure adjoining the open riding area, including no substrate enhancement or distribution of seeds or container plants in the vicinity, will be continued in 2013 (Appendix F).

Continue to study the benefits of wrack addition to the Southern Enclosure 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 2007-12, Drs. Jenifer Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara, examined the responses of invertebrate numbers and diversity in areas where wrack was added to the shoreline throughout the breeding season, with only limited sampling occurring at the beginning and end of the 2012 season. Results of the surveys suggested that the seven month seasonal closure (March through September) was not a sufficient period of time for invertebrates to effectively naturally recover species diversity and abundance on the Southern Enclosure shoreline. Preliminary analysis suggests that inoculating a large number of wrack-associated invertebrates into wrack over a wide area of the enclosure shoreline appeared to increase the estimated abundance of talitrids. If funding levels allow, experimental examination of wrack and invertebrate manipulation on the Southern Enclosure shore should continue in the 2013 season with the goal of identifying potential means to enhance the diversity and abundance of invertebrate species that are natural prey for plovers.

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. 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 first installed in early April and high winds quickly destroyed the plastic strips, making the cover ineffective and the cover was removed in early July. For daily surveys at the dumpster area, the month of July had the highest daily average number of gulls (124) as well as the maximum number of gulls present at one time (492 on 11 July) (see section titled Predators and predator management on page 40 for more details). It is recommended for 2013 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.

Ongoing management actions that will continue in 2013

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 utilized for monitoring. The equipment has been used for monitoring since 2007.
- Continue monitoring least tern juveniles, night roost, and foraging activity at nearby freshwater lakes.
- Tern chick shelters will continue to be used (Appendix F).
- Predator monitoring and management actions that have been in place since 2003 and 2004 will continue.
- Gull surveys will continue as they have since 2008.
- The Southern Exclosure 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 Exclosure 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 exclosures with net tops and mini-exclosures as needed to protect nests from avian predators. These small exclosures 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 Exclosure and Oso Flaco.
- Efforts to retain skilled monitors will continue at ODSVRA.

NOTES

Three snowy plover nests in the open riding area

In 2012, three of the 216 known snowy plover nesting attempts were in the open riding area. On 2 April, the first egg of nest SP1 was found approximately 300 feet east of 6 enclosure, and in an area where an unbanded pair had been scraping since 18 March. A circular single nest enclosure, approximately 200 feet in diameter, was constructed around the nest the same day. This nest was abandoned pre-term on 4 April and two eggs were collected on 26 April and held for later transfer to a scientific institution.

On 17 May, nest SP80, with three eggs, was found approximately 900 feet north of 6 enclosure. That same day, the first egg of nest SP81 was found approximately 3,000 feet north of 6 enclosure. Single nest enclosures, approximately 200 feet (SP80) and 250 feet (SP81) in diameter, were constructed the same day. Additionally, staff placed symbolic fencing (posts with a single rope) around each single nest enclosure, to delineate the area where parking and camping were not allowed (100 feet from the enclosure fence). On 24 May, SP81 was depredated by unknown avian predator (suspected to be gull sp.). On 2 June, SP80 was determined to be abandoned pre-term with adult mortality suspected. Two salvageable eggs from the nest were transported on 6 June to Monterey Bay Aquarium for captive rearing. One egg hatched and the fledgling was released at Moss Landing State Beach, Monterey County.

Snowy plover broods in the open riding area

In 2012, between 17 May and 7 June, a minimum of three different snowy plover broods were observed in the open riding area, three chicks from SP33 on two occasions, one large banded chick (likely SP19) on one occasion, and one chick from SP37 on one occasion.

On 17 May during the late morning, three chicks with two adults from SP33 were first observed on the shore 400 feet north of marker post 6 in the open riding area. Staff conducted traffic control until the chicks and adults returned to the 6 enclosure shoreline. The brood continued to be monitored throughout the day. On 18 May at 9:40 AM, three chicks and two adults from SP33 were observed halfway between marker post 5 and 6 in the open riding area. Staff implemented the same strategy as on 17 May, and the chicks entered the 6 enclosure shoreline at 12:21 PM. The brood was monitored continuously until 5 PM.

On 31 May at 9:21 PM, one large banded chick (likely SP19) with an adult was observed foraging on the shoreline of the open riding area approximately 1,200 feet north of marker post 6. Staff controlled traffic until the brood moved south into the 6 enclosure shoreline.

On 7 June at 6:27 AM, one chick from SP37 with an adult was observed just north of marker post 6 in the open riding area, and was directed into the enclosure.

Abandoned snowy plover eggs and chicks raised in captivity

On rare occasions, abandoned eggs or chicks are collected and transported to a facility to be raised in captivity and, if feasible, released into the wild.

On 24 May, one egg of SP80 was buried completely during high winds. This egg was unburied and all three eggs reset on the surface. On 24 and 25 May, during a period of sustained winds, the three-egg clutch was moved several times away from an encroaching sand bank. On 26 and 27 May, monitors on several occasions flushed roosting gulls out of the 200 foot diameter single nest enclosure. On 28 May, one of the eggs was found damaged twenty feet from the nest. The nest continued to be consistently incubated by the female until 30 May, after which only the male was seen on the nest and incubation was inconsistent. The nest was last seen with an incubating bird on 2 June. Over the next four days the nest was closely monitored, but no bird was seen at the nest, plover tracks at the nest were absent, and the eggs were partially buried. In addition, the eggs had been marked on 4 June and after two days their position was unchanged, indicating they were not being attended. The nest was determined to be abandoned pre-term and the two eggs were collected on 6 June and transported to the Monterey Bay Aquarium.

On 2 June, a mini-enclosure was installed on nest SP108 in South Oso Flaco. This was later replaced on 7 June with a 10 foot by 10 foot enclosure with a net top. On 28 June, the nest was determined to be abandoned and the three eggs were collected and transported to the Monterey Bay Aquarium. All three eggs hatched and three fledglings were released on 7 August at Moss Landing State Beach, Monterey County.

On 22 July, nest SP212 was found with one egg in Boneyard enclosure. This nest remained at one egg and was consistently incubated by the female. On 1 August, a 10 foot by 10 foot enclosure with net top was installed. On 7 August, the egg was noted with modest prehatching cracks. This nest was not incubated over a two-day period (8-9 August) and was determined to be abandoned. The egg was collected and transported to Monterey Bay Aquarium. This egg hatched and the fledgling was released on 10 September at Moss Landing State Beach, Monterey County.

On 10 August, nest SP205 in 7 enclosure had two recently hatched chicks and one egg. This nest was monitored (by spotting scope from a distant vehicle) for an extended period of time and was determined to be abandoned. The two chicks and one egg were transported to Monterey Bay Aquarium and the remaining egg hatched. Two fledglings were released on 10 September and one on 19 September at Moss Landing State Beach, Monterey County.

Capture and transfer to Monterey Bay Aquarium of injured snowy plover adult

On 2 October, an unbanded adult snowy plover with blood on its drooping left wing, and unable to fly, was captured north of Grand Avenue. This bird remained at Pacific Wildlife Care overnight and was transported to Monterey Bay Aquarium on 3 October. This injured adult was determined to be non-releasable. At the time of report completion, paperwork was in process for transfer of the live bird to the Long Beach Aquarium shorebird exhibit.

Necropsy of snowy plovers (see attached necropsy reports for more detail)

On 7 May, a mini-exclosure was installed on nest SP29 in 8 exclosure. On 22 May, a live unbanded chick from the third hatching egg was found three feet from the nest bowl and not moving. No adults or previously banded chicks were in the area. The chick was collected and transferred to Monterey Bay Aquarium. The chick was euthanized the following day after failing to feed. Necropsy results were unremarkable, and indicate nephrosis probably occurred due to dehydration.

On 18 August, the carcass of an unbanded adult snowy plover was found partially buried in faint tire tracks in the open riding area northeast of 6 exclosure. The carcass appeared fresh and had dried blood on the chest. Despite severe post-mortem changes, the necropsy results indicate hemorrhage in the lungs, mineralization of the kidneys and ventricular wall, and the presence of adult parasites in the intestines. Results were inconclusive as to cause of death.

Necropsy of least tern chick

On 2 July, the carcass of an unbanded least tern chick from LT16 was found dead in its nest bowl. This chick was approximately one day old and had been seen being brooded with its sibling earlier this same day. The carcass was sent for necropsy on 5 July to test for levels of DDT/DDE. Final results have yet to be received.

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APPENDICES

Appendix A. California least tern nests at ODSVRA in 2012.

Least tern chicks were banded with blue over white 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. Chicks were weighed immediately prior to banding, typically at one to three days old. Five chicks from four known hatching nests were not banded. In addition, there were seven nests with unknown fate (unknown if hatched or failed). A total of six unbanded fledglings were seen in 6 enclosure on 4 August. The sixth fledgling is assumed to be from an unknown fate nest that did hatch. Band information on breeding adults is provided when known. Sex of banded adults is typically not known.

Location: 6 = 6 enclosure, 7 = 7 enclosure

Abandoned pre-term = nest abandoned before expected hatch date

Abandoned post-term = nest abandoned after expected hatch date

Unknown = unknown if nest hatched or failed

U = unbanded

na = Estimated date not available due to insufficient information

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		5/27	Hatch	6/22	2	2 (2)	R:B/W (8.9 g) W:B/W (7.4 g)	R:/B/W W:B/W	
2	7	-:A/G	6/2	Hatch	6/23	2	1 (1)	Y:B/W (8.3 g)	Y:B/W	One egg abandoned post-term on 5 July.
3	6		6/3	Hatch	6/29	3	1 (1)	Y/W:B/W (7.3 g)	Y/W:B/W	The two nonhatching eggs (both unnaturally light in weight) abandoned on 2 July.
4	7		na	Failed, unknown cause	6/6	1	0			Insufficient information to estimate initiation date.
5	7		6/4	Abandoned, unknown if pre- or post-term	6/26	2	0			Both eggs unnaturally light in weight and suspected to be nonviable.
6	7		na	Unknown	6/17	2				Nest found 6 June as two-egg nest. Seen consistently incubating for 12 consecutive days. Insufficient information to estimate initiation date.
7	7		6/8	Abandoned post-term	7/28	2	0			Nest consistently incubated for a minimum of 51 days prior to abandonment. Eggs nonviable.
8	7	U	6/7	Hatch	6/27	2	2 (2)	G:B/W (8.5 g) V:B/W (8.8 g)	G:B/W V:B/W	

Appendix A. California least tern nests at ODSVRA in 2012 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledged)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
9	6		6/10	Hatch	7/2	1	1 (1)	G/Y:B/W (6.7 g)	G/Y:B/W	
10	6		6/4	Hatch	6/25	2	1 (1)	P:B/W (7.9 g)	P:B/W	Remaining egg last observed incubated 26 June. When examined on 27 June, egg had no pre-hatching cracks.
11	6		6/6	Hatch	6/27	2	2 (1)	L:B/W (4.6 g) O:B/W (4.8 g)	O:B/W	L:B/W chick last observed alive 27 June at time of banding on hatch day.
12	6		6/6	Hatch	6/28	2	1 (1)	R/W:B/W (8.3 g)	R/W:B/W	One egg abandoned post-term 29 June.
13	6	U	6/10	Hatch	7/1	1	1 (1)	G/R:B/W (5.6 g)	G/R:B/W	
14	7	Y/W/Y:-	6/1	Hatch	6/26	2	1 (1)	B:B/W (5.0 g)	B:B/W	
15	6		6/7	Hatch	6/28	2	2 (2)	O/W:B/W (7.6 g) G/W:B/W (9.4 g)	O/W:B/W G/W:B/W	
16	6	U	6/9	Hatch	6/30	2	2 (1)	W/R:B/W (6.6 g) U (dead at nest)	W/R:B/W	One chick dead at nest bowl.
17	6		6/3	Abandoned post-term	7/23	2	0			Nest active during a 51-day period 3 June to 23 July prior to abandonment.
18	6		6/3	Hatch	6/26	3	2 (0)	A:B/W (6.7 g) B/W:B/W (9.6 g)		Both chicks last observed alive 2 July at approximately 6 days old.
19	6	-:B/G/B U	6/4	Unknown	7/3	1				Nest active during a 29-day period 4 June to 2 July. No evidence of nest 3 July.
20	6		6/16	Hatch	7/9	2	2 (2)	A/R:B/W (5.8 g) O/A:B/W (14.8 g)	A/R:B/W O/A:B/W	
21	6		6/18	Hatch	7/10	1	1 (1)	A/Y:B/W (6.0 g)	A/Y:B/W	
22	6	U	6/15	Hatch	7/6	2	2 (2)	A/W:B/W (6.9 g) W/B:B/W (7.1 g)	A/W:B/W W/B:B/W	
23	6		6/8	Hatch	6/30	2	2 (2)	Y/G:B/W (8.6 g) O/G:B/W (7.3 g)	Y/G:B/W O/G:B/W	
24	6		6/17	Hatch	7/9	2	2 (?)	U U		Two chicks last observed alive 12 July at approximately 3 days old.
25	6	(light):W/B/W U	na	Unknown	7/4	1				Nest observed active during a 17-day period 18 June to 4 July with inconsistent incubation from 25 June to 4 July. Insufficient information to estimate initiation date.

Appendix A. California least tern nests at ODSVRA in 2012 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledged)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
26	6	U	6/17	Hatch	7/9	2	2 (2)	A/B:B/W (8.4 g) A/O:B/W (7.8 g)	A/B:B/W A/O:B/W	
27	6	W/B:W/Y	6/20	Hatch	7/12	2	2 (2)	O/B:B/W (5.7 g) O/R:B/W (5.7 g)	O/R:B/W O/R:B/W	
28	6		na	Unknown	6/28	2				Nest observed active during a 11-day period 18 June to 28 June. Insufficient information to estimate initiation date.
29	6		na	Abandoned, unknown if pre- or post-term	7/4	2	0			Nest observed active during a 20-day period 15 June to 4 July. Two eggs found at nest after abandonment. Insufficient information to estimate initiation date.
30	6		na	Unknown	6/28	2				Nest observed active during a 9-day period 20 June to 28 June. Insufficient information to estimate initiation date.
31	6		na	Unknown	7/1	1				Nest observed active during a 3-day period 29 June to 1 July. Insufficient information to estimate initiation date.
32	6	U U	6/20	Hatch	7/11	2	2 (?)	U U		Two chicks last observed alive 22 July at approximately 11 days old.
33	6		na	Unknown	7/13	1				Nest active during a 14-day period 30 June to 13 July. Insufficient information to estimate initiation date.
34	6	-:W	6/28	Hatch	7/20	1	1 (1)	G/A:B/W (6.0 g)	G/A:B/W	
35	7		6/23	Hatch	7/15	2	2 (2)	B/G:B/W (6.2 g) B/R:B/W (6.1 g)	B/G:B/W B/R:B/W	
36	6		6/21	Hatch	7/23	2	2 (0)	G/O:B/W (4.8 g) Y/A:B/W (5.5 g)		Two chicks last observed alive 25 July at approximately 2 days old.
37	6		6/17	Hatch	7/8	2	2 (2)	W/A:B/W (5.3 g) W/O:B/W (5.9 g)	W/A:B/W W/O:B/W	
38	7	Y/W:W/B/W U	7/4	Hatch	7/27	2	2 (1)	Y/B:B/W (7.1 g) Y/O:B/W (6.0 g)	Y/B:B/W	Y/O:B/W chick last observed alive 2 August at approximately 6 days old.

Appendix A. California least tern nests at ODSVRA in 2012 (continued).

Nest	Location	Adult pair	Estimated initiation date	Nest fate	Estimated fate date	No. eggs	No. chicks (No. fledged)	Chick band combination (chick weight in grams)	Confirmed fledged	Notes
39	6		6/27	Hatch	7/18	2	2 (0)	B/Y:B/W (7.5 g) G/B:B/W (5.7 g)		G/B:B/W chick last observed alive 31 July at approximately 13 days old. B/Y:B/W chick last observed alive 2 August at approximately 15 days old.
40	6		na	Abandoned, unknown if pre- or post-term	6/28	2				Two-egg nest found 7 June and observed active during a 3-day period 7 June to 9 June. One egg found at nest after abandonment. Insufficient information to estimate initiation date.
41	7		6/24	Hatch	7/15	2	2 (1)	O/Y:B/W (4.8 g) B/A:B/W (5.1 g)	O/Y:B/W	B/A:B/W last observed alive 2 August at approximately 19 days old.
42	6	U	6/12	Hatch	7/3	1	1 (1)	W/G:B/W (7.21 g)	W/G:B/W	
43	6		6/22	Hatch	7/15	2	1 (1)	B/O:B/W (8.1 g)	B/O:B/W	One egg well pipped and chick's bill visible, but no movement. Portion of chick inside egg that is visible appears dry and chick appears dead.
44	6	U U	6/1	Hatch	6/22	≥1	1 (?)	U		Insufficient information to determine clutch size.
45	6	-:W W/B:W/A	7/12	Hatch	8/2	≥1	1 (1)	Y/R:B/W (10.3 g)	Y/R:B/W	Insufficient information to determine clutch size. Minimum of one egg.
46	6		na	Abandoned pre-term	6/28	2	0			Nest observed active during a 8-day period 21 June to 28 June. Two eggs found at nest after abandonment. Insufficient information to estimate initiation date.

Appendix B. Snowy plover nests at ODSVRA in 2012.

Split hatch noted for nests with eggs hatching on more than one day. Plover chicks were banded to brood.

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

10'x10' exc. with top = 10 foot by 10 foot enclosure

na = Estimated date not available due to insufficient information

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
1	Open riding area	F=U M=U	1 Apr	Abandoned pre-term	4 Apr	2				Single nest enclosure	Two eggs abandoned pre-term.
2	6	F=U M=U	1 Apr	Abandoned, suspected wind	27 Apr	3				Seasonal enclosure	Three eggs buried during period of high winds. One egg scavenged by a northern harrier on 10 May.
3	7	F=U M=U	29 Mar	Abandoned pre-term	3 Apr	1				Seasonal enclosure	One egg abandoned pre-term.
4	6	F=U M=PV:AG	1 Apr	Hatch	6 May	3	2	2 GG:OB		Seasonal enclosure	Split hatch. One egg (without cracks) abandoned post-term. On 14 May, one chick seen with injured right leg, not seen after 15 May. Band combination reused on SP151 (no chicks fledged).
5	6	F=VV:VW M=BB:-	1 Apr	Hatch	4 May	3	3	3 BB:BB	3	Seasonal enclosure	Split hatch. On 15 May, one chick observed favoring left leg slightly, seen subsequently without limp.
6	7	F=RR:AR M=PG:VY	5 Apr	Hatch	9 May	3	3	2 GA:AY 1 unbanded	1	Seasonal enclosure	On 9 May, one recently hatched chick depredated by male northern harrier near nest site.
7	8	F=BB:YG M=U	5 Apr	Hatch	10 May	3	3	3 GA:GB	1	Mini-enclosure Seasonal enclosure	
8	BY	F= M=	6 Apr	Abandoned, suspected wind	7 Apr	1				Seasonal enclosure	One egg buried during period of high winds.
9	6	F=VV:RB M=RR:PG	5 Apr	Hatch	10 May	3	1	1 GA:GR	1	Seasonal enclosure	Two eggs depredated by northern harrier.
10	6	F=U M=U	8 Apr	Hatch	12 May	3	3	3 GA:BY		Seasonal enclosure	Split hatch. Band combination reused on SP187 (two chicks fledged).
11	6	F=U M=U	2 Apr	Hatch	5 May	3	2	2 GG:BW	2	Seasonal enclosure	One egg (without cracks) abandoned post-term.
12	7	F=U M=RR:WR	8 Apr	Hatch	13 May	3	3	3 GA:WB	1	Mini-enclosure Seasonal enclosure	
13	6	F=U M=U	8 Apr	Hatch	12 May	3	3	3 VV:WG	1	Mini-enclosure Symbolic fence	

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
14	6	F=PV:BY M=U	10 Apr	Abandoned, suspected wind	12 Apr	1				Bumpout Seasonal enclosure	One egg buried during period of high winds.
15	8	F=U M=U	9 Apr	Hatch	13 May	3	3	3 GG:AW	2	Mini-enclosure Seasonal enclosure	Split hatch.
16	7	F= M=	8 Apr	Depredated, northern harrier	8 May	3				Seasonal enclosure	Three eggs depredated by northern harrier.
17	6	F=VV:VG M=PV:BR	7 Apr	Hatch	10 May	3	2	2 unbanded		Bumpout Seasonal enclosure	Chicks not banded due to predator disturbance in the area. One egg (without cracks) abandoned post-term.
18	7	F=U M=U	12 Apr	Depredated, avian	10 May	3				Seasonal enclosure	Three eggs depredated by unknown avian predator during period of northern harrier activity.
19	6	F=U M=U	6 Apr	Hatch	9 May	3	3	3 GG:RG	3	Seasonal enclosure	
20	7	F=U M=PV:AG	6 Apr	Hatch	9 May	3	3	3 BB:GR	1	Seasonal enclosure	
21	7	F= M=	12 Apr	Depredated	7 May	2				Seasonal enclosure	Two eggs depredated by unknown predator during period of northern harrier activity.
22	8	F=U M=BB:YY	9 Apr	Hatch	12 May	3	3	3 GA:AG	2	Mini-enclosure Seasonal enclosure	
23	8	F= M=U	10 Apr	Hatch	13 May	3	3	3 GA:WW	3	Mini-enclosure Seasonal enclosure	Split hatch. Band combination reused on SP72 (no chicks fledged).
24	8	F= M=	5 Apr	Abandoned pre-term	28 Apr	3				Seasonal enclosure	Three eggs abandoned pre-term.
25	8	F=VG:VY M=U	2 Apr	Hatch	5 May	3	3	3 GG:WW	3	Seasonal enclosure	
26	7	F=PV:YG M=U	6 Apr	Hatch	9 May	3	3	3 RR:RB	3	Mini-enclosure Symbolic fence	Split hatch.
27	7	F=U M=U	10 Apr	Hatch	13 May	3	2	2 GG:RR	1	Mini-enclosure Bumpout Seasonal enclosure	One egg (without cracks) abandoned post-term.
28	SOF	F=RR:BW M=	13 Apr	Abandoned pre-term	4 May	3				10'x10' excl. with top Symbolic fence	Three eggs abandoned pre-term.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
29	8	F= M=	16 Apr	Hatch	19 May	3	3	1 VV:YG 1 -:YG 1 unbanded		Mini-exclosure Seasonal exclosure	Split hatch. On 19 May, one chick sprawled on back, not moving, skin missing and blood on tibiotarsal joint of left leg. On 22 May, live unbanded chick from third hatching egg is found three feet from nest bowl, not moving and no adults in area. Chick is collected and transferred to Monterey Bay Aquarium. Chick euthanized the following day after no response to feeding. See necropsy report. Band combination reused on SP158 (no chicks fledged). On 3 August, carcass of small, decomposed VV:YG chick found on surface of sand in North Oso Flaco.
30	8	F=U M=U	16 Apr	Hatch	19 May	3	3	3 VG:WB	2	Mini-exclosure Seasonal exclosure	
31	BY	F=RR:VW M=U	14 Apr	Hatch	18 May	3	2	2 GG:YR	1	10'x10' excl. with top Seasonal exclosure	Split hatch. One egg (without cracks) abandoned post-term.
32	6	F=U M=U	13 Apr	Hatch	16 May	3	2	2 GG:RY	1	Mini-exclosure Symbolic fence	One egg (without cracks) abandoned post-term.
33	6	F=PV:VY M=U	13 Apr	Hatch	16 May	3	3	3 VV:WY	2	Seasonal exclosure	On 3 July, intact carcass of a VV:WY 48-day-old fledge collected from the site of an observed peregrine falcon kill inside 6 exclosure.
34	7	F=banded M=U	19 Apr	Abandoned pre-term	22 Apr	1				Seasonal exclosure	One egg abandoned pre-term.
35	7	F=U M=	17 Apr	Hatch	20 May	2	1	1 VG:RW		Seasonal exclosure	One egg (with cracks and pips) abandoned post-term. Band combination reused on SP199 (no chicks fledged).
36	8	F= M=	21 Apr	Depredated	3 May	3				Seasonal exclosure	Three eggs depredated by unknown predator during period of northern harrier activity.
37	6	F=RR:PB M=U	17 Apr	Hatch	20 May	3	1	1 VV:RW	1	Seasonal exclosure	One egg missing pre-term. One egg (without cracks) abandoned post-term.
38	6	F= M=	13 Apr	Depredated	9 May	3				Seasonal exclosure	Three eggs depredated by unknown predator during period of northern harrier activity.
39	6	F=AY:AW M=U	16 Apr	Hatch	19 May	3	3	3 VV:YB	1	Seasonal exclosure	

