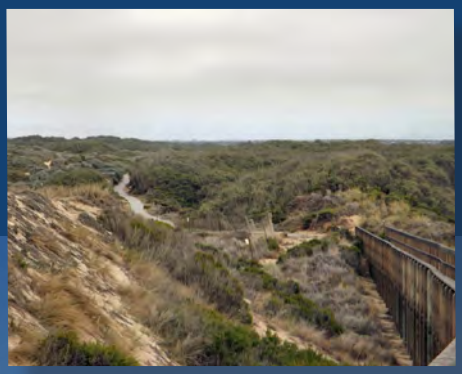

# Draft
# Habitat Conservation Plan for the Oceano Dunes District

## Appendices

July 2025

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# Draft Habitat Conservation Plan
# for the California Department of Parks and Recreation
# Oceano Dunes District

## Appendices

*Prepared for:*

*California State Parks*
*Off-Highway Motor Vehicle Recreation Division*
*Oceano Dunes District*
*340 James Way, Ste. 270*
*Pismo Beach, CA*

*Prepared by:*
*MIG*
*2055 Junction Ave., Suite 205*
*San Jose, CA 95131*
*(650) 327-0429*

*July 2025*

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# Appendices

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# Appendix A. Listed Species and Other Special-Status Species Not Included in the HCP

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# LISTED SPECIES AND OTHER SPECIAL-STATUS ANIMAL AND PLANT SPECIES NOT INCLUDED IN THE HABITAT CONSERVATION PLAN (HCP)

In addition to the covered species in the HCP, observations of other special-status animal and plant species have been documented in the HCP area. Additionally, numerous other special-status animal and plant species have been documented within five miles of the HCP area and/or are included on the U.S. Fish and Wildlife Service (USFWS) Resource Report for the HCP area.

The following tables provide an explanation (i.e., omission rationale) for why California Department of Parks and Recreation (CDPR) has not included each species as a covered species. These or other species could be added to the HCP and Incidental Take Permit (ITP) via a formal amendment to the HCP if either 1) the species becomes listed under the federal Endangered Species Act (ESA) during the duration of the permit and requires incidental take authorization, or 2) the species is already listed, and it is determined that incidental take authorization is warranted due to new information about the potential for take.

**ANIMAL SPECIES**

**Table 1**: Special-status animals not included in the HCP

| Species | Listing Status[1] | Potential to Occur in the HCP Area | Omission Rationale |
|---|---|---|---|
| **Invertebrates** | | | |
| Western bumble bee (*Bombus occidentalis*) | SC | Low | • This species has not been documented in the HCP area or within 5 miles of the HCP area.<br>• The range of verified occurrences appears to be north of the HCP area, and collections in southern California may be rare wayward migrants.<br>• This species is not currently federally listed; the potential for federal listing during the permit term is unknown. |
| Vernal pool fairy shrimp (*Branchinecta lynchi*) | FT | None | • No suitable habitat for this species is present within the HCP area.<br>• This species has not been documented in the HCP area or within 5 miles of the HCP area. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| Monarch butterfly (*Danaus plexippus*) | FPT | Observed | • This species overwinters within the HCP area.<br>• Suitable habitat for overwintering monarch butterflies is limited to two distinct groves of eucalyptus (*Eucalyptus* sp.) and Monterey cypress (*Hesperocyparis macrocarpa*) trees within the HCP area. These two sites provide the necessary wind protection and microclimate conditions that continue to support overwintering monarchs. These sites, which are proposed as monarch butterfly critical habitat,[1] are unlikely to be affected by covered activities because they are already being managed and protected by ODD through a comprehensive management plan (*Monarch Butterfly Overwintering Site Management Plan for Pismo State Beach*, October 2020) that guides the work to restore, maintain, and improve the sites' valuable habitat for monarchs. Site conditions, vulnerabilities, and monitoring protocols are also addressed in the Overwintering Plan. The proposed rule for listing the monarch butterfly references ODD's Overwintering Management Plan and invites other interested parties to utilize it as a template[1]. |
| Kern primrose sphinx moth (*Euproserpinus euterpe*) | FT | None | • This species has not been documented in the HCP area or within 5 miles of the HCP area.<br>• In San Luis Obispo (SLO) County, this species is only known to occur within the Carrizo Plain. |

[1] USFWS. 2024. Endangered and Threatened Wildlife and Plants; Threatened Species Status with Section 4(d) Rule for Monarch Butterfly and Designation of Critical Habitat. Docket ID No. FWS-R3-ES-2024-0137, December 12, 2024.