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
40	7	F= M=	12 Apr	Depredated, northern harrier	9 May	3				Seasonal enclosure	Three eggs depredated by northern harrier.
41	6	F=U M=U	15 Apr	Hatch	18 May	3	2	2 VV:GR	2	Seasonal enclosure	One egg with unknown fate.
42	6	F=U M=U	22 Apr	Hatch	25 May	2	2	2 GG:WY	1	Seasonal enclosure	Split hatch.
43	6	F= M=GG:AB	17 Apr	Hatch	20 May	2	2	2 VV:AW		Seasonal enclosure	Band combination reused on SP UNK 7 (no chicks fledged).
44	BY	F=U M=U	22 Apr	Abandoned, suspected wind	7 May	3				Circular excl. with top Seasonal enclosure	One egg missing during period of high wind. Second egg missing during subsequent period of high wind. Nest camera records adult leaving nest for extended time periods during these high wind events but incubates consistently otherwise. Third egg abandoned pre-term.
45	7	F= M=	22 Apr	Depredated, avian	8 May	3				Seasonal enclosure	Three eggs depredated by unknown avian predator during period of northern harrier activity.
46	6	F=GG:VY M=U	20 Apr	Hatch	23 May	3	2	2 GA:GY		Seasonal enclosure	One egg (without cracks) abandoned post-term. Band combination reused on SP51 (two chicks fledged).
47	8	F= M=U	22 Apr	Abandoned pre-term	23 May	3				Mini-enclosure Seasonal enclosure	Three eggs (two with cracks) abandoned pre-term. On 22 August an adult-sized plover wing found half-buried near nest site.
48	6	F= M=	25 Apr	Depredated, avian	9 May	3				Seasonal enclosure	Three eggs depredated by unknown avian predator during period of northern harrier activity.
49	6	F=U M=BB:OR	23 Apr	Hatch	26 May	3	2	2 VG:GY		Seasonal enclosure	Split hatch. One egg missing pre-term. Band combination reused on SP204 (no chicks fledged).
50	8	F=RR:WR M=U	21 Apr	Hatch	24 May	3	2	2 VG:YR	2	Mini-enclosure Seasonal enclosure	One egg missing pre-term.
51	NOF	F=U? M=U	27 Apr	Hatch	30 May	3	3	3 GA:GY	2	Mini-enclosure Symbolic fence	Split hatch. Band combination previously used on SP46 (no chicks fledged).
52	7	F=VV:YW M=U	27 Apr	Abandoned, suspected wind	22 May	3				Seasonal enclosure	Three eggs buried during period of high winds.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
53	6	F=GA:OB M=	22 Apr	Unknown	23 May	3				Mini-enclosure Symbolic fence	
54	7	F=U M=VG:YW	30 Apr	Hatch	2 Jun	3	3	3 VG:RY		Seasonal enclosure	Band combination reused on SP161 (no chicks fledged).
55	SOF	F=VG:VR M=	30 Apr	Abandoned, suspected wind	16 May	2				Circular excl. with top Symbolic fence	One egg buried during period of high winds.
56	7	F=GG:YG? M=RR:GG	26 Apr	Hatch	29 May	3	3	3 GA:GW		Mini-enclosure Symbolic fence	Split hatch. Band combination reused on SP162 (no chicks fledged).
57	BY	F=VG:AW M=	30 Apr	Abandoned pre-term	28 May	3				Circular excl. with top Seasonal enclosure	Three eggs abandoned pre-term.
58	8	F=U M=VG:PR	28 Apr	Hatch	31 May	3	2	2 GG:PR	2	Circular excl. with top Symbolic fence	One egg abandoned post-term.
59	8	F= M=	30 Apr	Depredated, avian	6 May	3				Seasonal enclosure	Three eggs depredated by avian predator during period of northern harrier activity.
60	BY	F= M=U	30 Apr	Hatch	5 Jun	2	2	2 GA:WY		Mini-enclosure Seasonal enclosure	Split hatch. Band combination reused on SP156 (no chicks fledged).
61	8	F= M=U	25 Apr	Hatch	28 May	3	2	2 VG:BY	1	Mini-enclosure Seasonal enclosure	One egg (without cracks) abandoned post-term.
62	7	F= M=	30 Apr	Failed, unknown cause	21 May	3				Seasonal enclosure	
63	7	F= M=	25 Apr	Depredated, northern harrier	11 May	3				Seasonal enclosure	Three eggs depredated by northern harrier.
64	7	F=U M=U	25 Apr	Hatch	28 May	3	2	2 VG:OY		Mini-enclosure Symbolic fence	Split hatch. One egg (without cracks) abandoned post-term. Band combination reused on SP174.
65	6	F=U M=U	1 May	Hatch	3 Jun	3	3	3 GA:OW		Seasonal enclosure	
66	6	F=U M=U	24 Apr	Hatch	27 May	3	3	3 GG:AY	1	Seasonal enclosure	On 13 June, desiccated carcass of one GG:AY chick approximately one-week-old found on 6 enclosure shoreline. Last observed alive on 4 June.
67	6	F= M=	na	Depredated, avian	9 May	3				Seasonal enclosure	Three eggs depredated by unknown avian predator during period of northern harrier activity. Insufficient information to estimate initiation date.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
68	6	F= M=	na	Abandoned, unknown if pre- or post-term	25 May	3				Seasonal enclosure	Three eggs abandoned, unknown if abandoned pre- or post-term. Insufficient information to estimate initiation date.
69	6	F= M=	2 May	Abandoned pre-term	24 May	3				Seasonal enclosure	Three eggs abandoned pre-term.
70	6	F= M=	30 Apr	Hatch	2 Jun	3	3	3 GA:RG		Seasonal enclosure	Band combination reused on SP196 (no chicks fledged).
71	7	F=RR:OY M=S:-	25 Apr	Hatch	28 May	3	3	3 GA:VG	1	Circular excl. with top Symbolic fence	Band combination reused on SP173 (no chicks fledged).
72	8	F=VG:GW M=U	18 Apr	Hatch	21 May	3	3	3 GA:WW		Bumpout Seasonal enclosure	Band combination previously used on SP23 (three chicks fledged).
73	7	F=U M=BB:RG	22 Apr	Hatch	25 May	3	3	3 GA:VW		Seasonal enclosure	Split hatch. Band combination reused on SP178 (no chicks fledged).
74	6	F=GG:VY M=VG:YW	27 Apr	Hatch	30 May	3	3	2 GG:OG 1 unbanded		Mini-enclosure Symbolic fence	Split hatch. On 13 September, desiccated carcass of small GG:OG chick found on 6 enclosure shoreline possibly from SP74 or SP194. Band combination reused on SP194 (no chicks fledged).
75	7	F= M=	na	Depredated, northern harrier	9 May	2				Seasonal enclosure	Nest location known by observation of incubating adult. Minimum two eggs depredated by northern harrier (based on depredated eggshell fragments). Insufficient information to estimate initiation date.
76	6	F= M=	28 Apr	Hatch	31 May	3	3	3 GG:YW		Seasonal enclosure	Band combination reused on SP192 (no chicks fledged).
77	6	F=Banded M=	29 Apr	Depredated, northern harrier	12 May	3				Seasonal enclosure	Three eggs depredated by northern harrier.
78	NOF	F= M=RR:WR	9 May	Hatch	11 Jun	3	2	2 RR:RG		Mini-enclosure Seasonal enclosure	
79	6	F= M=	28 Apr	Depredated, peregrine falcon	23 May	2				Seasonal enclosure	Two eggs depredated by peregrine falcon.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
80	Open riding area	F=U M=banded	30 Apr	Abandoned pre-term	2 Jun	3				Single nest enclosure	On 24 May, one egg is completely buried during high winds and replaced in bowl. Clutch of three eggs is moved away from encroaching sand bank multiple times on 24 and 25 May during sustained high winds. Gulls roosting in enclosure are flushed by monitors multiple times on 26 and 27 May.
81	Open riding area	F=PV:WW M=U	16 May	Depredated, avian	24 May	3				Single nest enclosure	Three eggs depredated by unknown avian predator.
82	6	F=U M=U	13 May	Hatch	15 Jun	3	1	1 RR:YW		Mini-enclosure Symbolic fence	Two eggs abandoned post-term.
83	6	F=U M=GA:YB	13 May	Hatch	15 Jun	3	3	3 GA:PW		Bumpout Seasonal enclosure	Band combination reused on SP215 (no chicks fledged).
84	7	F= M=	12 May	Failed, unknown cause	21 May	2				Seasonal enclosure	
85	7	F=U? M=U	16 May	Hatch	18 Jun	3	2	1 RR:YG 1 unbanded		Seasonal enclosure	One egg missing pre-term. One egg seen in process of hatching and egg or hatched chick not seen subsequently. Band combination reused on SP209.
86	7	F=U M=WS:WB	16 May	Hatch	18 Jun	3	3	2 VG:PG 1 VG:GP	1	Seasonal enclosure	One chick banded VG:PG fledged.
87	8	F= M=	15 May	na	24 May	3				Mini-enclosure Symbolic fence	Three eggs abandoned pre-term. Insufficient information to estimate initiation date.
88	SOF	F=U M=	11 May	Abandoned post-term	15 Jun	3				Circular excl. with top Symbolic fence	Three eggs abandoned post-term.
89	7	F=GA:RY M=U	18 May	Hatch	20 Jun	3	3	3 RR:AG		Seasonal enclosure	Split hatch. On 28 August, desiccated carcass of small RR:AG chick found partially buried west of 7.5 revegetation area. Last observed alive on 24 June.
90	SOF	F=VG:VY M=GA:PY	19 May	Hatch	21 Jun	3	3	3 VG:WR	2	Circular excl. with top Symbolic fence	Split hatch. On 29 May replaced existing mini-enclosure with circular enclosure.
91	6	F=VV:RB M=U	22 May	Hatch	24 Jun	3	3	3 PV:VR		Seasonal enclosure	Band combination reused on SP203 (no chicks fledged).

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
92	7	F=U M=U	11 May	Hatch	13 Jun	3	2	2 RR:OG	1	Mini-exclosure Symbolic fence	One egg (without cracks) abandoned post-term.
93	7	F=RR:AR M=U	14 May	Hatch	16 Jun	3	3	3 RR:BG		Seasonal exclosure	Band combination reused on SP183 (no chicks fledged).
94	7	F=U M=U	19 May	Hatch	21 Jun	3	2	2 GA:WR	2	Seasonal exclosure	One egg (without cracks) abandoned post-term.
95	7	F=B:PR M=VV:VR	17 May	Hatch	19 Jun	2	2	2 RR:RY		Mini-exclosure Symbolic fence	
96	6	F= M=	16 May	Flooded	2 Jun	3				Circular excl. with top Symbolic fence	Three eggs lost to tide.
97	7	F=U M=U	22 May	Hatch	24 Jun	3	3	3 RR:GW	1	Mini-exclosure Symbolic fence	Split hatch.
98	8	F=U M=U	12 May	Hatch	14 Jun	3	3	3 GA:OG		Seasonal exclosure	Split hatch. Band combination reused on SP171 (no chicks fledged).
99	BY	F= M=	21 May	Depredated, corvid	4 Jun	2				Seasonal exclosure	Two eggs depredated by corvid, likely common raven.
100	6	F=VV:VW M=VV:GB	17 May	Hatch	19 Jun	3	2	2 VG:PW	1	Symbolic fence	One egg abandoned post-term.
101	6	F=U M=U	24 May	Hatch	26 Jun	3	3	3 PV:OB		Seasonal exclosure	Split hatch.
102	6	F= M=	6 May	Hatch	8 Jun	3	3	3 BB:PG		Seasonal exclosure	Band combination reused on SP164 (no chicks fledged).
103	NOF	F=U M=VV:YY	19 May	Hatch	21 Jun	3	1	1 GA:OY		Mini-exclosure Seasonal exclosure	Two eggs (without cracks) abandoned post-term.
104	BY	F=GA:PB M=	28 May	Hatch	30 Jun	3	3	2 PV:WY 1 unbanded		10'x10' excl. with top Seasonal exclosure	Split hatch. Unbanded chick last seen with brood 5 July.
105	6	F=U M=NB:BY	8 May	Hatch	10 Jun	3	3	3 VG:PB		Seasonal exclosure	On 28 August, desiccated carcass of small VG:PB chick found in north portion of North Oso Flaco from SP105 or SP200. Band combination reused on SP200 (no chicks fledged).
106	6	F=U M=U	8 May	Hatch	10 Jun	3	3	3 GA:RR		Seasonal exclosure	Band combination reused on single unbanded chick (no chicks fledged).
107	7	F= M=U	17 May	Hatch	19 Jun	3	2	2 GG:PB	2	Mini-exclosure Symbolic fence	One egg abandoned post-term.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
108	SOF	F=U M=U	24 May	Abandoned pre-term	25 Jun	3		1 AP:YL 1 AP:RL 1 WO:GG		10'x10' excl. with top Symbolic fence	On 28 June, three eggs observed for an extended period of time without attending adult and eggs considered abandoned. Eggs collected and transported to Monterey Bay Aquarium. Eggs hatched. Three fledglings released 7 August.
109	7	F=U M=U	24 May	Hatch	26 Jun	3	3	3 PG:AB	1	Seasonal enclosure	
110	6	F=VV:AA M=GG:VY	31 May	Hatch	3 Jul	3	3	3 PG:GW	2	Seasonal enclosure	
111	6	F=(GG:R)? M=	na	Abandoned post-term	18 Jul	2				Mini-enclosure Symbolic fence	One egg is unnaturally light with large clumps of sand stuck to egg where fluid possibly leaked. This egg goes missing pre-term. Second egg abandoned post-term. Insufficient information to estimate initiation date.
112	6	F=U M=GG:WB	28 May	Hatch	30 Jun	3	3	3 PV:BW	1	Symbolic fence	
113	6	F=BB:VG M=VV:GG	22 May	Hatch	24 Jun	3	1	1 GA:PR	1	Symbolic fence	Two eggs abandoned post-term.
114	7	F= M=	30 May	Depredated, corvid	20 Jun	3				Seasonal enclosure	Three eggs depredated by corvid.
115	6	F=U M=banded	25 May	Hatch	27 Jun	3	2	2 unbanded		Seasonal enclosure	Two chicks observed 27 June, not seen subsequently. One egg with unknown fate.
116	6	F=GG:VY M=U	4 Jun	Hatch	7 Jul	3	3	2 PG:YW 1 unbanded	1	Seasonal enclosure	Split hatch. Unbanded chick last seen with brood 5 August.
117	8	F= M=	6 Jun	Failed, unknown cause	19 Jun	1				Seasonal enclosure	
118	8	F= M=	3 Jun	Unknown	9 Jun	2				Seasonal enclosure	
119	Unknown	F= M=RR:OW	25 Apr	Hatch	(30 May)	2	2	2 unbanded	1		
120	7	F= M=	22 May	Abandoned, suspected wind	26 Jun	3				Seasonal enclosure	Three eggs buried during period of high winds.
121	7	F=VV:YW M=U	29 May	Hatch	1 Jul	3	3	2 RR:GY 1 unbanded	1	Seasonal enclosure	
122	7	F=U M=U	7 Jun	Hatch	7 Jul	3	2	2 PG:BR	1	Seasonal enclosure	Split hatch. One egg (without cracks) abandoned post-term.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
123	7	F=AY:AW M=VG:YY	26 May	Hatch	28 Jun	3	3	1 GA:YR 2 unbanded		Seasonal enclosure	Unbanded chicks last seen with brood 2 July.
124	6	F=U M=GG:AR	26 May	Hatch	28 Jun	2	1	1 RR:AY	1	Symbolic fence	One egg (without cracks) abandoned post-term.
125	7	F= M=PG:OG	1 Jun	Hatch	4 Jul	3	2	2 PG:YY		Seasonal enclosure	
126	7	F=RR:AW M=U	2 Jun	Hatch	5 Jul	3	2	2 PG:OB	1	Seasonal enclosure	One egg (without cracks) abandoned post-term.
127	8	F=U M=	2 Jun	Abandoned pre-term	20 Jun	3				Mini-enclosure Seasonal enclosure	Three eggs abandoned pre-term.
128	6	F=GG:YG M=U	27 May	Hatch	29 Jun	3	1	1 GG:PY	1	Seasonal enclosure	Two eggs (without cracks) abandoned post-term.
129	6	F=GG:YG M=U	4 Jun	Hatch	7 Jul	3	3	3 PV:OY		Seasonal enclosure	Split hatch.
130	BY	F= M=	2 Jun	Depredated, coyote	17 Jun	3				Seasonal enclosure	Three eggs depredated by coyote.
131	6	F=VG:AW M=GG:AB	7 Jun	Hatch	10 Jul	3	3	3 PG:BY		Seasonal enclosure	
132	6	F=U M=U	4 Jun	Hatch	7 Jul	2	2	2 PV:GR		Seasonal enclosure	Split hatch.
133	6	F=U M=U	5 Jun	Hatch	8 Jul	3	3	3 PG:GG	2	Seasonal enclosure	
134	7	F=PV:BY M=U	27 May	Hatch	29 Jun	2	2	2 PV:WR	1	Seasonal enclosure	
135	7	F=VV:VW M=U	12 Jun	Hatch	15 Jul	3	3	3 PV:YR		Seasonal enclosure	
136	7	F= M=	20 May	Unknown	22 Jun	3				Seasonal enclosure	On 21 June, common raven is observed landing in area. No raven tracks are seen in the vicinity of the nest and two eggs remain. Last seen at three eggs on 14 June. On 22 June, nest location windswept. No evidence of hatch observed.
137	7	F= M=	27 May	Unknown	30 Jun	3				Seasonal enclosure	No evidence of hatch observed.
138	6	F=U M=PV:YY	3 Jun	Hatch	6 Jul	3	1	1 PG:GY	1	Seasonal enclosure	Two eggs (without cracks) abandoned post-term.
139	6	F= M=	30 May	Abandoned pre-term	27 Jun	3				Seasonal enclosure	Three eggs abandoned pre-term.
140	6	F=U M=U	1 Jun	Hatch	4 Jul	3	1	1 RR:GR		Seasonal enclosure	Two eggs (without cracks) abandoned post-term.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
141	SOF	F=VG:GW M=U	11 Jun	Abandoned pre-term	22 Jun	3				10'x10' excl. with top Symbolic fence	Three eggs abandoned pre-term. One egg is small (approximately half the normal size).
142	8	F=U M=?	9 Jun	Hatch	12 Jul	3	3	3 PG:RB	1	Mini-exclosure Seasonal exclosure	
143	6	F=PV:YG M=U	28 May	Hatch	30 Jun	3	2	2 RR:WG	2	Seasonal exclosure	One egg abandoned post-term.
144	6	F=VG:AR M=U	29 May	Hatch	1 Jul	3	3	3 PV:GW	3	Seasonal exclosure	
145	8	F= M=	14 Jun	Depredated, corvid	18 Jun	2				Seasonal exclosure	Two eggs depredated by corvid.
146	7	F=U M=U	17 May	Hatch	19 Jun	3	2	2 GA:OR		Symbolic fence	One egg abandoned post-term.
147	7	F=U M=U	6 Jun	Hatch	9 Jul	3	2	2 unbanded	1	Mini-exclosure Symbolic fence	Chicks not banded to avoid disturbing other nearby young snowy plover broods. One egg abandoned post-term.
148	8	F=NB:OW M=U	10 Jun	Hatch	13 Jul	3	3	3 PG:RG		Mini-exclosure Symbolic fence	
149	6	F=GG:VY M=	13 Jun	Hatch	16 Jul	3	3	3 unbanded		Mini-exclosure Symbolic fence	Split hatch. Chicks not banded to avoid disturbing other nearby young snowy plover broods.
150	8	F=RR:WR M=U	9 Jun	Hatch	12 Jul	3	3	3 PG:OW		Mini-exclosure Seasonal exclosure	Split hatch.
151	8	F=U M=U	21 Jun	Hatch	24 Jul	3	1	1 GG:OB		Mini-exclosure Seasonal exclosure	Two eggs (without cracks and one noticeably smaller) abandoned post-term. Band combination previously used on SP4 (no chicks fledged).
152	NOF	F=U M=GG:AR	15 Jun	Hatch	18 Jul	3	2	2 PG:PR		Mini-exclosure Symbolic fence	Split hatch. One egg (without cracks) abandoned post-term.
153	7	F=U M=PG:VY	11 Jun	Hatch	14 Jul	3	3	3 PG:BW	2	Mini-exclosure Symbolic fence	
154	6	F=U M=PV:AG	19 Jun	Hatch	22 Jul	3	2	2 PG:OY		Seasonal exclosure	Split hatch. One egg (without cracks) abandoned post-term.
155	8	F=RR:OY M=U	18 Jun	Hatch	21 Jul	3	3	3 VV:LY		Mini-exclosure Symbolic fence	
156	7	F=U M=RR:WR	22 Jun	Hatch	25 Jul	3	2	2 GA:WY		Seasonal exclosure	Split hatch. One egg (without cracks) abandoned post-term. Band combination previously used on SP60 (no chicks fledged).
157	6	F= M=	16 Jun	Unknown	21 Jul	3				Seasonal exclosure	No evidence of hatch observed.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
158	6	F= M=U	22 Jun	Hatch	25 Jul	3	3	3 VV:YG		Seasonal enclosure	On 3 August, carcass of small VV:YG decomposed chick found on surface of sand in North Oso Flaco from SP29 or SP158. Band combination previously used on SP29 (no chicks fledged).
159	8	F= M=	na	Abandoned pre-term	13 Jul	3				Mini-enclosure Symbolic fence	Three eggs abandoned pre-term. On 18 July a pair of adult-sized plover wings found five feet west of mini-enclosure. Insufficient information to estimate initiation date.
160	6	F=U M=U	15 Jun	Hatch	18 Jul	3	2	2 PG:PB		Seasonal enclosure	One egg (with cracks) abandoned post-term.
161	8	F=GA:RB M=BB:YY	24 Jun	Hatch	27 Jul	2	2	1 VG:RY 1 unbanded		Mini-enclosure Seasonal enclosure	Unbanded chick last seen with brood 1 August. Band combination previously used on SP54 (no chicks fledged).
162	8	F= M=U	20 Jun	Hatch	23 Jul	3	3	3 GA:GW		Mini-enclosure Seasonal enclosure	Band combination previously used on SP56 (no chicks fledged).
163	6	F=U M=U	19 Jun	Hatch	22 Jul	3	1	1 unbanded		Mini-enclosure Symbolic fence	Chick not banded to avoid disturbing other young snowy plover broods. Two eggs abandoned post-term.
164	NOF	F=(VG:VR)? M=BB:VR	19 Jun	Hatch	22 Jul	3	3	3 BB:PG		Mini-enclosure Symbolic fence	Band combination previously used on SP102 (no chicks fledged).
165	7	F=U M=U	19 Jun	Hatch	22 Jul	3	3	3 GG:LY	1	Seasonal enclosure	
166	6	F= M=	12 Jun	Hatch	15 Jul	3	3	3 PG:YG		Seasonal enclosure	
167	6	F= M=VG:YY	3 Jun	Hatch	6 Jul	3	3	3 PV:AW	1	Seasonal enclosure	Split hatch.
168	6	F= M=	17 Jun	Hatch	20 Jul	3	3	3 unbanded		Seasonal enclosure	Chicks not banded to avoid disturbing other young snowy plover broods.
169	6	F=BB:AW M=GG:VB	13 Jun	Hatch	16 Jul	3	2	3 PG:AY		Seasonal enclosure	One egg (without cracks and unnaturally weighted) abandoned post-term.
170	6	F=U M=U	19 Jun	Hatch	22 Jul	3	3	3 PG:PW	2	Seasonal enclosure	
171	7	F=U M=U	30 Jun	Hatch	2 Aug	3	2	2 GA:OG		Mini-enclosure Symbolic fence	One egg (peeping) abandoned post-term. Band combination previously used on SP98 (no chicks fledged).

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
172	6	F=U M=U	15 Jun	Hatch	18 Jul	3	3	3 PV:PG		Mini-enclosure Symbolic fence	
173	SOF	F=RR:VW M=U	23 Jun	Hatch	26 Jul	2	2	2 GA:VG		10'x10' excl. with top Symbolic fence	Band combination previously used on SP71 (one chick fledged).
174	6	F=U M=U	23 Jun	Hatch	26 Jul	3	2	2 VG:OY		Seasonal enclosure	One egg (without cracks) abandoned post-term. Band combination previously used on SP64 (no chicks fledged).
175	6	F=U M=GG:WB	18 May	Hatch	20 Jun	3	3	3 PG:AG	1	Seasonal enclosure	
176	6	F= M=	5 Jun	Unknown	4 Jul	3				Seasonal enclosure	Nest location known by multiple observations of incubating adult. Unable to walk to nest to avoid disturbing other young snowy plover broods. No evidence of hatch observed.
177	6	F=U M=U	9 Jun	Hatch	12 Jul	2	1	1 unbanded		Seasonal enclosure	Nest location known by multiple observations of incubating adult. Unable to walk to nest and band chick to avoid disturbing other nearby snowy plover broods. Minimum two eggs. One egg abandoned post-term.
178	7	F=U M=U	22 Jun	Hatch	25 Jul	2	2	2 GA:VW		Seasonal enclosure	Band combination previously used on SP73 (no chicks fledged).
179	6	F=U M=VG:YW	12 Jun	Hatch	19 Jul	3	3	3 unbanded		Seasonal enclosure	Split hatch. Chicks not banded to avoid disturbing other nearby young snowy plover broods.
180	6	F=U M=U	20 Jun	Hatch	23 Jul	3	3	3 VG:LY		Seasonal enclosure	
181	6	F=U M=U	15 Jun	Hatch	19 Jul	3	3	3 PV:PB		Seasonal enclosure	Split hatch.
182	6	F= M=	23 Jun	Unknown	4 Jul	1				Seasonal enclosure	Nest known by multiple observations of incubating adult. Unable to walk to nest to avoid disturbing other nearby young snowy plover broods. Minimum one egg.
183	6	F=U M=	22 Jun	Hatch	25 Jul	3	3	3 PV:RY		Seasonal enclosure	Band combination previously used on SP93 (no chicks fledged).
184	7	F=banded M=	28 Jun	Hatch	31 Jul	3	1	1 RR:BG		Seasonal enclosure	Two eggs abandoned post-term.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
185	6	F=GA:OB M=Banded	1 Jul	Abandoned, unknown if pre- or post-term	29 Jul	3				Mini-exclosure Symbolic fence	Three eggs abandoned unknown if pre- or post-term.
186	8	F=U M=	30 Jun	Hatch	2 Aug	3	3	3 VV:VR		Mini-exclosure Symbolic fence	
187	6	F=U M=U	22 Jun	Hatch	25 Jul	3	2	1 GA:BY 1 unbanded	2	Seasonal exclosure	One banded and one unbanded chick fledged. Band combination previously used on SP10 (no chicks fledged).
188	6	F=U M=B:G/Y	22 Jun	Hatch	25 Jul	3	3	3 PG:WR		Seasonal exclosure	
189	6	F=U M=BB:RG	13 Jun	Hatch	16 Jul	3	3	3 PG:YR		Seasonal exclosure	
190	6	F=V:AB M=U	20 Jun	Hatch	23 Jul	3	3	3 PV:LY		Mini-exclosure Seasonal exclosure	
191	6	F=U M=	23 Jun	Hatch	26 Jul	3	2	2 PG:OR		Mini-exclosure Seasonal exclosure	
192	6	F= M=U	25 Jun	Hatch	28 Jul	3	3	3 GG:YW		Seasonal exclosure	Band combination previously used on SP76 (no chicks fledged).
193	7	F= M=U	3 Jul	Hatch	5 Aug	2	2	2 unbanded		Seasonal exclosure	Chicks not banded to avoid disturbing other snowy plover and least tern broods.
194	6	F= M=U	26 Jun	Hatch	29 Jul	3	2	2 GG:OG		Seasonal exclosure	One egg with unknown fate. On 13 September, desiccated carcass of small GG:OG chick found on 6 enclosure shoreline possibly from SP74 or SP194. Band combination previously used on SP74 (no chicks fledged).
195	6	F= M=U	24 Jun	Hatch	27 Jul	1	1	1 unbanded		Seasonal exclosure	Nest location known by multiple observations of incubating adult. Unable to walk to nest and band chick to avoid disturbing other young snowy plover and least tern broods. Minimum one egg.
196	6	F=U M=U?	25 Jun	Hatch	28 Jul	2	2	2 GA:RG		Seasonal exclosure	Band combination previously used on SP70 (no chicks fledged).
197	SOF	F=(BB:VG)? M=	30 Jun	Hatch	2 Aug	3	2	2 unbanded		10'x10' excl. with top Symbolic fence	One egg with unknown fate.
198	6	F= M=U	26 Jun	Hatch	29 Jul	3	3	3 unbanded		Symbolic fence	Chicks not banded to avoid disturbing other young snowy plover and least tern broods.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
199	6	F=BB:YG M=BB:OR	21 Jun	Hatch	24 Jul	3	2	2 VG:RW		Seasonal enclosure	Split hatch. One egg (without cracks) abandoned post-term. Band combination previously used on SP35 (no chicks fledged).
200	6	F= M=	2 Jul	Hatch	4 Aug	3	3	3 VG:PB		Seasonal enclosure	On 28 August, desiccated carcass of small VG:PB chick found in north portion of North Oso Flaco possibly from SP105 or SP200. Band combination previously used on SP105 (no chicks fledged).
201	6	F= M=	na	Abandoned, unknown if pre- or post-term	7 Aug	3				Symbolic fence	Nest identified by multiple observations of incubating adult. Three eggs abandoned unknown if pre- or post-term. Nest walked to on 21 August and three eggs collected. Not walked to when active to avoid disturbing other young snowy plover and least tern broods. Insufficient information to estimate initiation date.
202	6	F=U M=	2 Jul	Hatch	4 Aug	3	3	3 unbanded		Seasonal enclosure	Split hatch. Chicks not banded to avoid disturbing other young snowy plover and least tern broods.
203	6	F=(PV:WW)? M=U	2 Jul	Hatch	4 Aug	3	3	3 PV:VR		Mini-enclosure Seasonal enclosure	On 28 August, desiccated carcass of a 1-2 week-old PV:VR chick found partially buried on 7 shoreline. Chick last seen alive on 19 August at 15 days of age. Band combination previously used on SP91.
204	SOF	F=U M=VG:VY	26 Jun	Hatch	29 Jul	3	3	3 VG:GY		10'x10' excl. with top Symbolic fence	Band combination previously used on SP49 (no chicks fledged).
205	7	F= M=	8 Jul	Hatch	10 Aug	3	2	1 VV:RG 1 AP:YG 1 AP:WY		Seasonal enclosure	On 10 August, nest with two chicks and one egg observed for an extended period of time without an attending adult and considered abandoned. Chicks and egg collected and transported to Monterey Bay Aquarium. Egg hatched. Three fledglings released 10 and 19 September at Moss Landing State Beach, Monterey County.
206	6	F=U M=NB:BY	4 Jul	Hatch	6 Aug	3	3	2 VV:GB 1 unbanded		Seasonal enclosure	Split hatch. One unbanded chick last seen with brood on 9 August.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
207	7	F= M=U	4 Jul	Hatch	6 Aug	3	3	3 GG:VW		Seasonal enclosure	
208	8	F= M=U	10 Jul	Hatch	12 Aug	3	3	3 GG:AB		Mini-enclosure Seasonal enclosure	
209	7	F= M=	5 Jul	Hatch	7 Aug	3	1	1 RR:YG		Seasonal enclosure	Two eggs (without cracks) abandoned post-term. Band combination previously used on SP85 (no chicks fledged).
210	6	F= M=	9 Jun	Unknown	22 Jun	1				Symbolic fence	Nest location known by multiple observations of incubating adult. Unable to walk to nest due to close proximity of young snowy plover and least tern broods. Minimum one egg. No evidence of hatch observed.
211	Unknown	F=VG:OG M=U	na	Hatch	22 Jul	2	2	2 PG:RY			Insufficient information to estimate initiation date.
212	BY	F=NY:RB M=	17 Jul	Abandoned pre-term	8 Aug	1		1 AP:WG		10'x10' excl. with top Seasonal enclosure	Egg noted with modest cracks 7 August. Nest not attended over a 2-day period (8-9 August) and considered abandoned. Egg collected and transported to Monterey Bay Aquarium. Egg hatched. Fledgling released 10 September at Moss Landing State Beach, Monterey County.
213	7	F=Banded M=GA:YB	na	Hatch	13 Aug	3	3	3 VV:RB		Seasonal enclosure	Split hatch. Insufficient information to estimate initiation date.
214	Unknown	F= M=RR:OR	12 Jul	Hatch	(14 Aug)	3	3	3 unbanded			Three chicks observed 15 August, not seen subsequently.
215	Unknown	F= M=RR:BB	na	Hatch	(22 Jul)	2	2	2 GA:PW			Band combination previously used on SP83 (no chicks fledged). Insufficient information to estimate initiation date.
216	Unknown	F=NB:PG M=VG:BG	na	Hatch	(12 Jul)	3	3	3 PG:RW	1		Insufficient information to estimate initiation date.
UNK 1	Unknown	F=RR:PB M=U	na	Hatch	(22 Jun)	3	3	3 PV:YB	3		Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation date.