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| **Fish** | | | |
| Steelhead (South-Central California Coast DPS) (*Oncorhynchus mykiss irideus*) | FT | Observed | • Letter from National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) to CDPR dated December 23, 2008, found that unauthorized steelhead take from covered activities was unlikely. Specific to Arroyo Grande Creek, NOAA Fisheries concluded vehicle crossings do not occur under conditions that could cause direct contact with steelhead or that diminish the value of the creek as steelhead habitat; therefore, an ITP was not recommended.<br>• Superintendent's Order 554-005-2023 restricts motorized crossing of Arroyo Grande Creek to specified conditions, which prohibit 1. crossing Arroyo Grande Creek when water depth exceeds 12 inches, is posted closed, or in any manner other than by crossing the creek as close to the ocean waterline as possible and parallel to the ocean waterline; and 2. driving upstream or downstream in the creek channel or in any other manner in the creek channel. CDPR rangers specifically patrol the crossing area when closed to keep visitors from crossing.<br>• Ongoing monitoring of Arroyo Grande Creek fisheries populations, conducted at multiple times each year since 2003, has not documented take or risk of take to steelhead or damage to steelhead habitat from vehicle creek crossings or other covered activities. Observations continue to be consistent with conclusions of the 2008 NOAA Fisheries conclusions. |
| Arroyo chub (*Gila orcuttii*) | CSSC | None | • Fish surveys have been conducted from 2003-2023, and this species has not been documented in the HCP area[2]. |
| **Reptiles/Amphibians** | | | |
| California tiger salamander (*Ambystoma californiense*) | FT, ST | None | • This species has not been documented in the HCP area or within 5 miles of the HCP area. |

[2] Arroyo chub have been extirpated from much of their native range, and the only occurrences within five miles of the HCP area were introduced into the Santa Maria River.