Appendix B. Snowy plover nests at ODSVRA in 2012 (continued).

Nest	Location	Adult Pair	Est. Initiation Date	Nest Fate	Fate date (estimated)	No. eggs	No. chicks	No. chicks banded and combination	No. chicks fledged	Protection Type	Notes
UNK 2	Unknown	F=unb? M=GA:PG	na	Hatch	na	2	2	2 VG:OR			Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation and fate date.
UNK 3	Unknown	F=U M=PV:WB	na	Hatch	(2 Jul)	3	3	3 PG:AW	2		Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation date.
UNK 4	Unknown	F=RR:PB M=VG:GW	na	Hatch	(7 Jul)	3	3	3 unbanded			Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation date.
UNK 5	Unknown	F=U M=U	na	Hatch	(17 Jul)	3	3	3 PG:PG			Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation date.
UNK 6	Unknown	F=U M=BB:--	na	Hatch	(21 Jul)	2	2	2 PG:AR			Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Insufficient information to estimate initiation date.
UNK 7	Unknown	F=U M=U	na	Hatch	(25 Jul)	3	3	3 VV:AW			Insufficient information available to assign chicks to a specific nest with unknown fate or unbanded chicks. Band combination previously used on SP43 (no chicks fledged). Insufficient information to estimate initiation date.

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012.

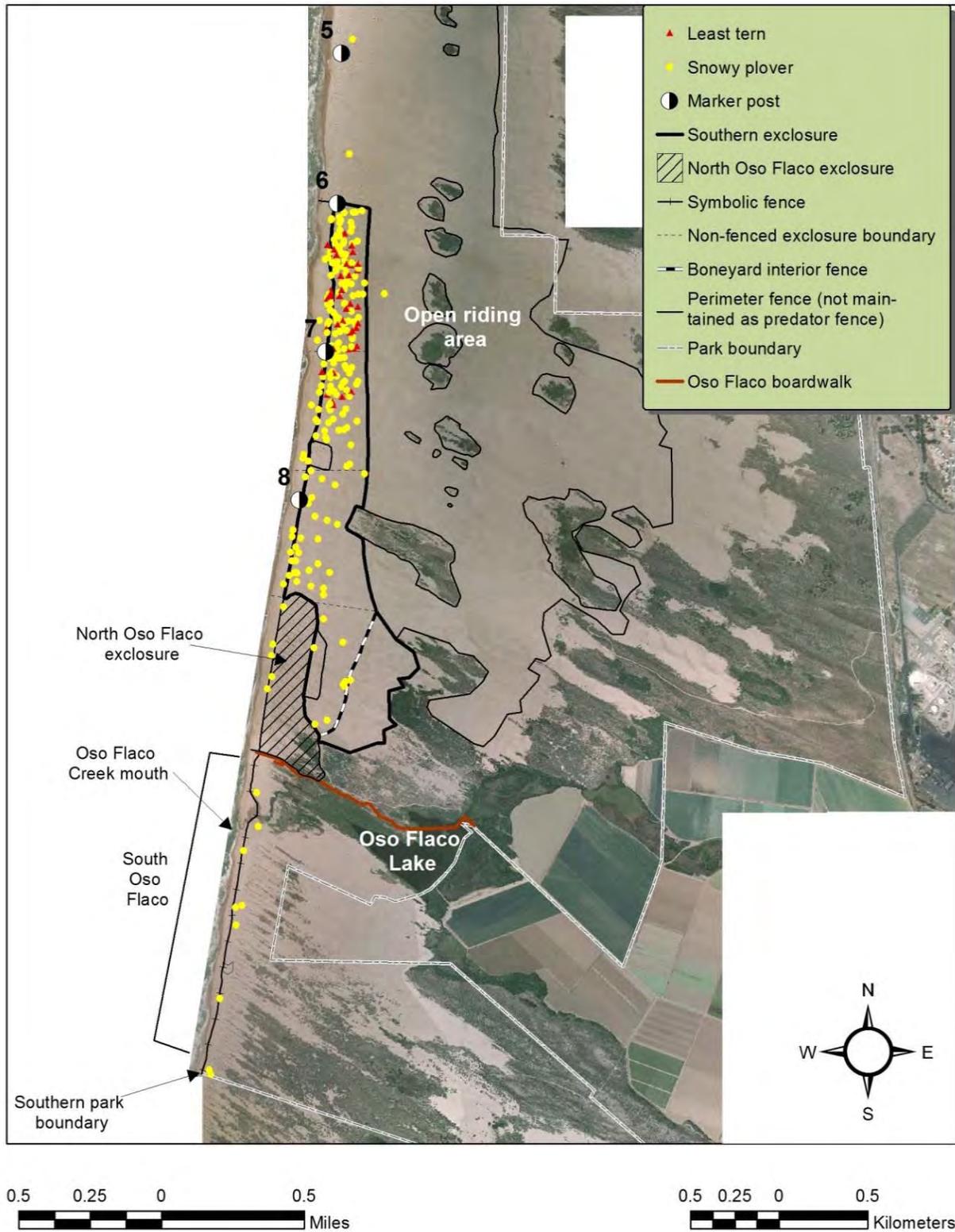


Figure C.1. All California least tern and snowy plover nest locations at ODSVRA in 2012.

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

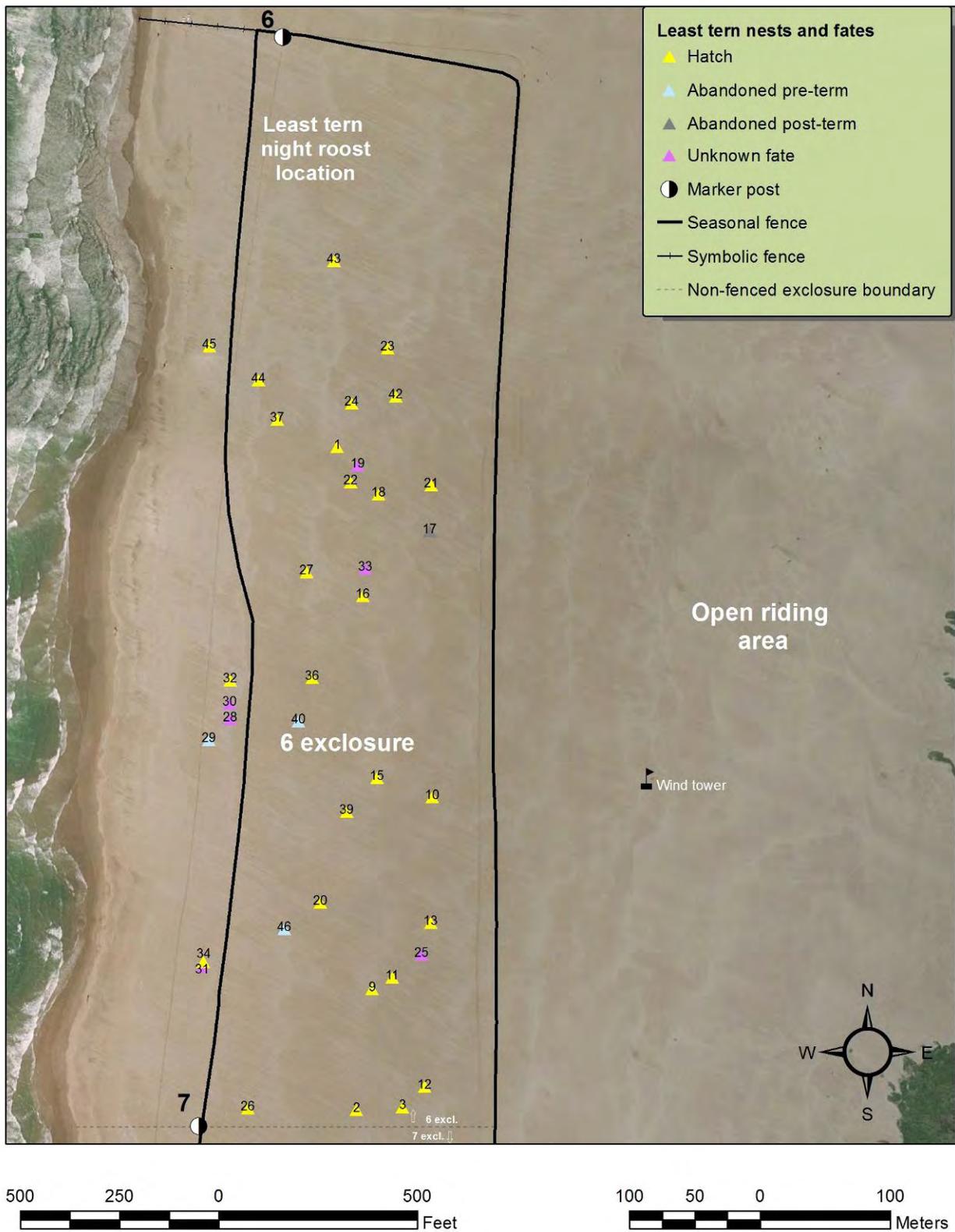


Figure C.2. California least tern nest locations at ODSVRA in 2012 (6 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

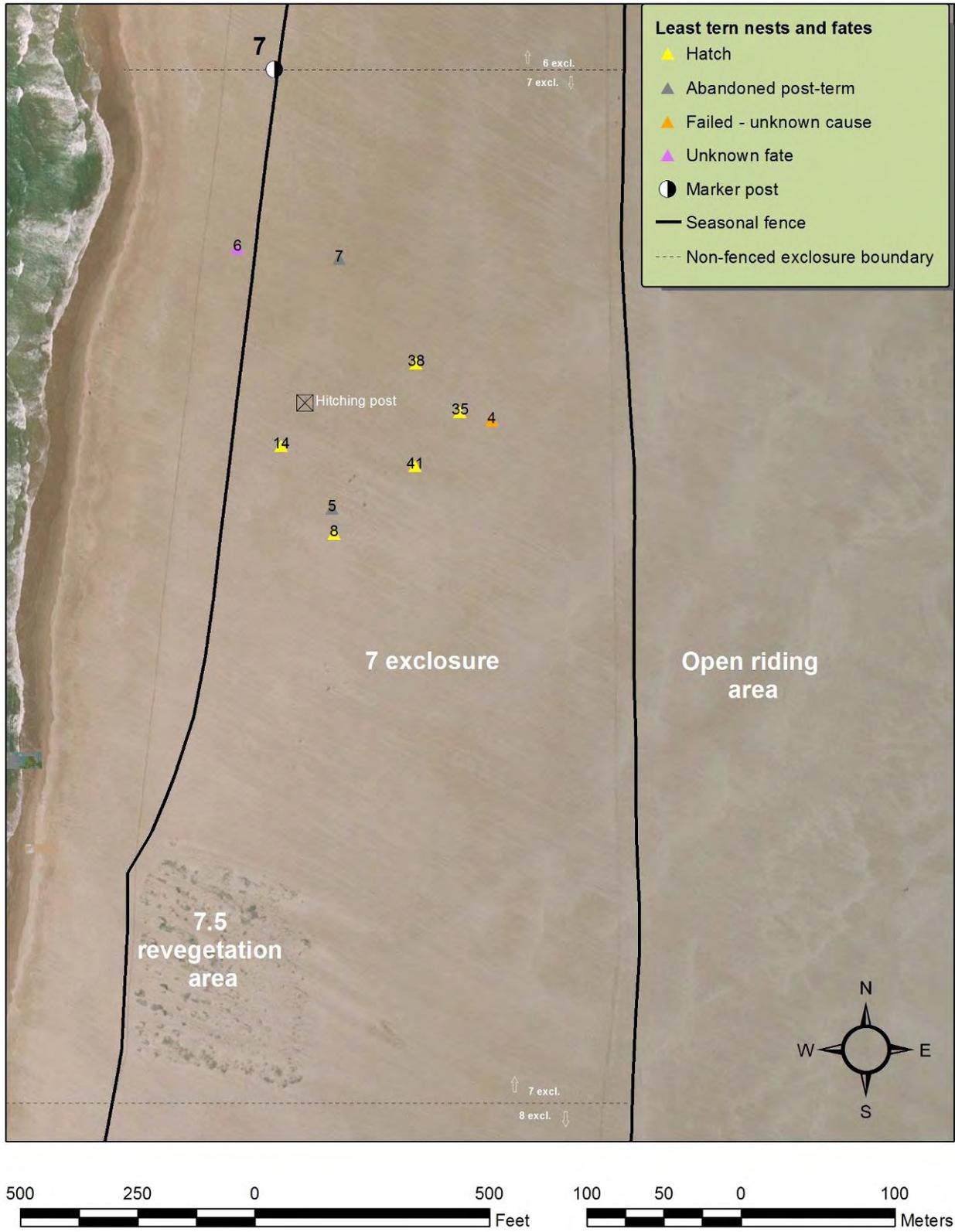


Figure C.3. California least tern nest locations at ODSVRA in 2012 (7 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

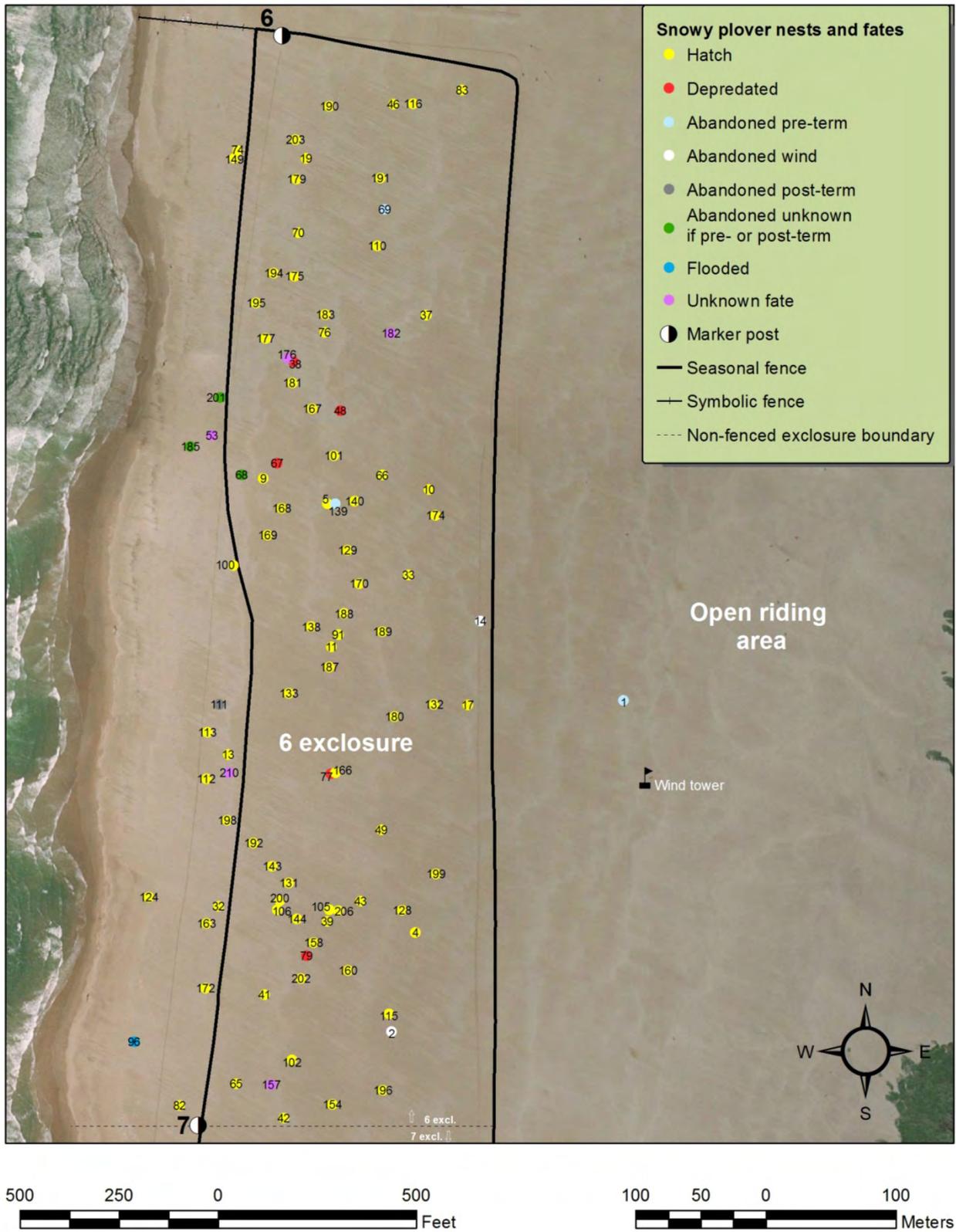


Figure C.4. Snowy plover nest locations at ODSVRA in 2012 (6 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

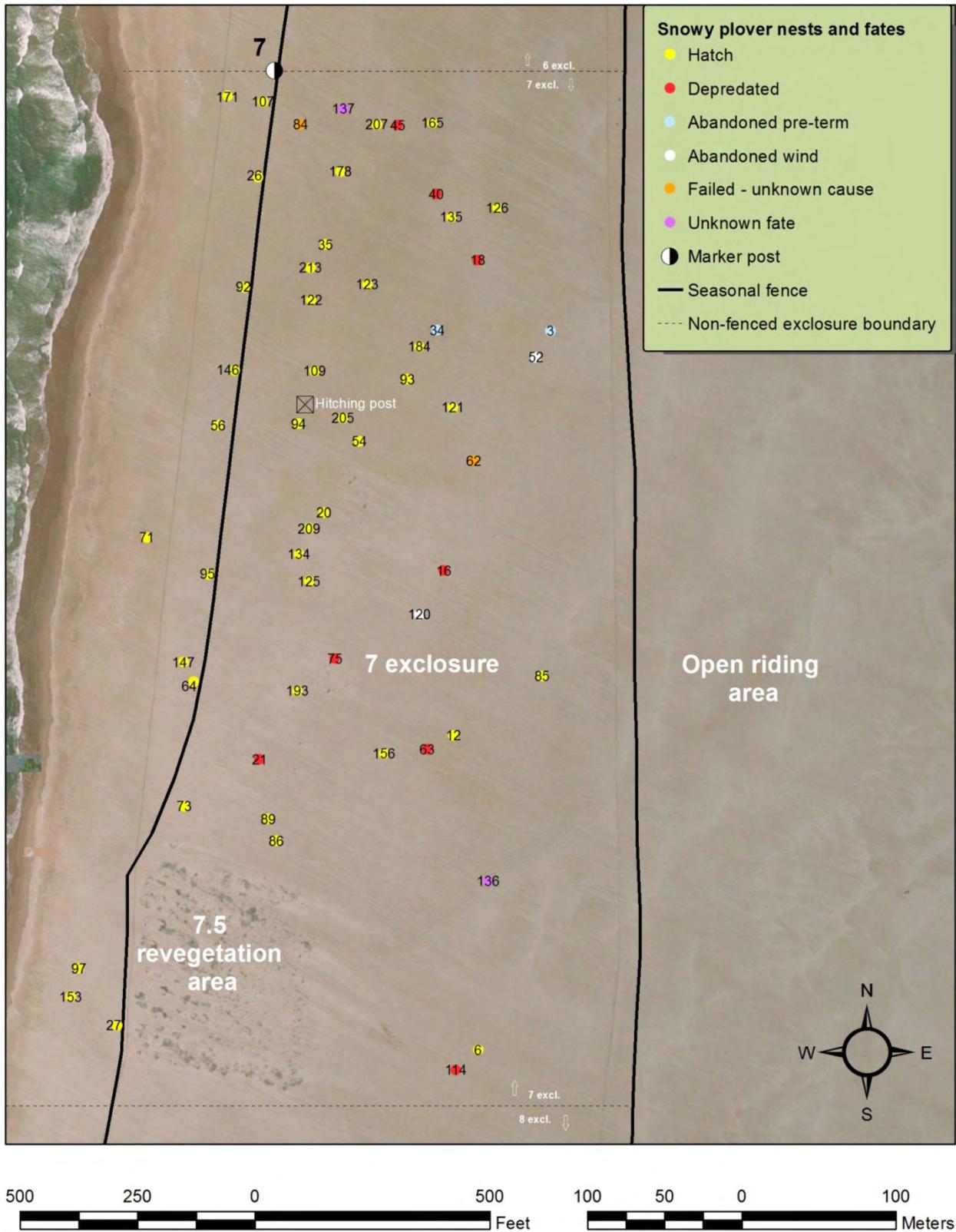


Figure C.5. Snowy plover nest locations at ODSVRA in 2012 (7 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

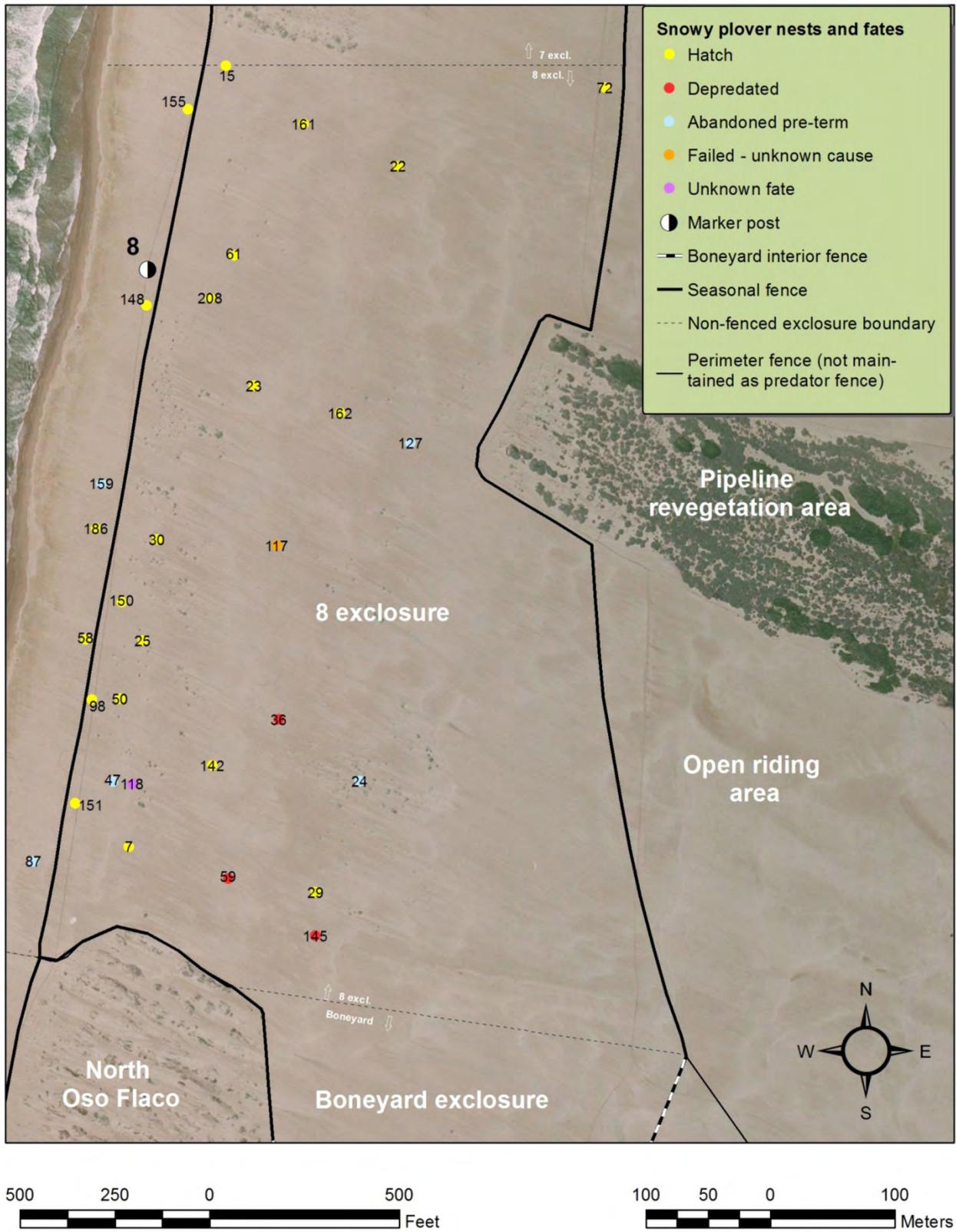


Figure C.6. Snowy plover nest locations at ODSVRA in 2012 (8 enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

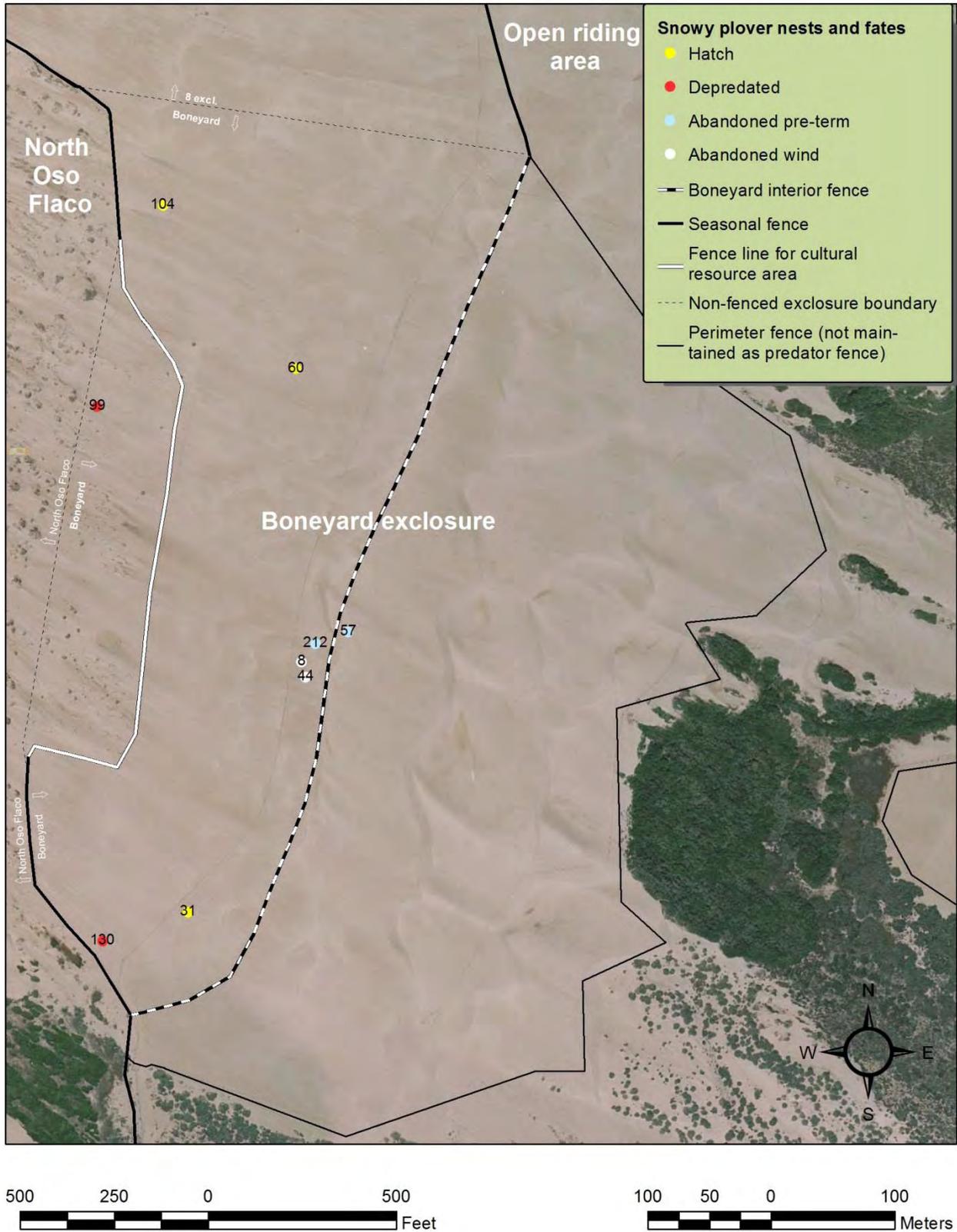


Figure C.7. Snowy plover nest locations at ODSVRA in 2012 (Boneyard enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