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| Northern California legless lizard (*Anniella pulchra*) | CSSC | Observed | • This species has been found at Oso Flaco Lake and within the vegetation islands in the HCP area; therefore, suitable habitat in the HCP area is limited.<br>• This species is listed by the International Union for Conservation of Nature (IUCN) as a Least Concern (LC) species. It is also given a Global Ranking of G3G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Blunt-nosed leopard lizard (*Gambelia sila*) | FE, SE, SFP | None | • This species has not been documented in the HCP area or within 5 miles of the HCP area.<br>• In SLO County, this species is only known to occur within the Carrizo Plain. |
| Coast horned lizard (*Phrynosoma blainvilli*) | CSSC | Observed | • This species has been found in Phillips 66 and within the vegetation islands in the HCP area; therefore, suitable habitat in the HCP area is limited.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G3G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Foothill yellow-legged frog – south coast DPS (*Rana boylii* pop. 6) | FE, SE | Low | • This species has not been observed in the HCP area, and limited suitable habitat is available within the HCP area to support this species.<br>• The nearest occurrences for this species are considered "Extirpated" by the CNDDB. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| Coast range newt (*Taricha torosa*) | CSSC | Observed | • Suitable habitat for this species is limited to aquatic habitat and areas near aquatic habitat in the HCP area.<br>• This species has only been rarely observed in the HCP area; therefore, the chance for take is remote.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Two-striped gartersnake (*Thamnophis hammondii*) | CSSC | Observed | • Suitable habitat for this species is limited to aquatic habitat in the HCP area.<br>• This species has only been rarely observed in the HCP area and the chance for take is remote.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| **Birds** | | | |
| *Ducks, Geese, and Swans* | | | |
| Redhead (*Aythya americana*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species, and this species is only known as a migrant and wintering bird in estuarine and lake habitats in the HCP area. |
| Black brant (*Branta bernicla*) | CSSC (wintering and staging) | Observed | • The HCP area is outside the known breeding range for this species.<br>• This species relies on intertidal eelgrass beds within marine waters during the non-breeding season; therefore, it is unlikely to be affected by covered activities.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *Loons* | | | |
| Common loon (*Gavia immer*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species, and this species is only known as a migrant and wintering bird in estuarine, subtidal, and lake habitats in the HCP area. |
| *Pelicans* | | | |
| American white pelican (*Pelecanus erythrorhyncos*) | CSSC (nesting colony) | Observed | • The HCP area is outside the known breeding range for this species, and this species is only known as a summer non-breeder, migrant, or wintering bird in estuarine, shallow marine, and lake habitats in the HCP area. |
| *Herons, Egrets, Bitterns* | | | |
| Least bittern (*Ixobrychus exilis*) | CSSC (nesting) | Observed | • This species is an uncommon breeder in the HCP area.<br>• This species is limited to breeding in suitable aquatic habitat (e.g., Oso Flaco Lake) in the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| *Storks* | | | |
| Wood stork (*Mycteria americana*) | CSSC | Observed | • The HCP area is outside the known breeding range for this species.<br>• This species has only been observed one time in the HCP area in 2011 near Oso Flaco Lake. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *New World Vultures* | | | |
| California condor (*Gymnogyps californianus*) | FE, SE, SFP | Low | • The HCP area is outside the known breeding range for this species.<br>• This species has not been documented in CNDDB within 5 miles of the HCP area.<br>• This species was recorded on eBird as being observed in 2014 outside the HCP area nearby Pismo Beach; however, this species is likely only a rare migrant through the area. |
| *Hawks, Kites, Harriers, Eagles* | | | |
| Golden eagle (*Aquila chrysaetos*) | SFP | Observed | • This species is not known to nest in the HCP area and is only known as a rare migrant in the area. |
| Swainson's hawk (*Buteo swainsoni*) | ST | Low | • The HCP area is outside the current known range for this species.<br>• This species has not been observed in the HCP area, and the only CNDDB occurrence within 5 miles of the HCP area is believed to be extirpated.<br>• This species was recorded on eBird as being observed only one time in the HCP area in 2010 at Oceano Campground and is likely only a very rare migrant through the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| Northern harrier (*Circus hudsonius*) | CSSC (nesting) | Observed | • This species has been observed to be a rare breeder in the HCP area.<br>• Suitable nesting habitat for this species is limited in the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| White-tailed kite (*Elanus leucurus*) | SFP (nesting) | Observed | • A nest for this species has never been documented in the HCP area; therefore, it is likely only a rare breeder in the area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| *Rails, Coots, Gallinules* | | | |
| California black rail (*Laterallus jamaicensis coturniculus*) | ST, SFP | Observed[3] | • This species is limited to suitable aquatic habitat (e.g., Oso Flaco Lake) in the HCP area.<br>• This species has not occurred in the HCP area since 1991. |
| Ridgway's rail (*Rallus obsoletus obsoletus*) | FE, SE, SFP | None | • The HCP area is outside the known range for this species. |
| *Gulls and terns* | | | |
| Black tern (*Chlidonias niger*) | CSSC (nesting colony) | Observed | • The HCP area is outside the known breeding range for this species, and this species is likely a rare non-breeding summer resident or migrant in aquatic habitats (e.g., Oso Flaco Lake and Oceano Lagoon) in the HCP area. |
| Black skimmer (*Rynchops niger*) | CSSC (nesting colony) | Observed | • The HCP area is outside the known breeding range for this species, and this species is likely only a rare spring or fall migrant in the HCP area. |

[3] Last observed in 1991 at Oso Flaco Lake and this occurrence was never visually confirmed.

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *Auklets, Puffins, and Relatives* | | | |
| Marbled murrelet (*Brachyramphus marmoratus*) | FT, SE | Observed | • The HCP area is outside the known breeding range for this species.<br>• This species forages offshore; therefore, it is unlikely to be impacted by covered activities. |
| *Cuckoos and Relatives* | | | |
| Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) | FT, SE | Observed[4] | • The HCP area is outside the current known breeding[5] and wintering range for this species. Any observations are likely rare migrants; therefore, this species is not likely to be affected by covered activities.<br>• This species has only rarely been observed in the HCP area at Oso Flaco Lake and Oceano Campground. |
| *Owls* | | | |
| Burrowing owl (*Athene cunicularia*) | SC | Observed | • This species is not known to breed in the HCP area.<br>• This species is known to be an infrequent winter visitor within the HCP area.<br>• Covered activities will not reduce the availability or suitability of wintering habitat within the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |

[4] Last observed in 1999 in the Oso Flaco Lake area.

[5] CNDDB documents a yellow-billed cuckoo nest in 1932 at Pismo Beach; however, this occurrence is extirpated. The eBird checklist for the HCP area documents a yellow-billed cuckoo at Oso Flaco Lake in 1999 that was later banded at a MAPS station, and another yellow-billed cuckoo was documented at Oceano Campground in 2010. No other yellow-billed cuckoos have been documented in the HCP area, and the current known breeding range does not include the HCP area.

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *Swifts* | | | |
| Vaux's swift (*Chaetura vauxi*) | CSSC (nesting) | Observed | • The HCP area is just south of the known breeding range for this species, and no suitable breeding habitat is present in the HCP area.<br>• This species likely only occurs as a rare migrant in the HCP area. |
| Black swift (*Cypseloides niger*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species, and this species is likely a rare migrant in the HCP area. |
| *Tyrant Flycatchers* | | | |
| Olive-sided flycatcher (*Contopus cooperi*) | CSSC (nesting) | Observed | • This species is an uncommon breeder in SLO County.<br>• Only marginal breeding habitat for this species is present in the HCP area.<br>• This species has only been observed in the HCP area at Oso Flaco Lake, Meadow Creek, and Oceano Campground. |
| Willow flycatcher (*Empidonax traillii*) | SE[6] | Observed[5] | • The HCP area is outside the known breeding and wintering sites for this species. Any observations are likely migrants; therefore, this species is not likely to be affected by covered activities. |
| Southwestern willow flycatcher (*Empidonax traillii extimus*) | FE, SE | None | • The HCP area is outside the known range for this species. |
| *Shrikes* | | | |
| Loggerhead shrike (*Lanius ludovicianus*) | CSSC (nesting) | Observed | • Loggerhead shrikes are resident birds that nest and winter within the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |

[6] The subspecies observed was not recorded; however, based on the known range of the willow flycatcher subspecies, it was most likely little willow flycatcher (*Empidonax traillii brewsteri*), which is state-listed only.

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *Vireos* | | | |
| Least Bell's vireo (*Vireo bellii pusillus*) | FE, SE | None | • The HCP area is outside the known range for this species. |
| *Swallows* | | | |
| Bank swallow (*Riparia riparia*) | ST | Observed | • The HCP area is outside the known breeding and wintering range for this species. Any observations are likely migrants; therefore, this species is not likely to be affected by covered activities. |
| *Wood Warblers* | | | |
| Yellow-breasted chat (*Icteria virens*) | CSSC (nesting) | Observed | • This species' breeding range has been documented as being restricted to Arroyo Grande Creek above Lopez Lake; however, this species could be a rare breeder in the HCP area based on a few rare records of this species singing in the HCP area during the breeding season.<br>• Suitable nesting habitat within the HCP area is limited to riparian habitat, and this species has only been observed at Oso Flaco Lake and Oceano Lagoon within the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| Lucy's warbler (*Leiothlypis luciae*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species, and this species is likely a rare migrant through the HCP area. |
| Yellow warbler (*Setophaga petechia*) | CSSC (nesting) | Observed | • This species has been documented within the HCP area during breeding season.<br>• This species is limited to breeding in riparian habitat in the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |