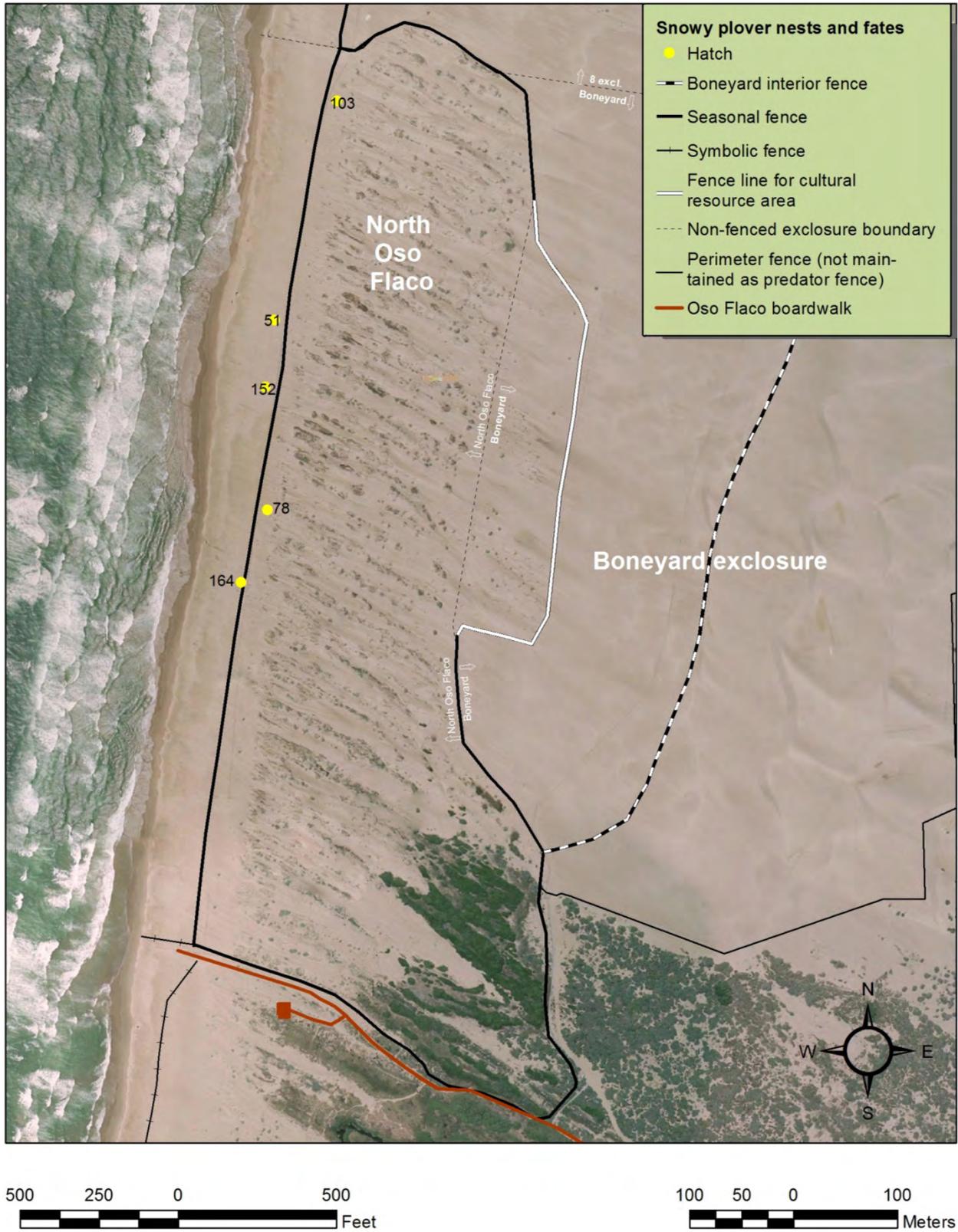


Figure C.8. Snowy plover nest locations at ODSVRA in 2012 (North Oso Flaco enclosure).

Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2012 (continued).

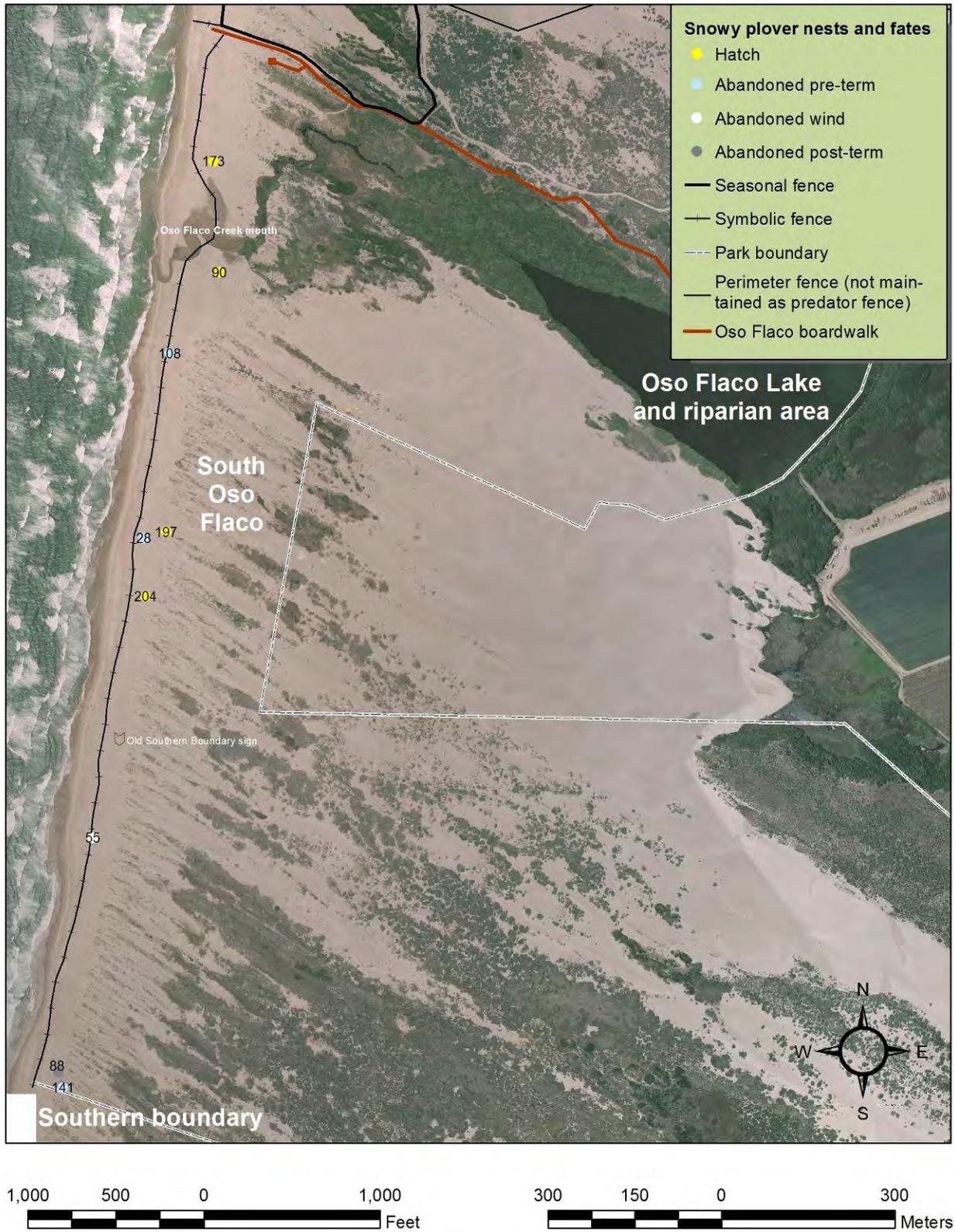


Figure C.9. Snowy plover nest locations at ODSVRA in 2012 (South Oso Flaco enclosure).

Appendix D. Banded least terns and snowy plovers.

Table D.1. Banded least terns recorded at ODSVRA in 2012.

Juveniles fledged from ODSVRA in 2012 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 in many cases, lost a band.

Band	Dates Seen	Origin and Year Banded	Notes
-:A/G	5/17, 5/24, 7/30, 8/6	ODSVRA, either 2006 or 2008	LT 2 breeding adult. Y/G:A/G banded in 2006 or G/Y:A/G banded in 2008. There was one additional sighting as -:A on 30 July. It was noted that the G was faded and could easily be read as -:A.
-:B/G	7/28	ODSVRA 2006	Y/G:B/G banded in 2006.
-:B/G/B	5/15, 5/27, 6/20	likely ODSVRA 2008	LT 19 breeding adult. G/Y:B/G/B banded in 2008.
-:B/W	7/28	ODSVRA, either 2006, 2008, or 2010	Y/G:B/W banded in 2006, G/Y:B/W banded in 2008, W/B:B/W banded in 2010.
-:G/O	5/15, 5/16, 5/24, 5/27, 8/14	ODSVRA 2008	G/Y:G/O banded in 2008.
--:R/W	8/24	ODSVRA 2006	Y/G:R/W banded in 2006.
-:S	5/17, 5/22, 5/24, 5/25, 5/27, 5/28, 6/5, 8/11, 8/14	unknown	Two birds confirmed. Multiple sites may band in this way. Also may be any fledgling from 2004 when all banded G/Y:S.
-:W	5/15, 5/31, 6/11, 6/27, 8/13, 8/14, 8/16, 8/29	ODSVRA, 2006, 2008, and 2010	LT 34 breeding adult and LT45 breeding adult. Y/G:W banded in 2006, G/Y:W banded in 2008, and W/B:W banded in 2010. Likely two different breeding adults.
-:W/B	5/14, 5/17, 5/22, 5/27, 5/28	likely ODSVRA , either 2006, 2008, 2009 or 2010	VG:W/B banded in 2006, G/Y:W/B banded in 2008, any fledgling from 2009 when all banded W/B on right leg, or W/B:W/B banded in 2010.
-:Y/G/Y	7/30	ODSVRA 2008	
-:Y/O	5/25	likely ODSVRA, either 2006 or 2008	Y/G:Y/O banded in 2006 or G/Y:Y/O banded in 2008
B/R:W/B	5/27	ODSVRA 2009	
B:W/B	7/25, 8/5	ODSVRA 2009	
G/O:-	8/17	ODSVRA 2007	
G/Y:-	5/27, 5/28	likely ODSVRA either 2004 or 2008	Two birds confirmed. A fledgling from 2004 or 2008 when all banded with G/Y on left leg.
G/Y:A/B	5/16, 5/24, 5/25, 5/28	ODSVRA 2008	
G/Y:W/A	5/17, 5/27, 6/5	ODSVRA 2008	
G/Y:W/A/W	8/1	ODSVRA 2008	
O/A:W/B	5/14, 5/15, 5/17, 5/27, 8/15	ODSVRA 2009	
R/A:W/B	5/28	ODSVRA 2009	
R/W:W/B	5/15, 5/22, 5/24, 5/25, 5/27, 5/28, 6/5	ODSVRA 2009	
S:-	5/14, 5/15, 5/16, 5/17, 5/22, 5/24, 5/25, 5/27, 6/1	unknown	Two birds confirmed. Multiple sites may band in this way. Also may be a fledgling from 2003 when all banded S:G/Y
S:W	8/16	unknown	Multiple sites may band in this way.
V:W/B	5/27	ODSVRA 2009	
W/B:B	6/22	ODSVRA 2010	

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

Table D.1. Banded least terns recorded at ODSVRA in 2012 (continued).

Band	Dates Seen	Origin and Year Banded	Notes
W/B:W/A	6/5, 6/16, 8/11, 8/17, 8/21, 8/29	ODSVRA 2010	LT 45 breeding adult.
W/B:W/G	8/20	ODSVRA 2010	
W/B:W/Y	8/8, 8/9, 8/10, 8/11, 8/13, 8/14, 8/15	ODSVRA 2010	LT 27 breeding adult.
W/B:Y	8/3	ODSVRA 2010	
W/Y:W/B	8/1	ODSVRA 2009	
Y/O:W/B	5/14, 5/15, 5/25, 6/5, 7/19	ODSVRA 2009	
Y/W/Y:-	7/30, 8/6, 8/9, 8/10, 8/11, 8/14	ODSVRA 2007	LT 14 breeding adult
Y/W:W/B/W	8/24, 8/25	possibly ODSVRA 2008	LT38 breeding adult. Possibly faded from G/Y:W/B/W banded in 2008. Observed feeding Y/B:B/W juvenile (LT38) at Oso Flaco Lake on 24 and 25 August.
(light):W/B/W	5/25, 6/20	likely ODSVRA 2008	LT 25 breeding adult. Parental exchange observed at the nest site.

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

Table D.2. Banded snowy plovers with known origins seen at ODSVRA 1 October 2011 to 29 February 2012.

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.

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

Band	Origin and Year Banded	County Banded	Dates Seen	Notes
GL:AR	Pajaro Spit 2009	Monterey	11/11, 11/30, 12/12, 1/11	
AR:GO	Moss Landing SP 2011	Monterey	10/6, 10/7	
GB:PP	Moss Landing SB 2009	Monterey	10/7, 10/11, 10/22, 10/25, 11/9, 12/12, 1/11, 2/1, 2/8	
GB:YA	Moss Landing SB 2010	Monterey	10/22, 10/25, 11/30, 12/12	
BG:WA	Salinas River SB 2010	Monterey	10/8, 10/14, 10/20, 11/16, 12/12, 1/11	
YP:OL	Salinas River NWR 2008	Monterey	10/14, 10/26, 12/7, 12/12	
OL:GP	Salinas River NWR 2009	Monterey	10/11, 10/23, 11/28, 12/12, 2/8	
AY:AW	Reservation Road 2009	Monterey	10/11, 10/14, 12/12, 2/1	
YB:GW	Monterey Bay 2009	Monterey	10/11, 10/14, 10/15, 10/26, 12/12	Yellow band is above the joint, banded as an adult.
BB:OG	ODSVRA 2010		10/23, 10/25, 10/26, 11/9, 11/16, 12/9, 12/12, 2/8	
BB:OR	ODSVRA 2010		10/14, 10/24, 10/25, 10/26, 11/9, 11/11, 11/28, 12/12, 12/22, 1/11	
BB:VR	ODSVRA 2011		10/4, 10/7, 10/20, 10/26, 11/2, 11/9, 11/30, 12/7, 12/12, 1/4, 2/23	
BB:WG	ODSVRA 2007 or 2010		10/26, 11/23, 11/30, 12/7, 12/12, 12/22, 1/4, 2/8, 2/15, 2/23	
BB:WR	ODSVRA 2010		10/25, 11/2, 11/9, 11/16, 12/7, 12/12	
BB:WW	ODSVRA 2010		10/5, 10/26, 11/9, 11/23, 11/30, 12/9, 12/12, 1/11, 2/8	
BB:YG	ODSVRA 2011		11/9, 11/16, 11/23, 11/30	
BB:YY	ODSVRA 2002 or 2010		10/7, 10/17, 11/9, 11/30, 12/7, 12/9, 12/12, 12/22, 1/4, 2/4, 2/8, 2/15	
GA:AR	ODSVRA 2011		10/15, 10/26, 11/23, 11/30, 12/12, 2/1, 2/4, 2/8	
GA:BB	ODSVRA 2010		11/16, 11/23, 2/4, 2/8	
GA:BG	ODSVRA 2011		10/26, 11/7, 11/30, 12/12	
GA:BW	ODSVRA 2011		10/5, 10/8, 10/10, 10/17, 11/30, 12/22, 2/8	
GA:PB	ODSVRA 2011		10/4, 10/14, 11/2, 11/9, 11/23, 11/30, 1/4, 2/8, 2/23	
GA:PG	ODSVRA 2011		10/15, 10/23, 10/26, 11/9, 11/23, 12/12, 1/4, 2/23	
GA:RB	ODSVRA 2004 or 2010		11/23, 12/12	
GA:RY	ODSVRA 2011		10/14, 10/17, 10/22, 10/23, 11/9, 11/11, 11/16, 11/28, 2/1	
GA:VB	ODSVRA 2008 or 2011		10/7, 10/26, 11/7, 11/11, 11/30, 12/7, 12/12	
GG:AB	ODSVRA 2007		10/12, 10/14, 11/16, 11/28, 11/30, 12/9, 12/12, 12/28, 1/4, 2/1, 2/8, 2/15	

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

Table D.2. Banded snowy plovers with known origins seen at ODSVRA 1 October 2011 to 29 February 2012 (continued).

Band	Origin and Year Banded	County Banded	Dates Seen	Notes
GG:VY	ODSVRA 2008 or 2011		10/1, 10/5, 10/7, 10/14, 10/15, 10/16, 10/21, 10/23, 10/25, 11/7, 11/9, 11/16, 11/30, 12/4, 12/9, 12/12, 12/22, 12/28, 12/30, 2/1, 2/8, 2/15	2 birds confirmed.
GG:YG	ODSVRA 2011		10/4, 10/14, 10/17, 10/19, 10/23, 10/26, 11/2, 11/9, 12/1, 12/12, 2/8	
PG:BB	ODSVRA 2011		10/4, 10/8, 10/21, 10/26, 11/2, 11/30, 12/12	
PG:GR	ODSVRA 2011		11/30, 12/12	
PG:VW	ODSVRA 2011		10/8, 10/12, 10/16, 1/11	
PG:VY	ODSVRA 2008		10/7, 10/16, 10/17, 10/22, 10/23, 11/30, 12/12	
PV:AG	ODSVRA 2008		10/20, 11/2, 11/16, 1/17, 2/4	
PV:AY	ODSVRA 2007		10/12, 10/26, 11/9, 12/7	
PV:BA	ODSVRA 2009 or 2010		10/14, 10/25, 11/30, 12/12	
PV:BB	ODSVRA 2008 or 2010		10/7, 10/24, 11/9, 12/12	
PV:BG	ODSVRA 2011		10/9, 10/16	
PV:BR	ODSVRA 2007		10/7, 10/26, 11/2, 11/23, 12/12, 1/4, 1/11, 2/23	
PV:GB	ODSVRA 2008		10/16, 10/26, 11/2, 11/30, 12/7, 12/12, 1/4	
PV:GY	ODSVRA 2008		10/26, 1/4, 1/11, 1/17	
PV:WG	ODSVRA 2008		11/9, 11/30, 12/7, 12/12, 1/4, 1/11, 2/8	
PV:WW	ODSVRA 2008		10/8, 10/16, 10/19, 10/24, 10/25, 11/9, 11/30, 12/12, 12/28, 1/17, 2/1, 2/15	
PV:YG	ODSVRA 2009		10/7, 10/23, 10/25, 11/7, 11/9, 11/30, 12/7, 12/12, 12/30, 2/8	
RR:BW	ODSVRA 2010		10/12, 10/14, 11/2, 11/9, 12/12, 12/22, 1/4, 1/11	
RR:GG	ODSVRA 2011		10/7, 10/12, 11/9, 11/16, 12/9, 12/28, 2/4	
RR:OB	ODSVRA 2011		10/9, 10/12, 10/26, 12/12, 12/13, 1/4, 1/11, 2/8, 2/23	
RR:PB	OSVRA 2007 or 2010		10/20, 12/7, 2/3, 2/4	
RR:PG	ODSVRA 2009		10/7, 11/2, 11/15, 11/16, 12/7, 12/9, 1/11, 2/15, 2/23	
RR:VW	ODSVRA 2009 or 2011		12/7, 12/12, 12/22, 1/4, 1/11, 2/8	
RR:WR	ODSVRA 2010		10/11, 10/14, 10/22, 10/23, 11/16, 12/12, 1/4, 2/1, 2/4, 2/23	
RR:YR	ODSVRA 2010		10/6, 10/17, 10/19, 10/25, 11/16, 12/12, 1/11, 2/1	
VG:AB	ODSVRA 2011		10/12, 11/2, 11/23, 12/7, 12/12, 12/13, 1/11, 2/8, 2/23	
VG:AR	ODSVRA 2011		10/21, 10/25, 2/8, 2/15	
VG:AW	ODSVRA 2011		10/23, 10/25, 11/7, 11/9, 12/7, 12/12, 12/22, 1/11	
VG:BG	ODSVRA 2011		10/14, 10/16, 10/19, 10/26, 11/7, 11/23, 11/30, 12/12, 12/22, 12/28, 1/4, 1/11, 2/23	

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

Table D.2. Banded snowy plovers with known origins seen at ODSVRA 1 October 2011 to 29 February 2012 (continued).

Band	Origin and Year Banded	County Banded	Dates Seen	Notes
VG:BO	ODSVRA 2011		10/23, 11/30	
VG:GW	ODSVRA 2011		10/9, 10/12, 10/19, 10/23, 10/26, 11/11, 12/12, 1/17, 2/4, 2/15	
VG:OG	ODSVRA 2011		2/8, 2/15, 2/23	
VG:PR	ODSVRA 2011		10/20, 10/26, 11/9, 11/11, 2/23	2 birds confirmed.
VG:RB	ODSVRA 2011		10/16, 10/18, 10/26	
VG:VB	ODSVRA 2008 or 2011		11/2, 1/17, 2/4	
VG:VG	ODSVRA 2008 or 2011		10/8, 10/12, 10/26, 11/9, 12/12, 12/13	
VG:VR	ODSVRA 2009 or 2011		10/9, 10/26, 12/7, 12/12, 1/4, 2/8, 2/10, 2/23	
VG:VY	ODSVRA 2009		10/12, 10/26, 11/9, 11/16, 11/30, 12/12, 1/4	
VG:YW	ODSVRA 2011		10/5, 10/7, 10/9, 10/12, 10/17, 10/18, 10/19, 10/20, 10/23, 11/7, 11/9, 11/11, 11/23, 12/7, 12/12, 1/4, 1/11, 2/4, 2/8, 2/23	
VG:YY	ODSVRA 2011		10/16, 10/23, 10/25, 10/26, 11/7, 11/9, 11/16, 12/7, 12/12, 2/8, 2/15	
VO:BB	ODSVRA 2011		10/9, 10/12, 10/15, 10/17, 10/19, 10/20, 10/26, 11/2, 11/9, 11/11, 1/4, 2/8	
VS:BR	ODSVRA 2003		10/6, 10/11, 12/12, 1/17, 2/23	
VV:AA	ODSVRA 2011		10/5, 11/2, 2/15	
VV:BB	ODSVRA 2011		10/18, 1/11	
VV:RB	ODSVRA 2009		10/9, 12/7, 12/12, 1/11	
VV:VB	ODSVRA 2011		10/5, 10/6, 10/12, 10/14, 10/17, 10/26, 11/30, 12/7, 12/12, 1/4, 2/8, 2/23	
VV:VG	ODSVRA 2009 or 2011		12/12, 1/4	
VV:VW	ODSVRA 2008 or 2011		10/5, 10/12, 10/16, 10/17, 10/26, 11/9, 11/30, 12/4, 12/12, 12/13, 1/4, 1/17, 2/1, 2/15, 2/23	
VV:VY	ODSVRA 2011		10/5, 10/6, 10/14, 10/17, 10/20, 10/23, 10/26, 11/11, 11/23, 2/8, 2/23	
VV:YR	ODSVRA 2011		10/7, 10/14, 11/11, 11/28, 11/30, 12/1, 12/12	
VV:YY	ODSVRA 2011		10/11, 10/26, 11/2, 11/9, 11/30, 12/12, 12/22, 1/4, 2/8	
NB:PR	VAFB 2011	Santa Barbara	10/4, 10/15, 10/25, 12/12, 2/8	
NB:PY	VAFB 2011	Santa Barbara	10/8/2011	
NY:RB	VAFB 2008	Santa Barbara	10/21, 11/30, 2/15, 2/23	

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 2012.

Juveniles fledged from ODSVRA in 2012 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.

The ULT, LLT, URT notation denotes chicks banded at ODSVRA from 2002 to 2004. Chicks were banded to brood during this time in a way to create combinations unique to each individual. This was done by alternating the leg (left or right) that received the federal band, as well as the location (upper or lower) on this band that remained exposed when color tape was applied. Due to viewing conditions, the exposed portion of the federal band was not always discernible, raising the possibility that two or more different birds were being recognized as the same band combination; these cases are noted below.

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

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
--:Sb	J	Oregon 2012		9/9, 9/14	
BG:YY		Pajaro Spit 2007	Monterey	8/13, 8/23	
WO:OW	J	Pajaro Spit 2012	Monterey	9/3, 9/12, 9/27	
GB:PP		Moss Landing SB 2009	Monterey	3/3, 3/6, 8/18, 8/31, 9/3, 9/10, 9/12	
GO:OB		Moss Landing SB 2012	Monterey	8/21, 8/29, 8/30, 8/31, 9/4, 9/9, 9/17	
AB:AB		Marina SB 2011	Monterey	4/7, 4/11	
WB:WW	J	Marina SB 2012	Monterey	8/18, 8/20, 8/22, 8/23	
BG:WA		Salinas River SB 2010	Monterey	3/3, 3/11, 3/13, 3/21, 3/23, 9/13, 9/20, 9/27	
OA:WW	J	Salinas River NWR 2012	Monterey	9/12, 9/18, 9/27, 9/28	
OL:GP		Salinas River NWR 2009	Monterey	3/3, 3/16	
RP:WR		Salinas River SB (Molera Potrero) 2010	Monterey	8/29, 9/10	
YB:GW	F	Monterey Bay 2009	Monterey	3/3, 3/9, 3/24, 4/4, 4/5, 4/6, 4/7, 4/11, 4/13, 4/19, 8/16, 8/18, 8/20, 8/22, 8/23, 8/27, 8/28, 8/31, 9/5, 9/8, 9/9, 9/10, 9/11, 9/12, 9/13, 9/20	Yellow band is above the joint.
AY:AW	F	Reservation Road 2009	Monterey	3/3, 5/19, 6/28, 7/3, 9/7, 9/14, 9/15, 9/20, 9/29	ODSVRA breeding female.
B:PR	F	ODSVRA 2010		3/26, 3/30, 4/12, 5/22, 6/2, 6/21, 6/22, 7/6, 8/6, 8/13, 8/18	ODSVRA breeding female. Banded in 2010 as BB:PR.
BB:--	M	ODSVRA 2005		3/30, 3/31, 4/11, 5/6, 5/7, 5/8, 5/11, 5/15, 6/24	ODSVRA breeding male. Banded in 2005 as BB:WB.
BB:AW	F	ODSVRA 2010		3/23, 4/12, 6/1, 6/2, 7/17, 7/18, 8/11, 8/13, 8/21, 9/10, 9/17	ODSVRA breeding female.
BB:OR	M	ODSVRA 2010		3/2, 3/3, 3/13, 3/15, 3/16, 3/19, 3/26, 3/27, 3/30, 4/6, 4/12, 4/17, 5/1, 5/2, 5/3, 5/8, 5/9, 5/17, 5/22, 5/25, 5/26, 5/27, 6/1, 6/24, 7/4, 7/5, 7/7, 7/8, 7/16, 7/30, 7/31, 8/16, 8/17, 8/22, 8/25, 8/28, 8/29, 9/1, 9/10, 9/17, 9/20, 9/29	ODSVRA breeding male.
BB:RG	M	ODSVRA 2007		4/12, 5/22, 6/1, 6/20	ODSVRA breeding male.
BB:RR		ODSVRA 2010		4/25, 7/22, 9/7, 9/19, 9/20	
BB:VG	F	ODSVRA 2008 or 2011		3/31, 4/12, 4/22, 6/7, 6/29, 7/1	ODSVRA breeding female.
BB:VR	M	ODSVRA 2011		3/4, 3/9, 3/10, 3/23, 3/26, 3/30, 4/25, 5/28, 7/24, 8/9, 8/13, 8/14, 8/27	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 2012 (continued).