| **Table 1**: Special-status animals not included in the HCP | | | |
|---|---|---|---|
| **Species** | **Listing Status[1]** | **Potential to Occur in the HCP Area** | **Omission Rationale** |
| *Cardinals* | | | |
| Summer tanager (*Piranga rubra*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species, and this species is likely a rare migrant in the HCP area[7]. |
| *Blackbirds* | | | |
| Tricolored blackbird (*Agelaius tricolor*) | ST, CSSC (nesting colony) | Observed | • This species is not known to nest in the HCP area.<br>• This species has only infrequently been observed flying over and foraging at Oso Flaco Lake and Arroyo Grande Creek in the HCP area. |
| Yellow-headed blackbird (*Xanthocephalus xanthocephalus*) | CSSC (nesting) | Observed | • The HCP area is outside the known breeding range for this species and this species is likely a migrant in the HCP area. |
| Mammals | | | |
| Pallid bat (*Antrozous pallidus*) | CSSC | Observed | • Detected during passive acoustic surveys at Oceano Lagoon.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| Townsend's big-eared bat (*Corynorhinus townsendii*) | CSSC | Observed | • Detected during passive acoustic surveys at Oceano Lagoon.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G3G4. Both of these rankings indicate that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Western red bat (*Lasiurus blossevillii*) | CSSC | Observed | • Detected during passive acoustic surveys at Oceano Lagoon.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |

[7] A male summer tanager was documented as singing in the HCP area in June 2012; however, no female or nest was ever found.

**Table 1**: Special-status animals not included in the HCP

| Species | Listing Status[1] | Potential to Occur in the HCP Area | Omission Rationale |
|---|---|---|---|
| Giant kangaroo rat (*Dipodomys ingens*) | FE, SE | None | • The HCP area is outside this species' known range. |
| Southern sea otter (*Enhydra lutris nereis*) | FT, SFP | Low | • This species occurs offshore of the HCP area; therefore, covered activities are unlikely to occur in areas that would affect this species. |
| American badger (*Taxidea taxus*) | CSSC | Observed | • This species has been found in Phillips 66 and within the vegetation islands in the HCP area.<br>• This species is listed by the IUCN as an LC species. It is also given a Global Ranking of G5. These rankings indicate that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |

[1]Listing Status Designations:

| | | | | | |
|---|---|---|---|---|---|
| FE | Federal endangered | SE | State endangered | CSSC | California species of special concern |
| FT | Federal threatened | ST | State threatened | SFP | State fully protected |
| FC | Federal candidate | SC | State candidate | | |

## PLANT SPECIES

**Table 2**: Special-status plants not included in the HCP

| Species | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
|---|---|---|---|
| Red sand verbena (*Abronia maritima*) | CRPR 4.2 | Observed | • This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Hoover's bent grass (*Agrostis hooveri)* | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area. |
| Douglas' fiddleneck (*Amsinckia douglasiana*) | CRPR 4.2 | None | • This species is not known to occur within the HCP area, and Monterey shale soils that support this species are not known to occur within the HCP area.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Aphanisma (*Aphanisma blitoides*) | CRPR 1B.2 | Low | • This species is not known to occur within the HCP area, and limited habitat suitable habitats are present with the HCP area.<br>• The nearest occurrence is over 5 miles south of the HCP area, near Point Sal. |
| Short-lobed broomrape (*Aphyllon parishii* ssp. *brachylobum*) | CRPR 4.2 | Observed | • This species has only been documented in South Oso Flaco; therefore, it has a limited distribution in the HCP area and is unlikely to be affected by covered activities. |
| Santa Lucia manzanita (*Arctostaphylos luciana*) | CRPR 1B.2 | None. | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Morro manzanita (*Arctostaphylos morroensis*) | FT, CRPR 1B.1 | None | • Known only from Morro Bay; therefore, the HCP area is outside this species' known range. |
| Bishop manzanita (*Arctostaphylos obispoensis*) | CRPR 4.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Pecho manzanita (*Arctostaphylos pechoensis*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Santa Margarita manzanita (*Arctostaphylos pilosula*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| La Purisima manzanita (*Arctostaphylos purissima*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area and occurs at elevations generally higher than those within the HCP. |
| Sand mesa manzanita (*Arctostaphylos rudis*) | CRPR 1B.2 | Observed | • Only a single individual has been documented within the HCP area in the Phillips 66 Leasehold area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities. |
| Nuttall's milkvetch (*Astragalus nuttallii* var. *nuttallii*) | CRPR 4.2 | Observed | • This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Davidson's saltscale (*Atriplex serenana* var. *davidsonii*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• Only one occurrence of this species has been documented within 5 miles of the HCP area, and that record is from 1965. |
| Brewer's calandrinia (*Calandrinia breweri*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area. This species has historical occurrences just north of the HCP area within Pismo Creek.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Club-haired mariposa lily (*Calochortus clavatus* var. *clavatus*) | CRPR 4.3 | Low | • This species is not known to occur in the HCP area.<br>• The nearest occurrences of this species are north of Pismo Beach in rocky serpentine areas surrounding San Luis Obispo and Morro Bay. |
| San Luis Obispo mariposa lily (*Calochortus obispoensis*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Arroyo Grande in rocky serpentine areas surrounding San Luis Obispo, and the HCP area is out of its known range. |
| La Panza mariposa-lily (*Calochortus simulans*) | CRPR 1B.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Cambria morning-glory (*Calystegia subacaulis* ssp. *episcopalis*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north and east of the project site in generally more mountainous areas. The nearest occurrence is from 1895 near Arroyo Grande. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| San Luis Obispo sedge (*Carex obispoensis*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north and east of the project site with the nearest occurrence being from the Irish Hills. |
| San Luis Obispo owl's clover (*Castilleja densiflora* var. *obispoensis*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• The nearest occurrence of this species is north of Avila Beach in rocky serpentine areas surrounding San Luis Obispo. |
| Monterey Coast paintbrush (*Castilleja latifolia*) | CRPR 4.3 | Observed | • This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| California jewelflower (*Caulanthus californicus*) | FE, SE, CRPR 1B.1 | None | • Known only from a few areas in the hilly terrain west of the San Joaquin Valley; therefore, the HCP area is outside this species' known range. |
| Lompoc ceanothus (*Ceanothus cuneatus* var. *fascicularis*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• The nearest occurrence of this species is just east of the HCP area near Black Lake.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Santa Barbara ceanothus (*Ceanothus impressus* var. *impressus*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• The nearest occurrence of this species is east of the HCP area near Nipomo Mesa and may correspond to var. *nipomensis*. It is suspected that the distribution of this species is well south of the HCP area. |
| Nipomo Mesa ceanothus (*Ceanothus impressus* var. *nipomensis*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• The nearest occurrence of this species is just east of the HCP area near Black Lake. |
| Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Avila Beach in alkaline clay soils, and the HCP area is out of its known range. |

**Table 2**: Special-status plants not included in the HCP

| Species | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
|---|---|---|---|
| Coastal goosefoot (*Chenopodium littoreum*) | CRPR 1B.2 | Observed | • This species has been observed in the back dunes at Phillips 66 Leasehold and South Oso Flaco; therefore, it has a limited distribution in the HCP area and is unlikely to be affected by covered activities. |
| Dwarf soaproot (*Chlorogalum pomeridianum* var. *minus*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) | FE, SE, CRPR 1B.2 | Low | • This species is not known to occur within the HCP area.<br>• The nearest occurrences are well north of the HCP near Morro Bay. |
| Irish Hills spineflower (*Chorizanthe aphanantha*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Brewer's spineflower (*Chorizanthe breweri*) | CRPR 1B.3 | Low | • This limited suitable habitat for this species is present in the HCP area, and it has only been observed in the Phillips 66 Leasehold and by Surprise Lake in the very southern portion of the HCP area.<br>• Only one occurrence of this species has been documented within 5 miles of the HCP area, and that record is from 1977. |
| Douglas' spineflower (*Chorizanthe douglasii*) | CRPR 4.3 | Observed | • This species has only been observed in the HCP area at the Pavilion Hill vegetation island, Phillips 66 Leasehold, and by Surprise Lake in the very southern portion of the HCP area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Palmer's spineflower (*Chorizanthe palmeri*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• The nearest occurrence of this species is just east of the HCP area near Arroyo Grande.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Straight-awned spineflower (*Chorizanthe rectispina*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| Chorro Creek bog thistle (*Cirsium fontinale* var. *obispoense*) | FE, SE, CRPR 1B.2 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Avila Beach and the HCP area is out of its known range. |
| Compact cobwebby thistle (*Cirsium occidentale* var. *compactum*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area.<br>• The nearest occurrence of this species is well south of the HCP area at Point Sal. |
| Seaside cistanthe (*Cistanthe maritima* = *Calandrinia maritima*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area.<br>• The nearest occurrence of this species is well south of the HCP area at Point Sal. |
| California saw-grass (*Cladium californicum*) | CRPR 2B.2 | Observed[8] | • This species has not been observed near the HCP area since 1990.<br>• Limited suitable habitat for this species is present in the HCP area (i.e., Oso Flaco Lake), and it has not been documented in this habitat to date. |
| Pismo clarkia (*Clarkia speciosa* ssp. *immaculata*) | FE, SR, CRPR 1B.1 | None | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area. |
| Small-flowered morning-glory (*Convolvulus simulans*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat is present in the HCP area.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) | FE, SE, CRPR 1B.1 | None | • The HCP area is outside the known range for this species.<br>• This species has only been documented in the coastal terraces near Gaviota, over 7 miles south of the HCP area. |