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
BB:WG	M	ODSVRA 2007 or 2010		3/4, 3/15, 3/19, 3/26	
BB:WW		ODSVRA 2010		4/9, 4/25	
BB:YG	F	ODSVRA 2011		3/9, 5/20, 6/20, 6/23, 6/27, 7/23, 7/25	ODSVRA breeding female.
BB:YY	M	ODSVRA 2002 or 2010		3/11, 3/31, 4/18, 4/19, 4/25, 5/20, 6/13, 6/23, 7/30, 9/1, 9/18	ODSVRA breeding male.
GA:BB		ODSVRA 2010		3/9, 4/12	
GA:BW	F	ODSVRA 2011		3/24, 3/25	
GA:OB	F	ODSVRA 2010		4/15, 4/26, 6/7, 6/29, 7/18	ODSVRA breeding female.
GA:PB	F	ODSVRA 2011		3/1, 3/4, 3/26, 4/8, 4/12, 7/6, 7/11, 8/21, 9/1	ODSVRA breeding female.
GA:PG		ODSVRA 2011		3/4, 3/15, 4/12, 4/16, 4/20, 5/27, 6/27, 7/27, 8/10, 8/13, 8/14, 8/15, 8/17, 8/18, 8/20, 8/22, 8/28, 8/31, 9/2, 9/10, 9/12, 9/13, 9/28	
GA:PY	M	ODSVRA 2010		4/26, 7/13, 7/22	ODSVRA breeding male.
GA:RB	F	ODSVRA 2004 or 2010		6/1, 6/14, 8/1, 8/10, 8/11, 8/21, 8/27, 9/10, 9/18	ODSVRA breeding female.
GA:RY	F	ODSVRA 2011		3/3, 3/5, 3/16, 3/21, 3/30, 4/4, 4/6, 4/7, 4/11, 4/14, 6/22, 6/23, 8/13, 8/27, 9/10, 9/11, 9/14, 9/16, 9/20	ODSVRA breeding female.
GA:YB	M	ODSVRA 2004		4/25, 5/7, 5/18, 5/31, 6/2, 6/5, 6/7, 6/13, 6/14, 6/15, 6/21, 6/22, 6/28, 7/27, 8/10, 8/20, 8/21, 8/22	ODSVRA breeding male.
GA:YG		ODSVRA 2011		4/26, 6/30	
GG:AB	M	ODSVRA 2007		3/3, 3/12, 3/14, 3/15, 3/27, 3/30, 4/6, 4/17, 5/8, 5/9, 5/13, 5/20, 5/25, 6/19, 6/27, 6/29, 7/9, 7/11, 7/21, 7/22, 8/12, 8/14, 8/18, 8/20, 8/25, 8/28, 8/29, 9/8, 9/10, 9/22	ODSVRA breeding male.
GG:AR	M	ODSVRA 2011		3/16, 5/15, 5/17, 5/30, 5/31, 6/13, 6/27, 6/29, 7/1, 7/4, 7/5, 7/6, 7/18, 7/21, 8/1, 8/22	ODSVRA breeding males (2).
GG:GR		ODSVRA 2011		3/25, 3/30, 4/4, 4/7, 5/9	
GG:VB	M	ODSVRA 2008 or 2011		6/24, 6/29, 7/26	ODSVRA breeding male.
GG:VY	F(2) and M	ODSVRA 2008 or 2011		3/3, 3/10, 3/11, 3/12, 3/14, 3/15, 3/16, 3/17, 3/18, 3/19, 3/20, 3/22, 3/24, 3/27, 3/28, 3/30, 4/2, 4/6, 4/7, 4/11, 4/16, 4/23, 5/17, 5/19, 5/21, 5/22, 5/23, 5/24, 5/25, 5/30, 5/31, 6/1, 6/2, 6/4, 6/7, 6/10, 6/12, 6/14, 6/15, 6/16, 6/20, 6/21, 6/22, 6/24, 6/29, 6/30, 7/5, 7/9, 7/16, 7/18, 7/21, 7/22, 7/28, 7/29, 8/13, 8/16, 8/17, 8/18, 8/20, 8/21, 8/22, 8/24, 8/25, 8/27, 8/29, 8/31, 9/2, 9/3, 9/5, 9/10, 9/11, 9/14, 9/20, 9/22,	ODSVRA breeding females (2) and ODSVRA breeding male.
GG:WB	M	ODSVRA 2011		4/18, 4/20, 5/2, 5/10, 5/22, 5/23, 5/24, 5/25, 5/27, 5/30, 5/31, 6/6, 6/7, 6/12, 6/13, 6/14, 6/24, 6/29, 7/1, 7/3, 7/5, 7/9, 7/10, 7/22, 8/9, 8/20, 8/24, 8/26, 8/27, 8/28, 9/1, 9/2, 9/3, 9/5, 9/8, 9/9, 9/14, 9/17, 9/18	ODSVRA breeding males (2).
GG:YG	F	ODSVRA 2011		3/3, 3/9, 3/11, 3/13, 3/19, 3/20, 3/26, 3/30, 4/12, 4/16, 4/19, 4/21, 6/27, 6/29, 7/1, 7/4, 7/5, 7/31, 8/11, 8/15, 8/21, 8/30, 9/1, 9/10, 9/11, 9/13, 9/28, 9/30	ODSVRA breeding females (2).
GG:YY		ODSVRA 2011		6/30, 9/29	

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 2012 (continued).

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
PG:GR	F	ODSVRA 2011		3/2, 3/16, 4/6, 4/7, 4/13, 4/14, 9/3, 9/20	
PG:OG	M	ODSVRA 2009		6/22, 7/4	ODSVRA breeding male.
PG:VY	M	ODSVRA 2008		3/3, 3/6, 3/10, 4/25, 5/11, 5/22, 6/1, 6/9, 6/13, 6/23, 7/4, 7/21, 8/1, 8/10, 8/14, 8/15, 8/22, 8/23	ODSVRA breeding male.
PV:AG	M	ODSVRA 2008		4/5, 4/26, 5/8, 5/9, 5/14, 5/17, 5/20, 5/22, 6/9, 7/16, 7/30, 7/31, 8/9, 8/27, 9/11, 9/30	ODSVRA breeding males (2).
PV:BA		ODSVRA 2009 and 2010		3/3, 3/13	
PV:BG	M	ODSVRA 2011		4/8, 4/11	
PV:BR	M	ODSVRA 2007		3/4, 3/11, 3/15, 3/27, 4/26, 5/14, 5/20, 5/31, 6/22, 7/16, 8/25, 8/29, 9/3, 9/11, 9/30	ODSVRA breeding male.
PV:BY	F	ODSVRA 2008		3/22, 4/7, 6/29, 7/4	ODSVRA breeding female.
PV:GY	M	ODSVRA 2008		3/9, 3/26, 5/3, 5/10, 6/1, 6/13, 6/14, 6/16, 6/21, 6/22, 6/29, 8/8, 8/10, 8/13, 8/15, 8/22, 8/27, 9/29	
PV:VY	F	ODSVRA 2009		3/23, 3/25, 4/8, 4/10, 4/11, 4/20, 4/23, 5/14, 5/18, 5/19, 5/20, 7/18, 7/22, 7/30, 8/12, 8/17, 8/22, 8/27, 8/29, 9/2, 9/3, 9/11, 9/12, 9/20, 9/21	ODSVRA breeding female.
PV:WB	F	ODSVRA 2007 or 2010		4/21, 5/11, 5/13, 6/1, 7/2, 7/3, 7/4, 7/21, 8/10, 8/14, 9/1, 9/2	ODSVRA breeding male.
PV:WG	M	ODSVRA 2008		3/4, 3/27, 6/6, 8/20, 9/10, 9/14, 9/18	
PV:WW	F	ODSVRA 2008		5/10, 5/13, 5/14, 5/16, 5/17, 5/18, 5/19, 5/20, 5/26, 6/1, 6/7, 7/1, 7/4, 7/7, 7/8, 8/22, 9/2, 9/3, 9/6, 9/7, 9/8, 9/11, 9/20, 9/23	ODSVRA breeding female.
PV:YG	F	ODSVRA 2009		3/2, 3/3, 3/31, 5/11, 5/15, 5/20, 5/21, 5/30, 7/3, 7/19, 7/22, 7/30, 8/10, 8/13, 8/17, 8/18, 8/19, 8/22, 8/25, 8/29, 8/31, 9/1, 9/9, 9/14, 9/20, 9/21, 9/22	ODSVRA breeding female.
PV:YY	M	ODSVRA 2009		3/25, 3/28, 3/29, 3/30, 3/31, 4/6, 4/16, 5/7, 5/13, 5/15, 5/21, 5/25, 5/26, 5/27, 6/2, 6/12, 6/22, 6/28, 7/5, 7/8, 7/9, 7/11, 7/15, 7/18	ODSVRA breeding male.
RR:AR	F	ODSVRA 2010		3/9, 3/10, 3/11, 3/13, 3/30, 3/31, 4/1, 4/6, 6/21, 6/22, 6/24	ODSVRA breeding female.
RR:AW	F	ODSVRA 2011		5/5, 6/13, 6/20	ODSVRA breeding female.
RR:BB	M	ODSVRA 2010		6/16, 6/22, 6/28, 7/4, 7/5, 7/10, 7/11, 7/18, 7/28, 8/17, 8/18, 8/21, 8/24, 8/25, 9/3, 9/11, 9/14, 9/18	ODSVRA breeding male.
RR:BW	F	ODSVRA 2010		3/4, 4/20, 4/26, 5/31	ODSVRA breeding female.
RR:GG	M	ODSVRA 2011		3/4, 3/11, 3/19, 3/26, 3/30, 4/12, 4/16, 4/22, 5/15, 5/20, 5/21, 5/22, 5/24, 5/26, 5/27, 5/28, 5/29, 5/31, 6/2, 6/4, 6/5, 6/6, 6/10, 6/16, 6/20, 6/21, 6/24, 7/4, 7/22, 8/15, 8/23, 8/28, 8/30, 8/31, 9/1, 9/2, 9/3, 9/5, 9/9, 9/10, 9/13, 9/22, 9/29	ODSVRA breeding male.
RR:OB	F	ODSVRA 2011		3/26, 3/30, 4/4, 4/25, 6/13, 6/16, 7/23, 8/10, 8/12, 8/15, 8/22, 8/25, 8/27, 9/10, 9/18	
RR:OR	M	ODSVRA 2010		4/17, 4/26, 7/11, 7/16, 8/10, 8/16	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 2012 (continued).

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
RR:OW-ULT	M	ODSVRA 2003		6/29	ODSVRA breeding male. There were 11 additional sightings recorded as RR:OW between 11 March and 25 August.
RR:OY	F	ODSVRA 2010		3/19, 3/20, 3/21, 3/30, 3/31, 4/4, 4/12, 4/15, 4/19, 4/20, 4/21, 5/16, 6/13, 6/18, 7/7, 7/21, 8/14, 8/27, 8/30, 9/18, 9/19	ODSVRA breeding female.
RR:PB	F (2)	ODSVRA 2007 or 2010		3/14, 3/15, 3/22, 3/27, 3/28, 3/30, 3/31, 4/7, 4/8, 4/12, 4/17, 4/19, 5/7, 5/20, 6/6, 6/13, 6/15, 6/21, 6/23, 6/28, 7/4, 7/5, 7/9, 7/11, 7/12, 7/15, 7/18, 7/21, 7/22, 7/29, 8/13, 8/20, 8/24, 8/29, 8/30, 9/1, 9/2, 9/5, 9/18, 9/21, 9/22	ODSVRA breeding females (2).
RR:PG	M	ODSVRA 2009		3/3, 3/4, 3/11, 3/13, 3/14, 3/15, 3/18, 3/19, 3/31, 4/6, 4/10, 4/12, 4/21, 5/5, 5/6, 5/10, 5/11, 5/21, 6/1, 6/7, 6/29, 7/4, 7/5	ODSVRA breeding male.
RR:PY		ODSVRA 2007 or 2010		7/22, 8/25	
RR:VW	F	ODSVRA 2009 or 2011		3/4, 3/7, 3/23, 3/26, 4/12, 5/18, 5/19, 9/27, 9/29	ODSVRA breeding female.
RR:WB	M	ODSVRA 2011		5/20, 6/22, 7/4, 7/6, 7/11, 7/16	
RR:WR	F and M	ODSVRA 2011		3/1, 3/3, 3/4, 3/9, 3/10, 3/13, 3/20, 3/24, 3/25, 3/30, 4/1, 4/12, 4/13, 5/15, 5/19, 5/29, 5/31, 6/13, 7/20, 7/26, 7/30, 8/1, 8/17, 8/21, 8/22, 9/1, 9/9, 9/10, 9/11, 9/13, 9/16, 9/20,	ODSVRA breeding female and male.
RR:YB	M	ODSVRA 2011		4/3, 4/6, 4/11, 4/13, 4/26	
RR:YR		ODSVRA 2010		3/10, 3/13, 3/17, 3/21, 3/23, 3/30, 3/31, 4/2, 4/4, 4/5, 4/6, 4/7, 8/13, 8/16, 8/18, 8/19, 8/22, 8/24, 8/25, 8/27, 8/28, 8/29, 9/8, 9/10, 9/13, 9/16, 9/20, 9/21	
RR:YY	M	ODSVRA 2010		5/21, 5/24, 6/6, 6/7, 6/9, 6/12, 6/13, 6/20, 6/22, 6/29, 7/4, 7/8, 7/20, 7/21	
VG:AB	M	ODSVRA 2011		3/4, 3/15, 3/26, 3/31, 4/12, 4/26, 6/13, 7/12, 8/10, 8/13, 8/20, 9/18, 9/27	
VG:AR	F	ODSVRA 2011		3/3, 3/11, 3/17, 3/26, 3/27, 3/30, 3/31, 7/3, 7/4, 7/5, 7/21, 7/22, 8/11, 8/13, 8/17, 8/24, 8/25, 8/27, 8/28, 8/30, 9/1, 9/5, 9/10, 9/11, 9/14, 9/17, 9/18, 9/30	ODSVRA breeding female.
VG:AW	F	ODSVRA 2011		4/12, 4/13, 4/25, 4/26, 5/9, 5/28, 6/27, 8/13	ODSVRA breeding female.
VG:AY		ODSVRA 2011		6/15, 6/28, 6/29, 7/4, 7/11, 8/13, 8/17, 8/22, 8/27, 8/29, 8/31, 9/3, 9/5, 9/8, 9/10, 9/21, 9/28	
VG:BG	M	ODSVRA 2011		3/1, 3/7, 3/15, 3/27, 3/30, 4/16, 4/19, 6/28, 7/11, 8/8, 8/9, 8/17	ODSVRA breeding male.
VG:BR	F	ODSVRA 2003		4/26, 5/9, 7/5, 8/18, 8/19, 8/21, 8/31, 9/29	
VG:GW	F and M	ODSVRA 2011		3/4, 3/10, 3/14, 3/31, 4/2, 4/25, 5/5, 5/11, 5/17, 5/20, 6/2, 6/4, 6/6, 6/10, 6/12, 6/14, 6/15, 6/16, 6/19, 6/21, 6/29, 7/11, 7/13, 8/13, 8/18, 8/28, 8/29, 9/12, 9/18, 9/28, 9/30	ODSVRA breeding female and male.
VG:OG	F	ODSVRA 2011		3/4, 3/30, 6/1, 6/14, 8/24, 8/28, 8/29, 8/31, 9/3, 9/6, 9/9, 9/12, 9/13, 9/21, 9/27	ODSVRA breeding female.
VG:PR	M	ODSVRA 2011		4/1, 4/12, 5/2, 5/7, 6/2, 6/14, 6/21, 7/4, 7/26, 8/9, 8/13, 8/14, 8/15, 8/21, 8/22, 8/25, 8/27, 9/1, 9/10, 9/18	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 2012 (continued).

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
VG:VR	F	ODSVRA 2009 or 2011		3/4, 3/7, 3/15, 4/9, 4/25, 5/15, 5/20, 5/31, 6/14, 6/15, 6/20, 7/16, 8/10, 8/21, 8/31, 9/2, 9/3, 9/5	ODSVRA breeding female.
VG:VW	F	ODSVRA 2011		3/31, 4/12, 6/1, 6/9	
VG:VY	F and M	ODSVRA 2009		3/10, 3/11, 3/30, 5/9, 6/4	ODSVRA breeding female and male.
VG:YW	M (2)	ODSVRA 2011		3/11, 3/15, 3/19, 3/20, 3/22, 3/23, 3/26, 3/27, 3/29, 4/1, 4/4, 4/5, 4/7, 4/12, 4/16, 4/26, 5/1, 5/2, 5/7, 5/9, 5/11, 5/13, 5/16, 5/17, 5/18, 5/20, 5/25, 5/26, 5/27, 5/28, 5/29, 5/30, 5/31, 6/1, 6/1, 6/2, 6/4, 6/15, 6/16, 6/19, 6/24, 6/28, 7/5, 7/8, 7/22, 7/26, 7/30, 8/10, 8/11, 8/13, 8/15, 8/17, 8/20, 8/25, 8/27, 8/29, 8/30, 9/1, 9/2, 9/3, 9/7, 9/10, 9/11, 9/18, 9/21, 9/22, 9/29	ODSVRA breeding males (2).
VG:YY	M (2)	ODSVRA 2011		3/13, 3/14, 3/20, 3/25, 3/27, 3/30, 3/31, 4/1, 4/3, 4/11, 4/16, 4/17, 4/21, 5/8, 5/19, 5/22, 6/1, 6/7, 6/14, 6/22, 6/24, 7/7, 7/9, 7/21, 7/22, 7/30, 8/9, 8/12, 8/14, 8/25, 8/29, 9/1, 9/4, 9/5, 9/9, 9/11, 9/12, 9/14, 9/20, 9/21, 9/22	ODSVRA breeding males (2).
VS:BR	F	ODSVRA 2003		5/10, 8/30	
VV:AA	F	ODSVRA 2011		3/2, 3/3, 3/14, 3/26, 3/30, 4/1, 4/8, 4/12, 4/16, 4/20, 5/24, 5/25, 5/30, 5/31, 6/1, 6/2, 6/15, 6/28, 7/5, 7/9, 8/13, 8/22, 8/29, 8/30, 9/2, 9/9, 9/10, 9/14, 9/21	ODSVRA breeding female.
VV:BY	M	ODSVRA 2007		8/27/2012	
VV:GB	M	ODSVRA 2009		4/13, 4/15, 5/17, 6/12, 6/20, 6/29, 7/1, 7/5, 7/22, 9/21	ODSVRA breeding male.
VV:GG	M	ODSVRA 2009		4/7, 4/10, 4/21, 5/20, 5/30, 6/1, 6/6, 6/12, 6/24, 6/29, 7/15, 7/18, 7/21	ODSVRA breeding male.
VV:GW	M	ODSVRA 2009		3/3, 3/25, 3/30, 4/12, 5/7, 5/8, 5/11, 5/22, 5/26, 6/6, 6/9, 6/12, 6/13, 6/18, 6/22, 6/28, 7/3, 8/12, 8/13, 8/18, 8/19, 8/25, 8/27, 8/28, 9/2, 9/3, 9/5, 9/7, 9/10, 9/11, 9/12, 9/13, 9/17, 9/21	
VV:OO	M	ODSVRA 2009 or 2010		3/24, 3/30, 3/31, 4/12, 4/21, 5/7, 5/8, 5/9, 5/13, 6/7, 6/24, 7/5	
VV:OY	M	ODSVRA 2007		3/11, 3/15, 3/27, 4/9, 4/13, 4/26	
VV:RB	F	ODSVRA 2009		3/3, 3/4, 3/12, 3/13, 3/14, 3/15, 3/19, 3/31, 5/11, 5/19, 6/13, 6/19, 6/24, 8/15, 8/18, 8/20, 8/28, 9/2, 9/3, 9/4, 9/8, 9/10	ODSVRA breeding female.
VV:VB	M	ODSVRA 2011		3/4, 3/31, 4/13, 4/26, 6/13	
VV:VG	F	ODSVRA 2009 or 2011		3/4, 3/11, 3/22, 3/28, 4/8, 4/23, 5/20, 5/31, 8/10, 9/11, 9/29	ODSVRA breeding female.
VV:VR	M	ODSVRA 2008		3/31, 4/12, 6/2, 6/21, 6/22	ODSVRA breeding male.
VV:VW	F	ODSVRA 2008 or 2011		3/2, 3/14, 3/16, 3/17, 3/18, 4/1, 4/25, 5/7, 6/6, 6/20, 6/29, 7/7, 7/18, 8/12, 8/14, 8/17, 8/19, 9/3, 9/9, 9/10, 9/20, 9/22, 9/23, 9/27	ODSVRA breeding female.
VV:VY	F	ODSVRA 2011		3/4, 3/7, 3/10, 3/30, 4/12, 6/4, 6/22, 6/29, 8/12, 9/2, 9/3, 9/18, 9/28	
VV:YW	F	ODSVRA 2011		4/11, 4/19, 4/21, 4/25, 5/25, 7/4	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 2012 (continued).

Band	Sex (#)	Origin and Year Banded	County Banded	Dates Seen	Notes
VV:YY	M	ODSVRA 2011		3/4, 3/10, 4/25, 4/30, 5/13, 5/28, 6/2, 6/22, 7/5, 7/6, 7/21, 7/22, 8/10, 8/17, 8/20, 8/21, 9/11, 9/18	ODSVRA breeding male.
WS:WB	M	Guadalupe NWR 2002		6/20, 6/23, 7/4, 7/5, 7/6, 7/16, 8/12	ODSVRA breeding male.
Y:GO	M	VAFB unknown year	Santa Barbara	4/2, 4/4, 4/7, 4/8, 4/16, 4/17, 4/18, 5/15, 5/20, 5/22, 5/24, 5/31, 7/1	
B:G/Y	M	VAFB 2002	Santa Barbara	8/1, 8/10, 8/15	ODSVRA breeding male.
B:GW		VAFB 2009	Santa Barbara	3/1, 3/18, 9/3	
NB:BY	M	VAFB 2011	Santa Barbara	5/9, 7/4	ODSVRA breeding male. There was one additional sighting as RB:BY on 10 August.
NB:OW	F	VAFB 2011	Santa Barbara	6/12, 7/16, 7/30, 8/10, 8/13, 8/27, 9/10	ODSVRA breeding female. There was one additional sighting as RB:OW on 25 August.
NB:PG	F	VAFB 2011	Santa Barbara	9/10	ODSVRA breeding female. There were 14 additional sightings as RB:PG between 16 July and 14 September.
NB:PR		VAFB 2011	Santa Barbara	3/16, 3/31, 4/5, 4/13	
NB:RW		VAFB 2011	Santa Barbara	6/1, 7/4	Both sightings recorded as RB:RW.
NW:AB	J	VAFB 2012	Santa Barbara	8/27/2012	
NY:OR	J	VAFB 2012	Santa Barbara	8/27/2012	
NY:RB	F	VAFB 2008	Santa Barbara	3/4, 3/15, 3/19, 3/26, 3/30, 4/17, 4/26, 8/13, 8/17, 8/19, 8/22, 9/21, 9/22	ODSVRA breeding female.
NY:RW		VAFB 2008	Santa Barbara	9/10, 9/20, 9/21, 9/22	

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 2011 to 29 February 2012.

This is a partial list based on information received from PRBO Conservation Science (pers. comm. F. Bidstrup), Morro Bay State Park (pers. comm. R. Orr), and Channel Coast District of State Parks (pers. comm. A. Frangis) and from sightings by staff at ODSVRA at nearby sites.

Notes: for multiple dates seen in 2012, the first date will have the year and all days following will be of the same year; ODSVRA is banding chicks to brood and some bands have been used multiple years so it is possible to have more than one bird with the same combination.

SB = State Beach, SP = State Park, NWR = National Wildlife Refuge, VAFB=Vandenberg Air Force Base

Band Combination	Year Banded	Location Seen	County	Dates Seen
VG:OG	2011	Arroyo de la Cruz	San Luis Obispo	2/5
BB:YB	2011	San Simeon Beach SP	San Luis Obispo	12/8, 2/5
VG:YB	2011	San Simeon Beach SP	San Luis Obispo	2/5
GA:OB	2010	Villa Creek, Estero Bluffs SP	San Luis Obispo	12/21, 12/27, 1/17
P:AG	2008	Villa Creek, Estero Bluffs SP	San Luis Obispo	12/21, 12/27, 1/15/12, 1/17, 2/21
B:PR	2010	Morro Bay Sandspit	San Luis Obispo	12/28, 2/21
BB:OB	2010	Morro Bay Sandspit	San Luis Obispo	12/28
BB:YG	2011	Morro Bay Sandspit	San Luis Obispo	12/28, 2/21
GA:VR	2009	Morro Bay Sandspit	San Luis Obispo	12/28
PV:PW	2008	Morro Bay Sandspit	San Luis Obispo	12/28
RR:BB	2010	Morro Bay Sandspit	San Luis Obispo	12/21, 12/28
RR:WW	2010	Morro Bay Sandspit	San Luis Obispo	12/21, 2/21
RR:YB	2011	Morro Bay Sandspit	San Luis Obispo	12/28
VG:PR	2011	Morro Bay Sandspit	San Luis Obispo	12/28, 2/21
VG:VR	2009 or 2011	Morro Bay Sandspit	San Luis Obispo	2/21
VG:VW	2011	Morro Bay Sandspit	San Luis Obispo	12/28
B:PR	2010	Morro Strand SB	San Luis Obispo	12/25
BB:OB	2010	Morro Strand SB	San Luis Obispo	12/21, 12/25
RR:YB	2011	Morro Strand SB	San Luis Obispo	12/21, 12/25, 1/13
R:YB	2011	Morro Strand SB	San Luis Obispo	12/8
PV:PW	2008	Morro Strand SB	San Luis Obispo	12/21, 12/25, 1/5
VG:VR	2009 or 2011	Morro Strand SB	San Luis Obispo	12/21, 12/25
VG:VW	2011	Morro Strand SB	San Luis Obispo	12/21, 12/25, 1/13
VG:YW	2011	Morro Strand SB	San Luis Obispo	12/21, 12/25, 1/11
BB:YY	2002 or 2010	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
GA:AR	2011	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
GA:BB	2010	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
GA:RB	2004 or 2010	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
PV:AG	2008	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4

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 2011 to 29 February 2012 (continued).

Band Combination	Year Banded	Location Seen	County	Dates Seen
RR:GG	2011	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
RR:PB	2007 or 2010	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
RR:VY	2008	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
RR:WR	2010	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
VG:GW	2011	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
VG:VB	2008 or 2011	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
VG:YW	2011	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
VV:BY	2007	Guadalupe-Nipomo Dunes NWR	San Luis Obispo	2/4
BB:RY	2010	Chevron Property	San Luis Obispo	1/15
GG:YG	2011	Chevron Property	San Luis Obispo	1/15
PV:VG	2008	Chevron Property	San Luis Obispo	1/15
PV:YG	2009	Chevron Property	San Luis Obispo	1/15
VG:PR	2011	Chevron Property	San Luis Obispo	1/15
BB:BR	2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
BB:OR	2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
BB:VG	2008 or 2011	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
BB:VR	2011	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
BB:WG	2007 or 2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
BB:WY	2007 or 2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
GA:RB	2004 or 2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
GA:VB	2008 or 2011	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
GA:VV		Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
PG:VW	2011	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
RR:PY	2007 or 2010	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
VG:RB	2011	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
VV:BY	2007	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
VV:GG	2009	Rancho Guadalupe Dunes County Park	Santa Barbara	1/15
RR:LY	2010	VAFB	Santa Barbara	2/10
RR:WW	2010	VAFB	Santa Barbara	1/30
VG:VR	2009 or 2011	VAFB	Santa Barbara	2/10
VV:OA	2011	VAFB	Santa Barbara	1/30
VV:YW	2011	VAFB	Santa Barbara	2/10

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 2011 to 29 February 2012 (continued).

Band Combination	Year Banded	Location Seen	County	Dates Seen
BB:AW	2010	Jalama Beach	Santa Barbara	11/13, 2/3
GA:PB	2011	Jalama Beach	Santa Barbara	11/13
PV:OG	2011	Jalama Beach	Santa Barbara	2/3
RR:PB	2007 or 2010	Jalama Beach	Santa Barbara	11/13, 2/3
VV:YW	2011	Jalama Beach	Santa Barbara	11/13, 2/3
VG:AW	2011	San Buenaventura Beach	Ventura	11/17, 12/19
PV:OG	2011	McGrath SB	Ventura	11/17
VG:AW	2011	McGrath SB	Ventura	10/4
VV:OO	2010	McGrath SB	Ventura	11/17, 12/19
BB:BG	2011	Mandalay SB	Ventura	10/4, 12/19
RR:AW	2011	Mandalay SB	Ventura	10/4, 12/19
RR:OR	2010	Hollywood Beach	Ventura	10/1
RR:AR	2010	Mugu Lagoon Beach	Ventura	11/14
RR:GG	2011	Cabrillo SB	Los Angeles	10/24
GG:AR	2011	Malibu Lagoon SB	Los Angeles	11/11, 12/6, 12/25
GG:BY	2007	Naval Air Station and North Island Peninsula	San Diego	10/19, 11/23, 11/28
GA:VB	2008 or 2011	Silver Strand SB	San Diego	12/11
GG:YY	2011	Tijuana River Beach	San Diego	11/14

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 2012.

This is a partial list based on information received from PRBO Conservation Science (pers. comm. F. Bidstrup), Morro Bay State Park (pers. comm. R. Orr), Chevron property in Guadalupe-Nipomo Dune Complex (pers. comm. K. Paradis), Guadalupe-Nipomo Dunes National Wildlife Refuge (pers. comm. G. Greenwald; pers. comm. T. Applegate), Channel Coast District of State Parks (pers. comm. A. Frangis) and from sightings by staff of ODSVRA at nearby sites. Note: ODSVRA is banding chicks to brood so it is possible to have more than one bird with the same combination.

Guadalupe NWR = Guadalupe-Nipomo Dunes National Wildlife Refuge, SB = State Beach, SP = State Park;

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

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen
GG:AR	2011	M	Gazos Creek Beach	San Mateo	4/24, 5/22
BB:GR	2012	J	Villa Creek, Estero Bluffs SP	San Luis Obispo	8/2, 8/4
GA:OB	2010	F	Villa Creek, Estero Bluffs SP	San Luis Obispo	8/7, 8/8, 8/9, 9/19
GG:AR	2011		Villa Creek, Estero Bluffs SP	San Luis Obispo	4/5
GG:YR	2012		Villa Creek, Estero Bluffs SP	San Luis Obispo	7/13
P:AG	2008	F	Villa Creek, Estero Bluffs SP	San Luis Obispo	3/6, 3/8, 3/14, 3/15, 3/16, 3/23, 3/29, 3/30, 4/4, 4/5, 4/6, 4/9, 4/13, 4/17, 4/19, 4/20, 4/23, 4/24, 4/27, 5/2, 5/3, 5/8, 5/9, 5/15, 5/17, 5/18, 5/22, 5/23, 5/24, 5/25, 5/28, 5/29, 5/31, 6/5, 6/6, 6/7, 6/8, 6/9, 6/12, 6/14, 6/15, 6/16, 6/19, 6/21, 6/26, 6/30, 7/10, 7/16, 7/19, 7/28, 7/31, 8/1, 8/2, 8/3, 8/4, 8/6, 8/7, 8/9, 8/10, 8/13, 8/15, 8/16, 8/18, 8/20, 8/24, 8/25, 8/27, 8/29, 8/31, 9/3, 9/5, 9/12, 9/14, 9/19, 9/21
PG:B?		M	Villa Creek, Estero Bluffs SP	San Luis Obispo	3/26
B:PR	2010	F	Morro Bay Sandspit	San Luis Obispo	8/6, 8/13, 8/18, 8/31, 9/12, 9/21
BB:GR	2012	J	Morro Bay Sandspit	San Luis Obispo	8/9, 8/14
BB:YG	2011		Morro Bay Sandspit	San Luis Obispo	9/12
GA:OB	2010	M	Morro Bay Sandspit	San Luis Obispo	8/14, 8/18, 8/21, 8/24, 8/29, 9/3, 9/12, 9/14
GA:VR	2009	F	Morro Bay Sandspit	San Luis Obispo	3/6, 3/7, 3/9, 3/14, 3/16, 3/19, 3/20, 3/23, 3/27, 3/29, 4/4, 4/11, 4/12, 4/17, 4/18, 4/19, 4/30, 5/24, 5/30, 6/6, 6/14, 6/15, 6/19, 6/25, 6/26, 6/28, 7/4, 7/12, 7/17, 8/1, 8/2, 8/8, 8/14, 8/15, 8/16, 8/18, 8/21, 8/24, 8/27, 8/29, 8/31, 9/14, 9/21
GG:BW	2012	J	Morro Bay Sandspit	San Luis Obispo	8/1, 8/18, 8/31
GG:YR	2012	J	Morro Bay Sandspit	San Luis Obispo	7/10
PG:AB	2012	J	Morro Bay Sandspit	San Luis Obispo	9/12
PV:PW	2008	M	Morro Bay Sandspit	San Luis Obispo	5/3, 5/7, 5/8, 5/24, 9/14
RR:AW	2011	M	Morro Bay Sandspit	San Luis Obispo	5/3, 5/21, 5/22, 6/6
RR:BB	2010		Morro Bay Sandspit	San Luis Obispo	8/8
RR:BW	2010		Morro Bay Sandspit	San Luis Obispo	5/3, 5/8, 5/10, 5/16
RR:VB	2008 or 2010		Morro Bay Sandspit	San Luis Obispo	8/6, 8/18, 8/12, 8/29, 8/31, 9/3
RR:WG	2012	J	Morro Bay Sandspit	San Luis Obispo	9/14

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 2012 (continued).

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen
RR:WW	2010	M	Morro Bay Sandspit	San Luis Obispo	3/8, 3/15, 3/23, 3/26, 3/29, 3/30, 4/16, 4/18, 4/19, 5/4, 5/7, 5/10, 5/18, 5/21, 5/24, 5/31, 6/1, 6/14, 6/15, 6/18, 6/19, 6/22, 6/27, 6/28, 6/29, 7/2, 7/3, 7/4, 7/5, 7/6, 7/9, 7/10, 7/11, 7/12, 7/13, 7/16, 7/17, 7/19, 7/20, 8/1, 8/4, 8/6, 8/8, 8/9, 8/10, 8/13, 8/14, 8/15, 8/16, 8/17, 8/18, 8/20, 8/21, 8/29, 9/3, 9/12, 9/18, 9/21
RR:YB	2011		Morro Bay Sandspit	San Luis Obispo	3/9
VG:PR	2011	F	Morro Bay Sandspit	San Luis Obispo	3/8, 3/12, 3/15, 3/16, 3/19, 3/26
VG:VR	2009 or 2011	F	Morro Bay Sandspit	San Luis Obispo	3/6, 3/7, 3/8, 3/12, 3/15, 9/12, 9/18, 9/21
VG:VW	2011	F	Morro Bay Sandspit	San Luis Obispo	3/7, 3/12, 3/14, 3/19, 4/4, 4/5, 4/10, 4/11, 4/12, 4/17, 4/18, 5/10
VV:GR	2007 or 2012		Morro Bay Sandspit	San Luis Obispo	8/2
B:PR	2010	F	Morro Strand SB	San Luis Obispo	3/6, 3/7
GA:OB	2010	F	Morro Strand SB	San Luis Obispo	3/9, 3/15
PV:PW	2008	M	Morro Strand SB	San Luis Obispo	3/8, 3/9, 3/19, 3/30, 4/6, 4/17, 6/1, 6/6, 6/8, 6/14, 6/16, 6/19, 6/20, 6/22, 6/26, 6/27, 6/28, 7/6, 8/5, 8/6, 8/7, 8/9, 8/10, 8/15, 8/27
RR:YB	2011	F	Morro Strand SB	San Luis Obispo	3/6, 3/19, 3/20
VG:VR	2009 or 2011	M	Morro Strand SB	San Luis Obispo	3/20, 4/5, 4/17
GG:BY	2007		Chevron	San Luis Obispo	8/15
PG:OB	2012		Chevron	San Luis Obispo	8/22
PV:YB	2007 or 2012		Chevron	San Luis Obispo	8/22
RR:WG	2012		Chevron	San Luis Obispo	8/22
VG:AB	2011		Chevron	San Luis Obispo	8/22
VG:PW	2012		Chevron	San Luis Obispo	8/20
VV:BY	2007		Chevron	San Luis Obispo	7/13
BB:RB	2007 or 2010	M	Rancho Guadalupe Dunes County Park	Santa Barbara	5/29
GA:VB	2008 or 2011	M	Rancho Guadalupe Dunes County Park	Santa Barbara	5/29
VG:WB		M	Rancho Guadalupe Dunes County Park	Santa Barbara	5/29
VV:OO	2009 or 2010		McGrath SB	Ventura	7/30, 8/2
VV:YB	2012		McGrath SB	Ventura	8/2
BB:BG	2011		Mandalay SB	Ventura	4/10, 5/4
GG:YY	2011	F	Mandalay SB	Ventura	4/10
RR:AW	2011	F	Mandalay SB	Ventura	4/10, 5/4
GG:RG	2012		Hollywood Beach	Ventura	8/17
RR:AW	2011		Hollywood Beach	Ventura	8/17
RR:GG	2011	M	Hollywood Beach	Ventura	8/3
VV:GG	2009	M	Hollywood Beach	Ventura	4/8

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 2012 (continued).

Band Combination	Year Banded	Sex or Age	Location Seen	County	Dates Seen
BB:RB	2007 or 2010		Point Mugu	Ventura	7/12, 7/30
RR:AR	2010		Point Mugu	Ventura	7/16, 7/23, 7/30
PV:YB	2007 or 2012		Malibu Lagoon SB	Los Angeles	9/27
RR:RB	2012		Bolsa Chica Ecological Preserve	Orange	8/8
RR:YY	2010		Silver Strand SB	San Diego	4/6
GG:YY	2011		Salt Works	San Diego	7/24
GG:YY	2011	F	Tijuana River Mouth	San Diego	4/19, 5/11, 6/14

Appendix E. Addendums to snowy plover nesting success.

Table E.1. Nesting success of snowy plovers at ODSVRA from 2001-12.

For calculation of percent nests hatching, nests with unknown fate or detected only by the presence of brood are excluded. Nests from unknown locations were detected as broods inside the seasonally protected habitat in Southern Exclosure or Oso Flaco. Between 1998-2003, the amount of riding area seasonally closed increased; size has been relatively stable since 2004. In 2003 and 2005, East Boneyard (part of the seasonally closed riding area) was included in the Riding Area category. Beginning in 2006, an additional 0.4 mile of shoreline at the southern end of park has been monitored by 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). In 2012, insufficient information existed to assign seven broods to specific known nests. Unassigned broods are not included in nest, egg, hatching, or chick totals and percentages. Fledglings from unassigned broods are included in totals and percentages, as they likely represent known existing nests. For corrections made to data presented in previous reports, see Appendix H in the 2009 report (CDPR 2009).

Year	Area	No. nests	No. nests with known fate and known location	No. nests hatching	% nests hatching	No. chicks	No. banded or known fate chicks	No. chicks fledged	% known fledged
2001	Arroyo Grande Creek	3	3	3	100	9	9	0	0
	Riding Area	26	25	22	88	65-68	54	1	2
	Oso Flaco	4	2	2	100	6	6	1	17
	Total	33	30	27	90	71-74	69	2	3
2002	Riding Area	33	33	25	76	62	62	35	56
	Oso Flaco	2	2	0	0	0	-	-	-
	Total	35	35	25	71	62	62	35	56
2003	Dune Preserve	1	1	1	100	3	3	0	0
	Riding Area	77	76	55	72	139	138	97	70
	Oso Flaco	13	13	5	38	11	11	7	64
	Pipeline Revegetation	3	3	2	67	4	4	2	50
	Unknown location	1	-	1	-	2	2	2	100
	Total	95	93	63	67	162	159	108	67
2004	Riding Area	114	112	87	78	208	205	59	29
	Oso Flaco	27	27	17	63	40	39	7	18
	Pipeline Revegetation	1	1	1	100	3	3	0	0
	Unknown location	5	-	5	-	12	12	0	0
	Total	147	140	110	75	263	263	66	25
2005	Riding Area	81	81	62	77	148	148	59	40
	Oso Flaco	22	22	18	82	49	49	23	47
	Unknown location	4	-	4	-	7	7	0	0
	Total	107	103	84	78	204	204	82	40
2006	Riding Area	88	85	65	76	173	173	8	5
	Oso Flaco	29	29	22	76	57	57	9	16
	Total	117	114	87	76	230	230	17	7
2007	Riding Area	76	76	61	80	159	157	58	37
	Oso Flaco	15	15	9	60	20	20	4	20
	Unknown location	8	-	8	-	21	21	4	19
	Total	99	91	78	77	200	198	66	33
2008	Riding Area	100	100	73	73	172	172	64	37
	Oso Flaco	19	19	8	42	19	19	5	26
	Unknown location	2	-	2	-	6	6	3	50
	Total	121	119	83	68	197	197	72	37
2009	Pismo Lagoon	1	1	0	0	0	-	-	-
	Riding Area	125	124	86	69	221	221	79	36
	Oso Flaco	23	22	8	36	22	22	2	9
	Unknown location	1	-	1	-	2	2	0	0
	Total	150	147	95	64	245	245	81	33
2010	Carpenter Creek	1	1	0	0	0	0	0	-
	Arroyo Grande Creek	3	3	0	0	0	0	0	-
	Riding Area	127	124	96	77	236	236	88	37
	Oso Flaco	22	22	13	59	33	33	15	45
	Unknown location	2	-	2	-	6	6	4	67
	Total	155	150	111	73	275	275	107	39
2011	Riding Area	142	137	115	84	305	305	130	43
	Oso Flaco	23	23	16	70	40	40	18	45
	Unknown location	7	-	7	-	20	20	4	20
	Total	172	160	138	82	365	365	152	42
2012	Riding Area	197	189	143	76	353	353	85	24
	Oso Flaco	14	14	9	64	21	21	4	19
	Unknown location	5	-	5	-	12	12	2	17
	Unassigned broods	7	-	7	-	19	19	5	26
	Total	216	203	157	75	386	386	96	25

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

Table E.2. Nest protection used at ODSVRA in 2012.

Nest protection used at ODSVRA in 2012. Nests with unknown location and unknown fate nests are excluded. Mini, circular and 10 foot by 10 foot enclosures (10x10) outside of the large seasonal enclosure (shoreline of 6, 7, 8 enclosures, North Oso Flaco and South Oso Flaco) were used in conjunction with symbolic fence. One mini-enclosure in 7 enclosure also received a bumpout. un=unknown predator, av=unknown avian predator, cor=corvid, no=northern harrier, pf=peregrine falcon, coy=coyote, pre=abandoned pre-term, pos=abandoned post-term, ukp=abandoned unknown if pre- or post-term, win=abandoned, suspected wind, fld=flooded, unk=failed, cause unknown.

Area	Large seasonal enclosure					Symbolic fencing				Single nest enclosure
	No additional fencing	Bumpout	10x10	Circular	Mini	No additional fencing	10x10	Circular	Mini	
6 enclosure	70	3	0	0	3	6	0	1	9	
Nests hatched	61 (88%)	2 (67%)			3 (100%)	5 (84%)			7 (78%)	
Nests depredated	5 (1 un, 2 av, 1 no, 1 pf, 1 coy)									
Nests failed other causes	4 (2 pre, 1 ukp, 1 win)	1 (1 win)				1 (1 ukp)		1 (1 fld)	2 (1 pos, 1 ukp)	
7 enclosure	41	0	0	0	2	1	0	1	10	
Nests hatched	27 (66%)				2 (100%)	1 (100%)		1 (100%)	10 (100%)	
Nests depredated	8 (1 un, 2 av, 1 cor, 4 no)									
Nests failed other causes	6 (2 pre, 2 win, 2 unk)									
8 enclosure	7	1	0	0	16	0	0	1	5	
Nests hatched	2 (29%)	1 (100%)			14 (88%)			1 (100%)	3 (60%)	
Nests depredated	3 (1 un, 1 av, 1 cor)									
Nests failed other causes	2 (1 pre, 1 unk)				2 (2 pre)				2 (2 pre)	
Boneyard	3	0	3	2	1	0	0	0	0	
Nests hatched			2 (67%)		1 (100%)					
Nests depredated	2 (1 cor, 1 coy)									
Nests failed other causes	1 (1 win)		1 (1 pre)	2 (1 pre, 1 win)						
SOUTHERN ENCLOSURE TOTALS	121	4	3	2	22	7	0	3	24	
Nests hatched	90 (75%)	3 (75%)	2 (67%)		20 (91%)	6 (86%)		2 (67%)	20 (84%)	
Nests depredated	18 (3 un, 5 av, 3 cor, 5 no, 1 pf, 1 coy)									
Nests failed other causes	13 (5 pre, 1 ukp, 4 win, 3 unk)	1 (1 win)	1 (1 pre)	2 (1 pre, 1 win)	2 (2 pre)	1 (1 ukp)		1 (1 fld)	4 (2 pre, 1 pos, 1 ukp)	
North Oso Flaco	0	0	0	0	2	0	0	0	3	
Nests hatched					2 (100%)				3 (100%)	
Nests depredated										
Nests failed other causes										
South Oso Flaco										
Nests hatched										
Nests depredated										
Nests failed other causes										
OSO FLACO TOTALS	0	0	0	0	2	0	6	3	3	
Nests hatched					2 (100%)		3 (50%)	1 (34%)	3 (100%)	
Nests depredated										
Nests failed other causes							3 (3 pre)	2 (1 pos, 1 win)		
Open riding area										3
Nests hatched										
Nests depredated										1 (1 av)
Nests failed other causes										2 (2 pre)
GRAND TOTAL	121	4	3	2	24	7	6	6	27	3
Nests hatched	90 (75%)	3 (75%)	2 (67%)		22 (92%)	6 (86%)	3 (50%)	3 (50%)	23 (86%)	
Nests depredated	18 (3 un, 5 av, 3 cor, 5 no, 1 pf, 1 coy)									1 (1 av)
Nests failed other causes	13 (5 pre, 1 ukp, 4 win, 3 unk)	1 (1 win)	1 (1 pre)	2 (1 pre, 1 win)	2 (2 pre)	1 (1 ukp)	3 (3 pre)	3 (1 pos, 1 win, 1 fld)	4 (2 pre, 1 pos, 1 ukp)	2 (2 pre)

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA and subsequent substrate use by nesting least terns and snowy plovers and their success.

Wrack

From 29 February to 25 September 2012, approximately 285 cubic yards of wrack were distributed on the exclosure shoreline throughout the season as habitat enhancement. In the winter prior to, and at the beginning of, the 2012 nesting season, wrack was collected from the riding area and distributed in a few large piles in areas east of the shoreline fence to create temporary hummocks within the exclosure.

In 2012, a total of approximately 34,400 wrack-associated invertebrates collected from north of Grand Avenue were inoculated into wrack over a wide area as was done in previous years. The inoculations took place from late March to early May. Late season September 2012 observations indicated the invertebrates were present under fresh wrack throughout the exclosure, similar to last year.

Least tern chick shelters

There were 223 tern chick shelters placed in the 6 and 7 exclosures in 2012 to provide chicks and juveniles with cover from predators and the elements (sun, wind, wind-blown sand).

Plants and seed

Experimental seed plots and planting areas (seeds and plants were not intermixed) were established in the closed exclosure at the start of the 2012 breeding season in an effort to provide areas of scattered vegetation for cover, and to encourage the development of small hummocks that can benefit plovers and terns during the breeding season. The focus of the experiment was 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. A total of 255 pounds of unprocessed seed from native dune species was distributed and raked into the plots prior to expected rains. Seed included 115 pounds of sea rocket (*Cakile maritima*), 65 pounds of beach bur (*Ambrosia chamissonis*) and sand verbena (*Abronia maritima*) mixture, 50 pounds of beach bur, 20 pounds of sand verbena, and five pounds of beach saltbush (*Atriplex leucophylla*). The plots were generally square to rectangular shaped, 4,000 to 18,000 square feet in size, and were completely bare of plants at the time of seeding. Seventeen total seed plots were installed from January to March 2012. Of those, eleven were on the shoreline (west of the west fence) (eight in 6 exclosure and three in 7 exclosure) and six were east of the west fence (three in each 6 and 7 exclosures) (Figure F.1). The seed plots were evaluated in September 2012 and, overall, 11 plots had good vegetative growth, with approximately five to 10% vegetative cover, and were considered successful. The shoreline had nine plots with good plant growth, while only two plots had good plant growth east of the west fence. All the eight plots with wrack present had good plant growth, including two plots east of the west fence. Although putting seed out prior to the exclosure closing on 1 March helped to increase the amount of seed that could be distributed, the March seed plots generally had greater success; six of the seven March plots had good plant growth compared to five of 10 of the January and February plots. Plants from all of the species of seed distributed were observed at the end of the season, except beach saltbush plants; however, only a small amount of this seed was distributed in three of the plots. Six rectangular shaped control plots of approximately 560 square feet were not seeded or planted. Three plots

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

(one on shoreline and two east of the west fence) were located in each of 6 and 7 exclosures. All of the control plots either had no plants at the end of the season or small seedlings providing less than one percent cover (Figure F.2).

Approximately 600 potted container plants were installed in three large experimental areas and were separate from the seeding plots. The planting areas were located on the mid-6 exclosure shoreline, east of the west fence within 6 exclosure, and east of the west fence within 7 exclosure (Figure G.1). Plants were dispersed in clusters within the approximately 1,000 to 1,500 square foot planting areas. The planting areas were bare of plants, except the two areas east of the west fence had a few scattered sea rocket plants growing. The shoreline planting area received 24 beach saltbush plants, 11 beach bur plants, and 200 sea rocket plants. Fresh wrack was piled at the west side of planting areas as part of the experiment. The 6 exclosure area received 116 beach evening primrose (*Camissonia cheiranthifolia*) plants and 83 dune mint (*Monardella crispa*) plants, with plants placed on the east side of wood logs or wrack. The 7 exclosure planting area received 114 beach evening primrose, 47 dune mint, and six beach bur plants, with plants placed east of wood logs or sea rocket plants already present in the planting area. The majority of the plant pots were small (2.25 inches square and five inches deep) and the plants were in the seedling stage (less than three inch tall). The beach bur and beach saltbush plants were slightly larger and in five inch square pots. Plants were installed prior to a rain event in mid-March. Within a week, most of the larger sized beach bur and saltbush plants were alive and had grown in size, but the smaller sized sea rocket, dune mint, and beach evening primrose were dry and did not survive. By the end of the season, a large number of the beach saltbush and beach bur planted on the shoreline had formed large hummocks of approximately one foot in height and plants were from two to four foot wide (Figure F.3). The beach bur planted within the 7 exclosure were also large and had formed hummocks. Only a few beach evening primrose planted within the exclosure survived but were still small in size with very little root system development and no dune mint survived.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

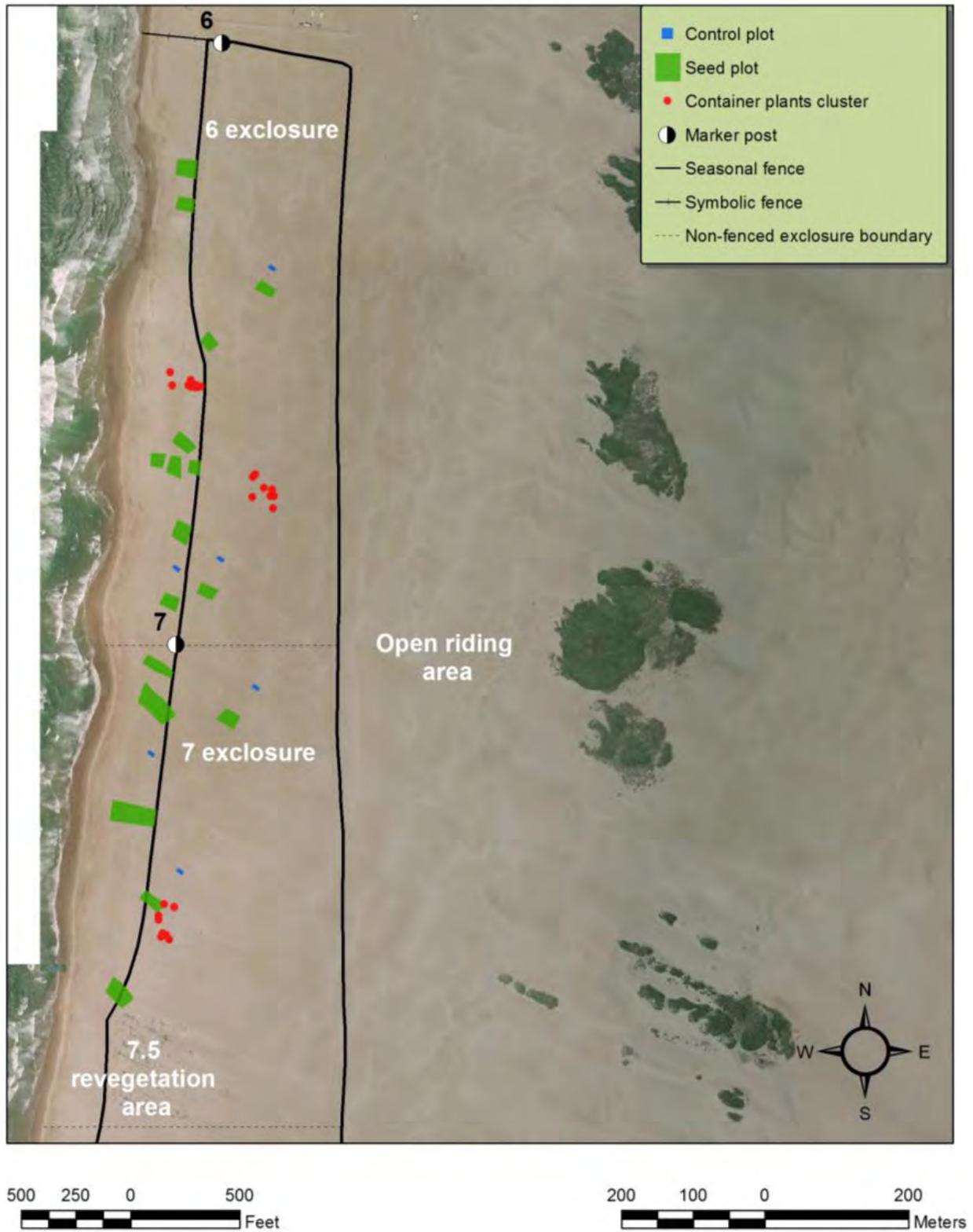


Figure F.1. Map of seeding and planting locations for 2012.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).



Figure F.2. Photos taken at the beginning and at the end of the 2012 breeding season of an experimental seed plot located on the shoreline of southern 6 exclosure.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).



Figure F.3. Photos taken at the beginning and at the end of the 2012 breeding season of an experimental plant plot located on the shoreline of 6 exclosure.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

Woodchips

Wind and shifting sand altered the amount and composition of surface substrates over the course of the season, exposing and covering debris and woodchip patches from this and earlier years. The amount of woodchip coverage was estimated quantitatively when the material was distributed at the beginning of the season. In all years when woodchips were added, bare sand substrate was extensive throughout the 6, 7 and 8 exclosures during the breeding season, while woodchip substrate was estimated to cover less than 15% of this area.

Substrate availability and use by snowy plovers and least terns

In 2012, 158 (out of 185) plover nests found in the 6, 7, and 8 exclosures were within the woodchip addition area and had formal substrate sheets (Figure F.10) completed while still active. Areas that were below the upper high tide line, and less than 100 feet from the open riding area, were excluded from this analysis because: 1) they have never received woodchip patches, and 2) the likelihood of nesting is reduced below the upper high tide line as well as in close proximity to the boundary with the open riding area. Nests were assigned to a category (assorted debris, bare sand, vegetation, or woodchips) based upon the one meter by one meter assessment, centered upon the nest, in the formal substrate sheet. The bare sand category represented nests wherein bare sand constituted greater than 90% of the coverage. Vegetation required either the nest was in substantial live vegetation or the vegetation coverage in the area was 10% or greater. Assorted debris were any combination of non-woodchip debris that constituted 10% or greater substrate cover. Woodchips had to stand alone as 10% or greater, and be the higher percentage if another category also held a substantial percentage greater than 10%.

Of the 158 nests, 56 (35%) were found in woodchip substrate, 47 (30%) in assorted debris (both natural and human litter other than material brought in as enhancement), 53 (34%) in bare sand, and two (1%) in vegetation (Figures F.4 and F.5). This is slightly lower than the average for nests found in woodchips from 2008-11 (41%).

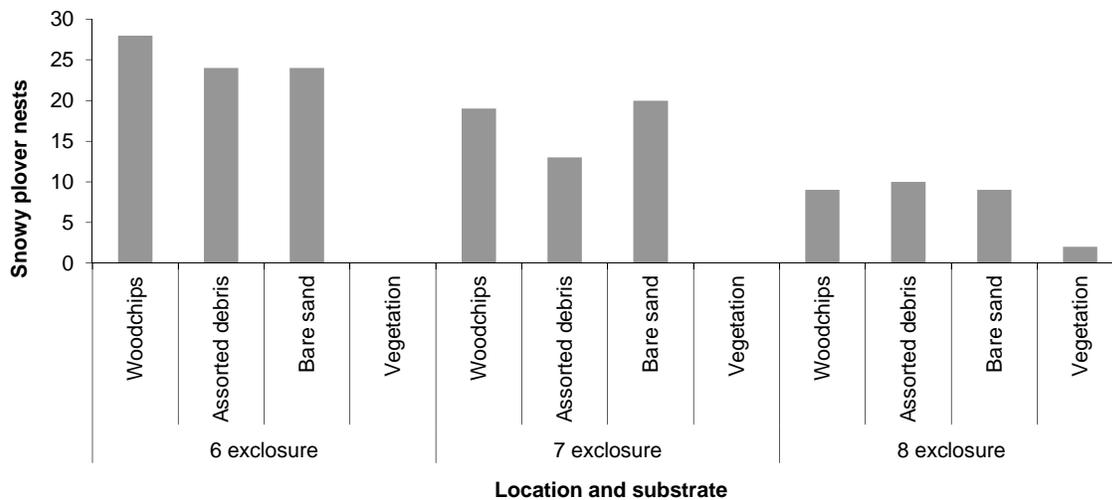


Figure F.4. Total number of snowy plover nests established in each substrate (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA in 2012.

Only nests (n=158) with determined substrates within the woodchip distribution area in the Southern Exclosure are included.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

Of the 56 snowy plover nests in woodchip debris in 2012, 64% hatched (Figure F.5), 20% were depredated, 9% were abandoned (two abandoned pre-term, one abandoned with wind as suspected cause, two abandoned unknown if pre- or post-term), 4% failed to unknown cause, and 4% had an unknown fate. In prior years, nests in woodchips had a higher hatch rate than those in other categories, but this year these nests had a lower hatch rate. For 47 nests in assorted debris, 79% hatched, 2% were depredated, 11% were abandoned (four abandoned pre-term, one abandoned unknown if pre- or post-term), 2% overwashed by tide, and 6% had an unknown fate. Of the 53 plover nests in bare sand substrate, 79% hatched, 6% were depredated, 11% were abandoned (three abandoned pre-term, two abandoned with wind as suspected cause, one abandoned post-term), 2% failed to unknown cause, and 2% had an unknown fate. Both nests in vegetation hatched (100%). Mini-exclosures and 10 foot by 10 foot exclosures can increase hatch rates when used, but nests receiving this additional protection were not addressed separately in this analysis of substrate hatching success. In 2012, less than 25% of nests in the 6, 7, and 8 exclosures received a mini-exclosure or 10 foot by 10 foot exclosure and nest substrate was not a factor in their selection.

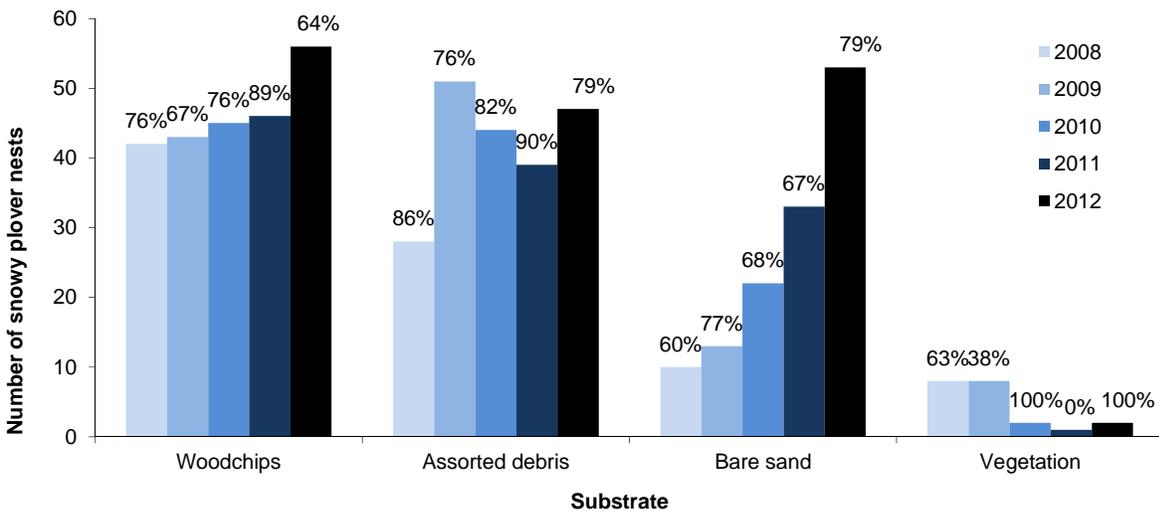


Figure F.5. Number and percentage of snowy plover nests hatching per the total number of nests in each substrate (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA in 2008-12.

The overall hatch rate for all nests within the woodchip distribution area in the 6, 7, and 8 exclosures with formally defined substrates (Figure F.6) was 74% in 2012 and compares to an average of 77% for 2008-11. Nests in woodchips had a 64% hatch rate, compared to an average of 77% for 2008-11, while assorted debris had a 79% hatch rate, compared to 83% for 2008-11. Nests in bare sand had a 79% hatch rate, which was higher than the average of 68% for 2008-11 (Table F.1). Even though bare sand accounts for approximately 89% of the Southern Exclosure (based upon results from substrates at random points), only 11% of the Southern Exclosure’s plover nests were in bare sand in both 2008 and 2009, 19% in 2010, 28% in 2011, and 34% in 2012; the higher rate in 2011-12 reflects the change in substrate collection methods (set minimum substrate at 10%, anything lower counted as bare sand).

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

Table F.1. Nest numbers and fates (hatched, depredated, abandoned) for different substrates (woodchips, assorted debris, bare sand, and vegetation) in 6, 7, and 8 exclosures at ODSVRA from 2008-12.

Only nests within the woodchip distribution area in the Southern Exclosure are included. %H = percent hatched, %D = percent depredated, %A = percent abandoned. All other nest fates (i.e. failed, cause unknown, unknown fate, overwash, etc.) not included.

Year	Location	Woodchips				Assorted debris				Bare sand				Vegetation				Total No. nests
		No. nests	%H	%D	%A	No. nests	%H	%D	%A	No. nests	%H	%D	%A	No. nests	%H	%D	%A	
2008	6 excl	13	77	8	15	17	94	0	6	3	67	0	33	0	-	-	-	88
	7 excl	16	94	0	0	5	100	0	0	4	75	25	0	6	50	0	50	
	8 excl	13	54	15	15	6	50	0	17	3	33	0	67	2	100	0	0	
	Total	42	76	7	10	28	86	0	7	10	60	10	30	8	63	0	38	
2009	6 excl	20	70	15	5	18	100	0	0	3	100	0	0	0	-	-	-	115
	7 excl	12	92	0	8	19	79	11	5	2	50	0	50	2	50	0	50	
	8 excl	11	36	45	9	14	43	36	14	8	75	0	13	6	33	67	0	
	Total	43	67	19	7	51	76	14	6	13	77	0	15	8	38	50	13	
2010	6 excl	21	81	5	14	23	91	0	4	14	71	14	14	0	-	-	-	113
	7 excl	17	76	12	12	8	88	13	0	6	67	0	33	0	-	-	-	
	8 excl	7	57	14	14	13	62	8	23	2	50	50	0	2	100	0	0	
	Total	45	76	9	13	44	82	5	9	22	68	14	18	2	100	0	0	
2011	6 excl	20	90	0	5	23	100	0	0	15	53	0	27	0	-	-	-	119
	7 excl	17	100	0	0	9	100	0	0	9	89	0	11	0	-	-	-	
	8 excl	9	67	11	11	7	43	57	0	9	67	0	22	1	0	0	100	
	Total	46	89	2	4	39	90	10	0	33	67	0	21	1	0	0	100	
2012	6 excl	28	71	11	14	24	79	0	4	24	88	4	8	0	-	-	-	158
	7 excl	19	63	32	0	13	77	8	15	20	75	5	10	0	-	-	-	
	8 excl	9	44	22	11	10	80	0	20	9	67	11	22	2	100	0	0	
	Total	56	64	20	9	47	79	2	11	53	79	6	11	2	100	0	0	
Grand total		232	74	12	9	209	82	7	7	131	73	5	17	21	57	19	24	593

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

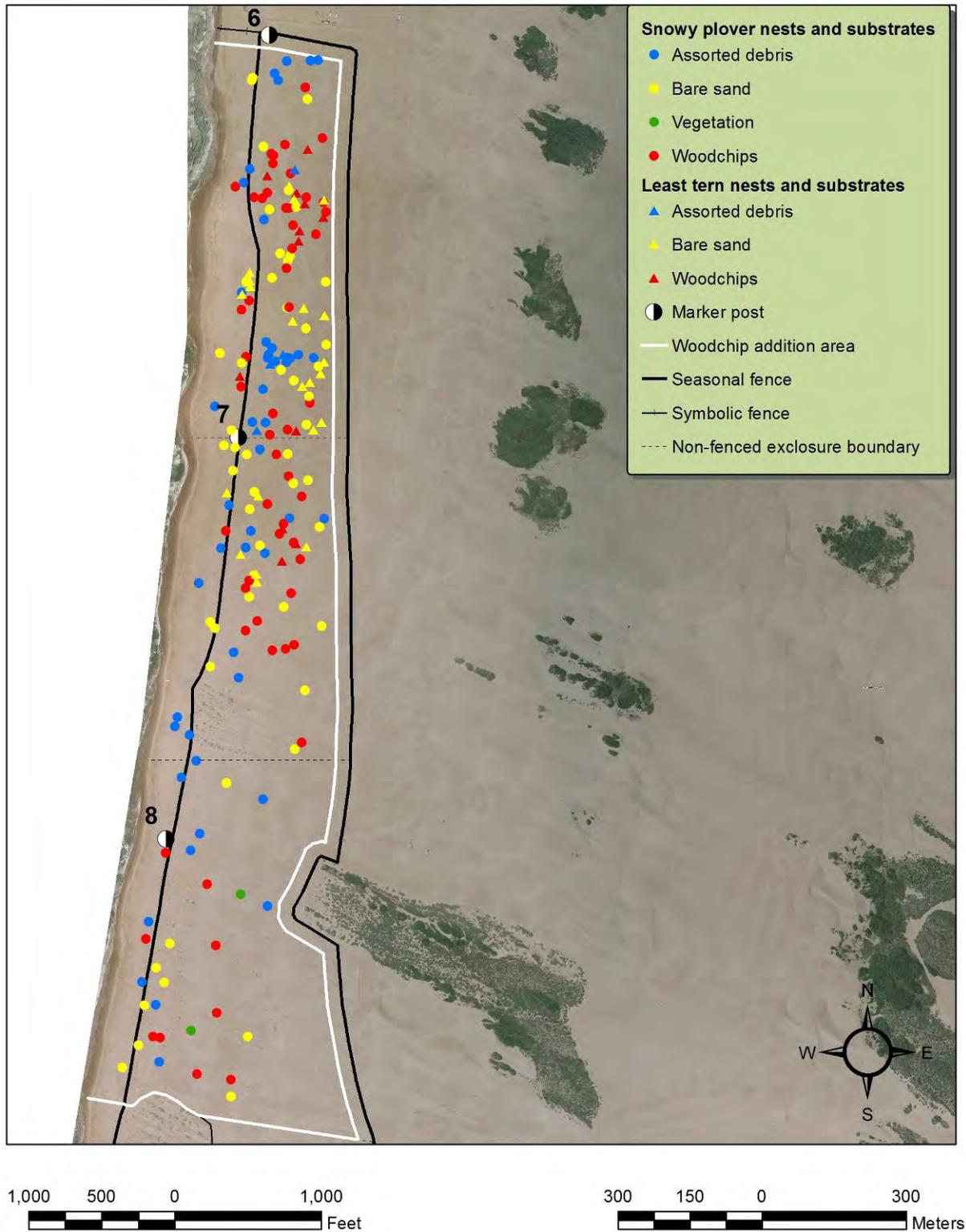


Figure F.6. Nest substrates of least terns and snowy plovers in 6, 7, and 8 exclosures at ODSVRA in 2012.

Only those nests in the woodchip addition area and with formal assessments on nest substrate forms conducted while the nests were active are included in this map: 158 plover nests and 38 tern nests in 2012.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

Of the 38 least tern nests located in the woodchip addition area with formal substrate assessments in 2012, 12 (32%) were in woodchips, four (11%) in assorted debris, and 22 (58%) in bare sand. For those least tern nests in woodchip debris, 75% hatched, 8% were abandoned (one abandoned post-term), and 17% had an unknown fate. Of nests in assorted debris, 75% hatched and 25% were abandoned (one abandoned pre-term). In bare sand, 64% hatched, 14% were abandoned (one abandoned post-term, two abandoned unknown if pre- or post-term), and 5% failed to unknown cause (Figures F.6, F.7 and F.8).

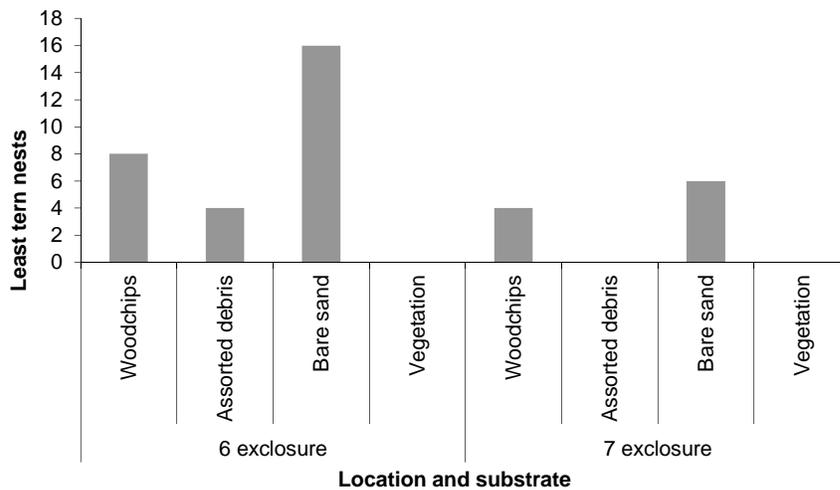


Figure F.7. Total number of least tern nests established in each substrate (woodchips, assorted debris, and bare sand) in 6 and 7 exclosures at ODSVRA in 2012.

No least terns nested in 8 exclosure. Only nests (n=38) within the woodchip distribution area in the Southern Exclosure and with identified substrates are included.

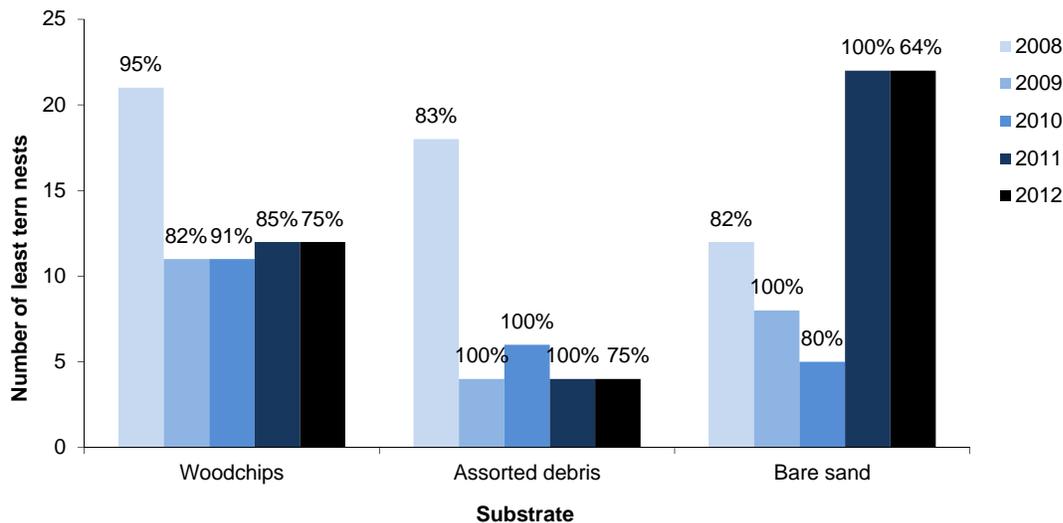


Figure F.8. Number and percentage of least tern nests hatching per the total number of nests in each substrate (woodchips, assorted debris, and bare sand) in 6, 7, and 8 exclosures at ODSVRA from 2008-12.

The increase in bare sand nests in 2011-12 reflected a trend showing increased tern nesting over time and the change in substrate category assignment that required greater than 10% coverage for assignment and defaulted to bare sand.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

The same substrate categorization criteria were used for a set of randomly generated points (in ArcMap 10) in 6, 7, and 8 exclosures, collected at the end of the season (prior to the exclosure’s removal). The random points (92 total in the woodchip addition area) give a snapshot of the substrates available in the exclosure, while the nest points (196 total nests including least tern and snowy plover nests in the woodchip addition area) give an indication of substrate selection by plovers and least terns while nests were still active (Table F.2). Of the available habitat (as revealed by random points), both plovers and terns showed a preference for areas with higher substrate or woodchip cover. In 2012, a greater proportion of snowy plover nests (66%) occurred in substrate patches than would be expected if they nested at random (11%); this is demonstrated in the high percentage of random points with substrate cover at low percentages, indicating bare sand. Least terns showed a similar, but less pronounced preference (42%). Since woodchips are the only substrate that management is currently distributing on a large basis, many of these nests occurred in woodchip patches with a density greater than 10%. While the woodchip patches and assorted debris provide nesting substrate attractive to plovers, it is important to note they do not provide chicks with the cover and shelter that is available with larger material such as driftwood, wrack, plants, and vegetated hummocks.

Table F.2. The percentage occurrence of random points, snowy plover, and least tern nests for all substrates except bare sand for the 6, 7, and 8 exclosures in 2012.

Greater than 10% substrate coverage over bare sand within one meter by one meter of the nest or point was required to be included in a substrate category. All substrate includes the maximum value in all categories other than bare sand while woodchips looks specifically at the contribution of woodchips to the one meter by one meter area. The sample size of random points, snowy plover nests, and least tern nests is shown in parentheses.

Exclosure	Woodchips, assorted debris, and vegetation combined			Woodchips		
	Random points	Snowy plovers	Least terns	Random points	Snowy plovers	Least terns
6	12% (33)	68% (76)	43% (28)	3% (33)	37% (76)	29% (28)
7	10% (29)	62% (52)	40% (10)	3% (29)	37% (52)	40% (10)
8	10% (30)	70% (30)	-	7% (30)	30% (30)	-
Total	11% (92)	66% (158)	42% (38)	4% (92)	35% (158)	32% (38)

In further analysis, the total percentage of bare sand in a one meter by one meter area centered on the point of interest (nest or random point) was averaged and standard error of the mean was calculated. To make the comparisons more accurate, only the random points in the 6 and 7 exclosures were averaged to compare to the least tern mean, while all random points were averaged to compare to the snowy plover mean (Table F.3, Figure F.8). Interestingly, the averages for random points including and excluding 8 exclosure were nearly identical (96.04% and 96.35% respectively). The average amount of bare sand around snowy plover nests (83%) was 13% lower than the average for the random points (96%). The least tern nests (90%), on average, had 6% less bare sand (alternately, 6% more substrate) than random points in 6 and 7 exclosures (96%).

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

Table F.3. The mean, median, mode, standard error, and standard deviation for all random points, snowy plover nests and least tern nests in the woodchip distribution area in 2012.

Statistic	Snowy plovers	Random points in 6, 7, and 8 exclosures	Least terns	Random points in 6 and 7 exclosures
Mean	83.35	96.04	90.32	96.35
Standard error	0.97	0.72	1.29	0.66
Median	85	98	92.5	98
Mode	90	99	96	99
Standard deviation	12.22	6.88	7.94	5.20
Count	158	92	38	62

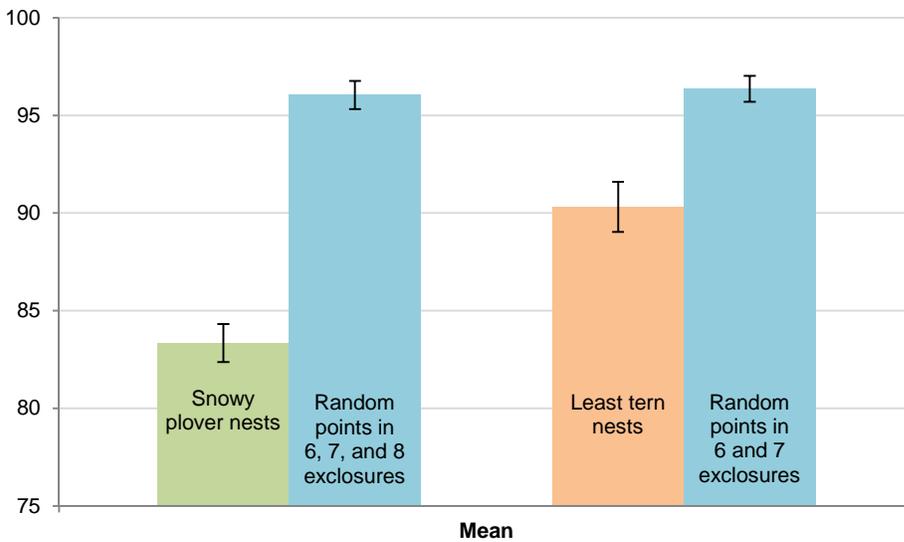


Figure F.9. The mean of the value for bare sand coverage in the one meter by one meter area centered around the random points, snowy plover nests, and least tern nests in 2012.

For comparison purposes, only random points from the 6 and 7 exclosures were included to compare to least tern substrates.

Appendix F. Habitat enhancement actions in 6, 7, and 8 exclosures at ODSVRA (continued).

ODSVRA Nest Data - Location and Substrate							Date/ Initials:			PERCENT TOTAL SUBSTRATE OTHER THAN SAND: (Please fill out at nest) # Photos taken? Definitions: Habitat Type Altered: ORA and seasonally closed area, starts w/ limited disruptive cover. Enhanced in patches with woodchips, driftwood, wrack, least tern shelters, seed and plants (6, 7, 8, BY). Beach: Waterline to foredunes. Foredunes: Slightly asymmetric ridge a bove beach high tide line. Forms from sand accumulating in sparse vegetation. Back Dunes: Vegetated dune landward of the foredunes. Sand Sheet: Featureless area of sand, usually east of foredunes or stable dunes. Hummocks: Vegetated hummocks not associated with foredunes. * Species List (circle all that apply) CAMA: sea rocket (<i>Cakile maritima</i>) AMCH: beach bur (<i>Ambrosia chamissonis</i>) ABMA: sand-verbena (<i>Abronia maritima</i>) ATLE: saltbush (<i>Atriplex leucophylla</i>) Topographic Relief Flat: surface is overall flat Concave: Surface is overall bowl formation Convex: Surface is overall hill formation Undulating: Surface has hummocks.
Nest number:		Species: SNPL LETE		Nest exclosure (Note if in 7.5):						
Habitat Type (circle all that apply):		Altered Sand		Marker:						
Beach		Foredune Sheet		Stable Dune Hummocks			Est. dist. to foredune (OF):			
							Est. dist. to nearest active nest (office):			
Nest bowl substrate: Sand Gravel Woodchip Shell Glass Cinder Vegetation Other:										
In the table below: PC column: Percent cover and a blank box means not present. Discrete Column: is checked if the material is in a discrete area of quadrat. Parks column: is checked if it is known habitat enhancement by parks.										
Substrate		1m X 1m			5m X 5m			25m X 25m		
Wood material		PC	Discrete	Parks	CC	Discrete	Parks	Similar to 5 X 5? Y N		
Woodchips (Parks)								Distinctive features or differences:		
Logs (Parks)										
Natural Wood										
Veg. height & species		PC	Discrete	Parks	CC	Discrete	Parks			
low (?1")										
medium (>1" and ?12")										
high (>12")										
Species List* (circle all that are present)		CAMA	AMCH	ATLE	CAMA	AMCH	ATLE			
		ABMA	other		ABMA	other				
Wrack		PC	Discrete	Parks	CC	Discrete	Parks			
Wrack										
Other natural substrate		PC	Discrete		CC	Discrete				
Sand (0.0025-0.08in)										
Rocks										
Shell										
Dead vegetation										
Other:										
Human misc. debris		PC	Discrete		CC	Discrete				
Misc debris (glass, metal, plastics, cinders, etc)										
Topographic Relief (circle one)		Flat	Concave	Convex	Flat	Concave	Convex	Flat	Concave	Convex
		Undulating (height ___)			Undulating (height ___)			Undulating (height ___)		
Notes:										

Figure F.10. Field sheet for substrate collection at nests and random points, 2012.

Appendix G. Predator summary tables and figures.

Table G.1. Summary of predators detected in the Southern Enclosure and Oso Flaco at ODSVRA in 2012.

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). Max no. individ. = maximum number of different individuals identified during one day. This number was not typically 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	Max no. individ.	Notes
Mammals					
Bobcat	8 Mar	31 Aug	7	-	Tracks primarily encountered in Boneyard. Also noted in 8 enclosure, North Oso Flaco, and South Oso Flaco.
Coyote	8 Mar	10 Sep	119	-	Common on the Southern Enclosure shoreline and North Oso Flaco shoreline. Noted inside the predator fencing of the Southern Enclosure on 57 days.
Domestic dog	3 Mar	11 Aug	2	-	Documented by tracks and live sightings. Two occurrences on 6 enclosure shoreline, three occurrences in South Oso Flaco, and one occurrence on 7 enclosure shoreline.
Opossum	11 Mar	31 Aug	25	-	Majority of activity in 6, 7 and 8 enclosures. Occasionally occurring in South Oso Flaco, North Oso Flaco, and Boneyard.
Raccoon	3 Mar	10 Sep	137	-	Highest occurrence in 8 enclosure. Less frequently noted in South Oso Flaco, North Oso Flaco, 6, and 7 enclosure, (especially near 7.5 revegetation area).
Skunk	13 Mar	7 Sep	19	-	Majority of activity in 6, 7 and 8 enclosure. Less frequently noted in North Oso Flaco and Boneyard.
Avian					
Osprey	18 Mar	7 Sep	44	4	Although not documented as a predator of plovers and least terns, ospreys are included in this table due to their disturbance when perched for longer periods of time in sensitive areas. Primarily observed flying over the shoreline and North Oso Flaco. Also seen at Oso Flaco Creek. Occasionally perching on the Southern Enclosure shore and fence during the later part of the season. Four individuals seen at one time on 25 September.
Northern harrier	2 Mar	10 Sep	47	3	Typically observed flying over South Oso Flaco. Frequent sightings flying in 6, 7, and 8 enclosures between 2 May and 12 May. Almost all observations in flight. Minimum of seven individuals (based on age and sex characteristics) observed during this season: three adult males, two adult females, and two juveniles (one identified as female).
Cooper's hawk	14 Aug	14 Aug	1	1	Seen once at Oso Flaco Lake.
Red-tailed hawk	27 Mar	10 Sep	74	3	Observed most often perched at north end of North Oso Flaco. Also many observations in South Oso Flaco as well as perched in 8 enclosure and 7.5 revegetation area. Minimum of four individuals (based on age characteristics) observed during this season: one adult male, one adult female, one subadult, and one juvenile.
American kestrel	12 Jul	7 Sep	10	2	Seen in 6, 7, and 8 enclosures and North Oso Flaco. Observed in flight and perch hunting. Minimum of three individuals (based on age and sex characteristics) observed during the season.

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

Table G.1. Summary of predators detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2012 (continued).

Species	First date observed	Last date observed	No. days detected	Max no. individ.	Notes
Avian					
Merlin	15 Mar	10 Sep	5	1	Observed in 6, 7 and 8 exclosure and North Oso Flaco.
Prairie falcon	20 Aug	20 Aug	1	1	One sighting of a banded bird in 7 exclosure feeding on a small prey item.
Peregrine falcon	6 Mar	3 Sep	52	2	Observed throughout the Southern Exclosure, North Oso Flaco and South Oso Flaco in flight and perching, sometimes over an extended time period. Multiple observations pursuing and/or consuming prey on the shoreline and inside the exclosure. Two plover chicks and one plover nest depredated by peregrine falcon. Minimum of six individuals (based on age characteristics) observed during this season: one adult male, one adult female, one subadult male, one subadult female, and two juveniles.
Large owl spp.	4 Mar	10 Sep	53	2	Primarily identified by tracks. Most tracks believed to be from great horned owl. Primarily noted inside the Southern Exclosure. Also seen in Boneyard and South Oso Flaco. Less frequently noted in 6 and 7 exclosures.
Gull spp.	Present daily throughout season				The maximum number of gulls in the Southern Exclosure and Oso Flaco was recorded during the month of September. Includes birds in flight, foraging on shoreline, and roosting.
Loggerhead shrike	29 Jun	10 Sep	11	1	Observed in South Oso Flaco, North Oso Flaco, and Boneyard. One seen perching on east fence of 8 exclosure. Minimum number of 10 individuals based on number trapped and observations after trapping.
American crow	8 Mar	22 Jul	5	3	Observed primarily flying over South Oso Flaco. Also seen flying over 7 and 8 exclosure on 18 March and 18 June.
Common raven	16 Mar	2 Jul	14	3	Observed primarily over South Oso Flaco, North Oso Flaco, Boneyard, and 8 exclosure. Several observations flying over 6 and 7 exclosures. All observations of birds in flight.
Corvid spp.	19 Jun	22 Jul	3	-	Tracks present at three depredated plover nests. Brief observations flying over 7 and 8 exclosures. Corvid spp. refers to crow or raven.

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

Table G.2. Mammalian and avian predators removed under predator management actions for least terns and snowy plovers at ODSVRA in 2012.

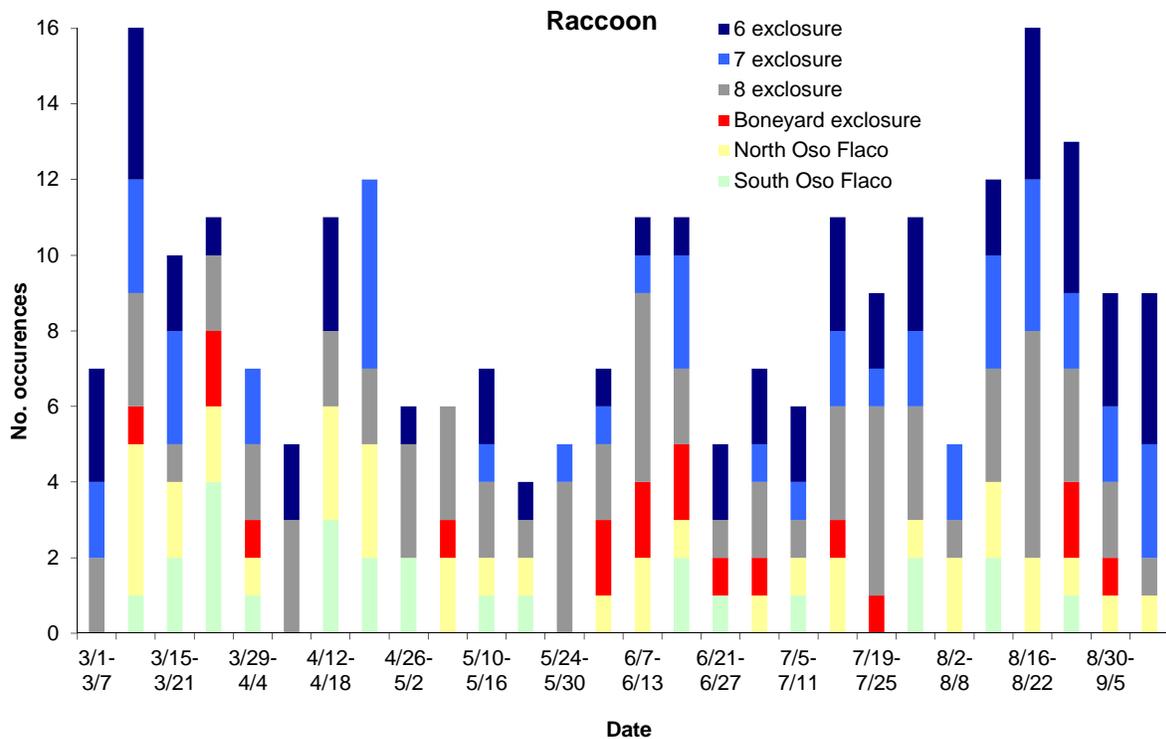
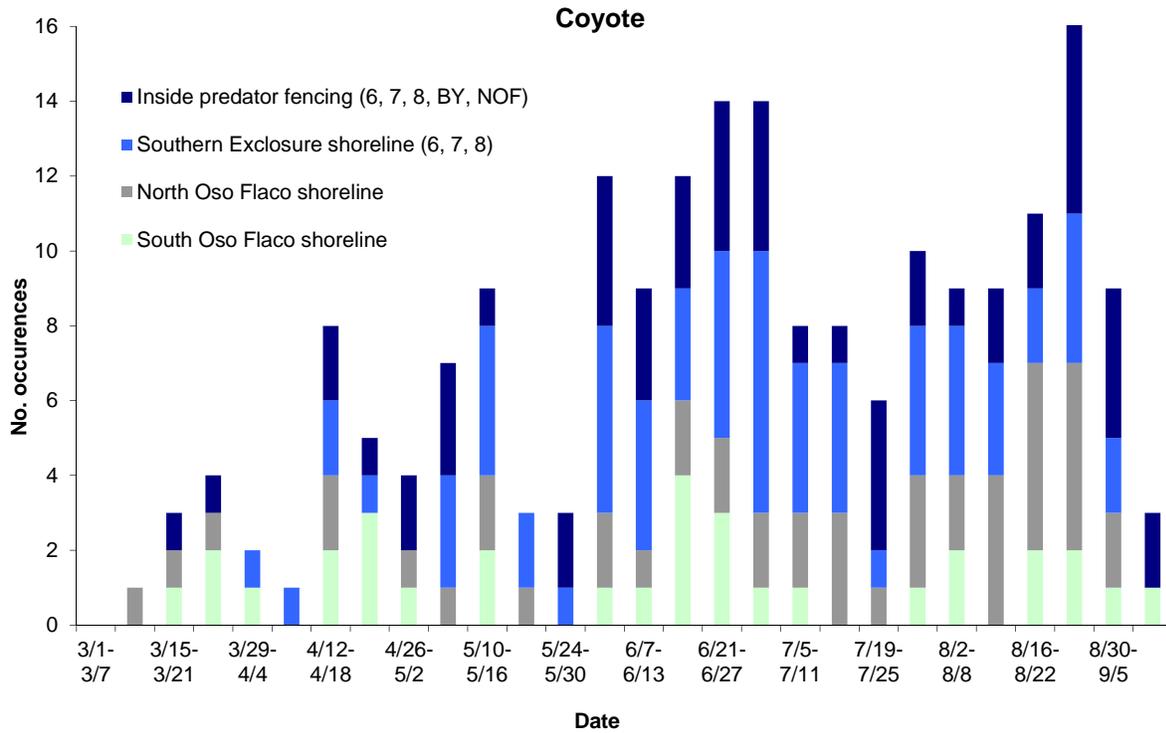
Eleven coyotes, six raccoons, and one northern harrier were lethally removed. All other animals were live-trapped and relocated. All animals trapped or removed were within ODSVRA boundaries.

Date	Species	Age/Sex	Location
Mammals			
15 May	coyote	female	Boyscout
15 May	coyote	male	South Oso Flaco
17 May	coyote	male	East Boneyard
30 May	coyote	female	Boyscout
5 Jun	coyote	male	South Oso Flaco
13 Jun	coyote	male	Boneyard enclosure
14 Jun	coyote	male	South Oso Flaco
20 Jun	coyote	male	South Oso Flaco
27 Jun	coyote	female	South Oso Flaco
29 Jun	coyote	male	South Oso Flaco
31 Jul	coyote	male	South Oso Flaco
31 Jul	raccoon	male	South Oso Flaco
31 Jul	raccoon	female	South Oso Flaco
1 Aug	raccoon	female	South Oso Flaco
8 Aug	raccoon	male	South Oso Flaco
14 Aug	raccoon	female	8 enclosure shoreline
17 Aug	raccoon	female	8 enclosure shoreline
Avian			
6 Feb	American kestrel	adult male	North Oso Flaco
16 Feb	loggerhead shrike	adult	South Oso Flaco
7 Mar	American kestrel	adult male	Dune Preserve
6 Apr	northern harrier	adult male	Oso Flaco Lake
18 Apr	great horned owl	adult female	Pipeline revegetation area
30 Apr	great horned owl	adult female	Maidenform revegetation area
12 May	northern harrier	adult male	Open riding area, east of 6 enclosure
23 May	peregrine falcon	sub-adult female	7 enclosure shoreline
30 May	great horned owl	adult male	North Oso Flaco
29 Jun	loggerhead shrike	juvenile	North Oso Flaco
12 Jul	loggerhead shrike	juvenile	North Oso Flaco
16 Jul	loggerhead shrike	juvenile	Tabletop revegetation area
24 Jul	barn owl	adult	Pipeline revegetation area
24 Jul	barn owl	adult	Pipeline revegetation area
26 Jul	loggerhead shrike	juvenile	North Oso Flaco
3 Aug	loggerhead shrike	juvenile	North Oso Flaco
6 Aug	loggerhead shrike	juvenile	North Oso Flaco
13 Aug	loggerhead shrike	juvenile	Pipeline revegetation area
14 Aug	loggerhead shrike	juvenile	North Oso Flaco

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

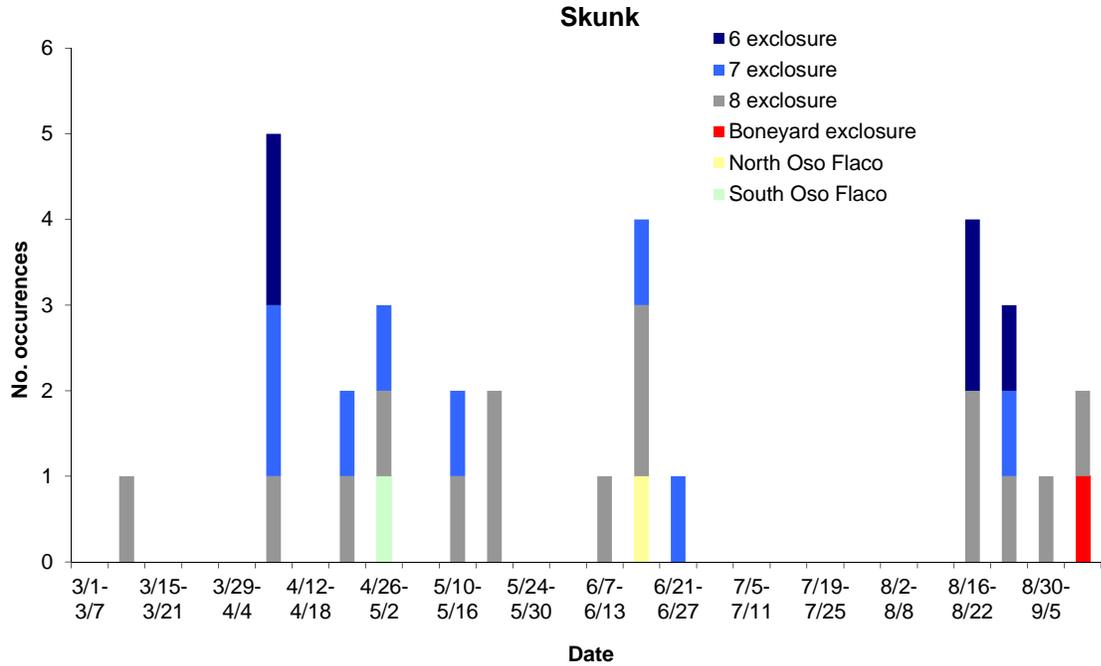
Figure G.1. Mammalian occurrences documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2012.

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



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

Figure G.1. Mammalian presence documented in the Southern Enclosure and Oso Flaco at ODSVRA in 2012 (continued).



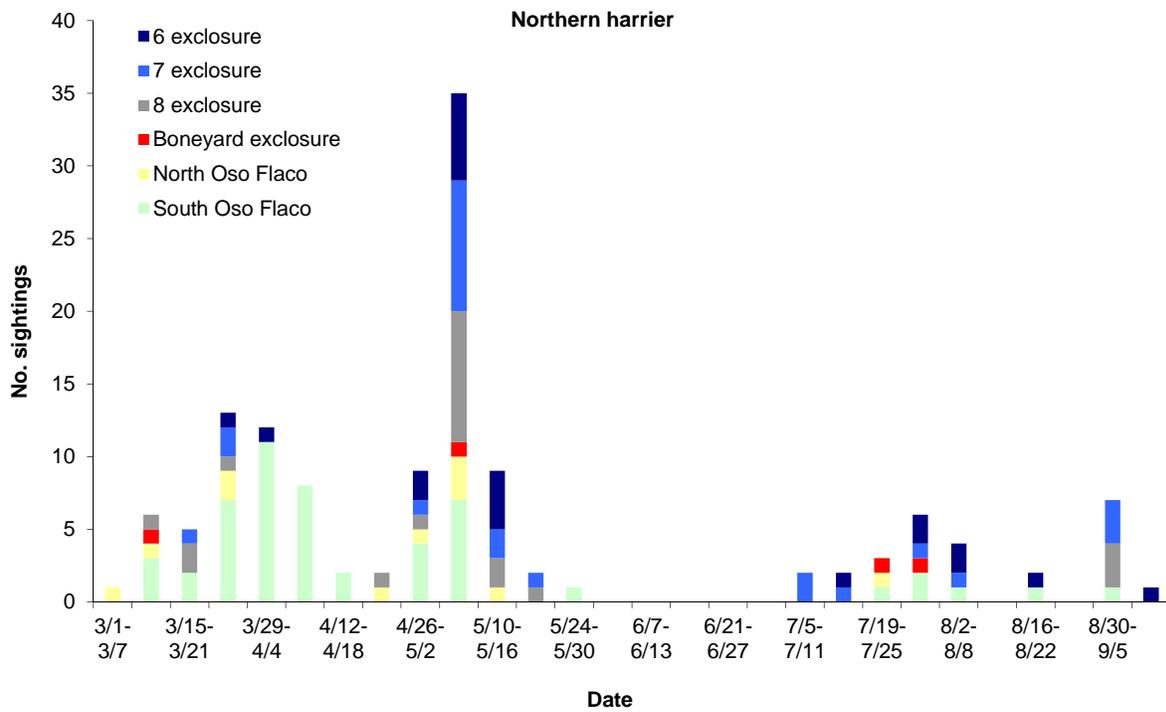
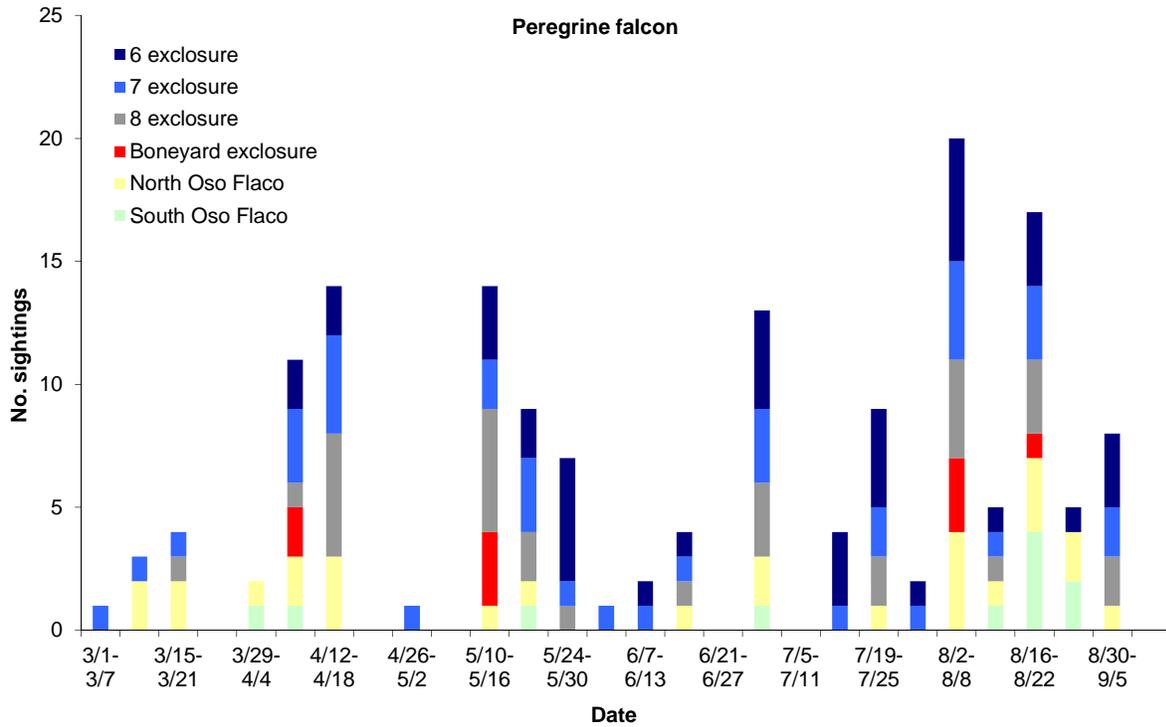
Coyote presence is documented for the Southern Enclosure shoreline (6, 7, and 8 enclosures), North Oso Flaco shoreline, South Oso Flaco shoreline, and inside the predator fencing of the Southern Enclosure (6, 7, 8, Boneyard, and North Oso Flaco) as separate occurrences. For the Southern Enclosure (6, 7, 8, and Boneyard enclosures) and North Oso Flaco, a distinction is made between the shoreline and inside the predator fencing of the enclosures because coyotes are typically excluded from the area protected by predator fencing.

Raccoon and skunk 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. For raccoon and skunk, 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 and some skunks are able to walk through the two by four inch mesh fencing.

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

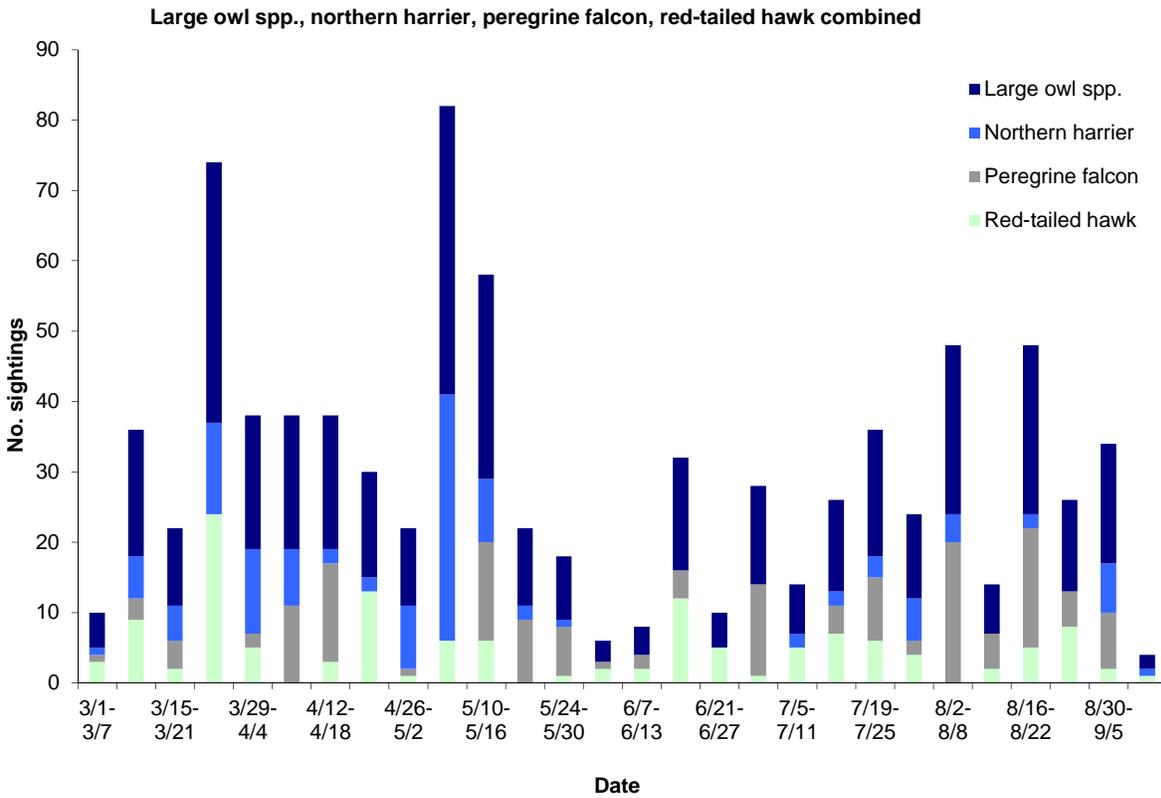
Figure G.2. Avian predator sightings documented in the Southern Enclosure and Oso Flaco at ODSVRA in 2012.

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



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

Figure G.2. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2012 (continued).



Appendix H. Documented mortality of California least tern and snowy plover chicks, juveniles, and adults at ODSVRA from 1 March to 30 September 2012.

Table H.1. Documented predation of least terns.

No. (age)	Predator	Location	Notes
1 (fledgling or near-fledgling)	Peregrine falcon	6 enclosure	On 31 July, a peregrine falcon was observed inside 6 enclosure with prey. Remaining feathers from prey collected and determined to be from a least tern (fledgling or near fledgling).
1 (likely juvenile)	Unknown avian	6 enclosure	On 11 August, feather remains and a bicolor B/W aluminum band used to band terns at ODSVRA were found inside 6 enclosure. The feathers collected were from a least tern (likely juvenile).
1 (unknown)	Coyote	east of southern North Oso Flaco	On August 9, coyote scat was found east of the southern portion of North Oso Flaco. One bicolor B/W aluminum band used to band least terns at ODSVRA was found.

Table H.2. Documented predation of snowy plovers.

No. (age)	Predator	Location	Notes
1 (chick)	Northern harrier (adult male)	7 enclosure	On 9 May, an adult male northern harrier was observed landing and grabbing a recently hatched chick from SP6 east of 7.5 revegetation. The harrier flew northeast with chick in talons.
2 (chicks)	Peregrine falcon (sub-adult female)	Border of 6 and 7 enclosure shoreline	On 23 May, a sub-adult female peregrine falcon hunting over 6 enclosure shoreline was seen to catch and eat one chick and a possible second. The falcon was live-trapped and placed in a carrier prior to relocation. A regurgitated pellet containing seven plastic color bands was removed from the carrier, representing a minimum of two chicks. Bands found were two violet, one red ¹ , one green, one aqua, one white, and one yellow.
1 (juvenile)	Peregrine falcon	6 enclosure	On 3 July, a peregrine falcon was inside 6 enclosure with suspected plover prey. An intact carcass of a juvenile plover from SP33 (VV:WY) was recovered at the site. This juvenile was 48 days old.
1 (adult size)	Unknown	8 enclosure	On 18 July, a pair of adult-sized plover wings was found five feet west of a mini-exclosure at SP159. On 9 July coyote tracks circled mini-exclosure and over-tracked plover tracks present outside of enclosure. Fresh plover tracks were documented at the three egg nest on 12 July.
1 (chick) 2 (unknown)	Coyote	east of southern North Oso Flaco	On 26 and 31 July and 9 August, four separate coyote scats were found east of the southern portion of North Oso Flaco. Eleven plastic color bands were found representing a minimum of three plovers. On 26 July two bands (one red and one orange) were found. On 31 July one green band was found and on 9 August eight bands (three green, two red ¹ , two white, and one orange) were found.
1 (adult size)	Unknown	8 enclosure shoreline	On 22 August, an adult-sized plover wing found half-buried in 8 enclosure near SP47 nest site. On 7 May, the nest received a mini-exclosure. On 22 May two of the three eggs pre-hatching had cracks. On 24 May, three eggs were found 20-30% buried with no plover tracks in or around mini. The mini-exclosure was removed after abandonment confirmed.
1 (chick) 2 (unknown)	Unknown avian	6 enclosure shoreline	On 7 September a regurgitated pellet was found on north 6 enclosure shoreline. The regurgitated pellet was comprised of small bones, feathers, and eleven plastic color bands representing a minimum of three plovers. Bands found were two red ¹ , two violet, two yellow, two pink, one blue, one green, and one violet tape.
3 (unknown)	Gull sp.	6 enclosure shoreline	On 13 September a regurgitated gull pellet was found 165 feet west of west fence on northern 6 enclosure shoreline. The pellet contained crustacean exoskeleton parts, sand and nine plastic color bands representing a minimum of three plovers. Bands found were three green, two pinks, one blue, one yellow, one violet and one unidentified color. The pellet measured 1 1/8" long with a diameter (at the widest) of 13/16".

¹ The red tape covering the red band had a white adhesive backing. Such red tape was first used at ODSVRA in 2012 and indicates a chick was taken.

Appendix H. Documented mortality of California least tern and snowy plover chicks, juveniles, and adults at ODSVRA from 1 March to 30 September 2012 (continued).

Table H.3. Mortality, other than predation, of least terns.

No. (age)	Location	Notes
1 (chick)	6 enclosure	On 7 July, one live and one dead chick were present within 2.5 feet of the nest. Both chicks were alive on the previous day (observed through spotting scope from the outside the enclosure).

Table H.4. Mortality, other than predation, of snowy plovers.

No. (age)	Location	Notes
1 (chick)	6 enclosure shoreline	On 12 June, the carcass of one chick from SP66 was seen while observing two siblings being brooded in area. All three chicks from this brood were seen alive on 4 June at eight days old (one subsequently fledged). The carcass was not collected due to proximity of other small plover broods in the area.
1 (chick)	North Oso Flaco shoreline	On 3 August, the intact decomposed carcass of small plover chick from SP158 was found on the surface of the sand. All three chicks from this brood were last observed on 25 July at one day old (no chicks known to fledge).
1 (adult)	ORA northeast of 6 enclosure	On 18 August, the carcass of an unbanded adult plover was found partially buried in the sand in faint tire tracks. The carcass was fresh and had dried blood on the chest. Necropsy report did not indicate the plover was crushed (Necropsy attachment).
1 (chick)	7 enclosure shoreline	On 28 August, the intact decomposed carcass of one small chick from SP89 was found west of 7.5 revegetation area. All three chicks from this brood were last observed on 22 June at two days old (no chicks known to fledge).
1 (chick)	7 enclosure shoreline	On 28 August, the intact decomposed carcass of one chick from SP203 was found 10 feet west of west fence at mid-7 enclosure shoreline. Chick appeared older than one week. All three chicks from this brood were last seen on 5 August at one day old (no chicks known to fledge).
1 (chick)	North Oso Flaco	On 28 August, the intact decomposed carcass of one chick from either SP105 or SP200 was found in the northwest corner of North Oso Flaco enclosure. Chick appeared to be less than one week old. All three chicks from SP105 were last observed on 12 June at two days old and all three chicks from SP200 were last observed on 5 August at one day old (no chicks were known to fledge from either brood).
1 (adult or older juvenile)	7 enclosure shoreline	On 2 September, the desiccated intact carcass of an unbanded adult or older juvenile was found on 7 enclosure shoreline.
1 (adult)	6 enclosure shoreline	On 3 September, the decomposed intact carcass of an unbanded adult was found on the southern portion of the 6 enclosure shoreline.
1 (chick)	6 enclosure shoreline	On 13 September, the desiccated intact carcass of one small chick from SP74 or SP194 was found on the northern portion of 6 enclosure shoreline. All three chicks from SP74 were last seen on 3 June at four days old during adult aggression between broods where one chick from SP74 was picked up and dropped (no chicks known to fledge). The two chicks of SP194 were last seen on 7 August at nine days old (no chicks known to fledge).