[8] California saw-grass has not been found in the HCP area in recent years; however, it was documented in CNDDB as occurring somewhere near Oso Flaco Lake in 1990.

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| Paniculate tarplant (*Deinandra paniculata*) | CRPR 4.2 | Observed | • This species has only been documented in the Phillips 66 Leasehold area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Dune larkspur (*Delphinium parryi* ssp. *blochmaniae*) | CRPR 1B.2 | Observed | • Targeted surveys have been conducted for this species, and it has only been found in the Phillips 66 Leasehold, Coreopsis Hill, and South Oso Flaco; therefore, it has a limited distribution in the HCP area.<br>• This species is given a Global Ranking of G4T2. This ranking indicates that this species is secure considering populations outside California; therefore, this species is not likely to be federally listed during the permit term. |
| Eastwood's larkspur (*Delphinium parryi* ssp. *eastwoodiae*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Umbrella larkspur (*Delphinium umbraculorum*) | CRPR 1B.3 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area. |
| Western dichondra (*Dichondra occidentalis*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area.<br>• The nearest occurrence of this species is near Point Sal. |
| Betty's dudleya (*Dudleya abramsii* ssp. *bettinae*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Avila Beach and the HCP area is out of its known range. |
| Mouse-gray dudleya (*Dudleya abramsii* ssp. *murina*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Blochman's dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*) | CRPR 1B.1 | Low | • This species is not known to occur in the HCP area.<br>• The nearest occurrences of this species are north of Avila Beach and south from Point Sal. |

**Table 2**: Special-status plants not included in the HCP

| Species | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
|---|---|---|---|
| Small spikerush (*Eleocharis parvula*) | CRPR 4.3 | Low | • This species is not known to occur in the HCP area.<br>• The distribution of this species is just outside of the HCP area near Big Twin Lake. |
| Blochman's leafy daisy (*Erigeron blochmaniae*) | CRPR 1B.2 | Observed | • This species was included in the 1985 USFWS "Review of Plant Taxa for Listing as Endangered or Threatened Species" and was placed in category 3C during this review. Category 3C includes taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat. This species was not included in the subsequent USFWS review of plant taxa (e.g., 1990 and 1993). As a result, this species is not likely to be federally listed during the permit term. |
| Saints' daisy (*Erigeron sanctarum*) | CRPR 4.2 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Indian knob mountain balm (*Eriodictyon altissimum*) | FE, SE, CRPR 1B.2 | None | • Known only from higher elevations in the Irish Hills (between Morro Bay and Indian Knob) in San Luis Obispo County; therefore, the HCP area is outside this species' known range. |
| Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| San Luis Obispo wallflower (*Erysimum capitatum* var. *lompocense*) | CRPR 4.2 | Observed | • This species has been observed on the sand dunes near the outlet near Oso Flaco Lake in 1951 and 1962.<br>• This taxon is given a Global Ranking of G5T3. This ranking indicates the taxon may be vulnerable but not imperiled; therefore, this taxon is not likely to be federally listed during the permit term. |
| Suffrutescent wallflower (*Erysimum suffrutescens*) | CRPR 4.2 | Observed | • This species is given a Global Ranking of G3. This ranking indicates that this species is vulnerable, but not imperiled; therefore, this species is not likely to be federally listed during the permit term. |
| Irish Hills monkeyflower (*Erythranthe serpentinicola*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Avila Beach, and the HCP area is out of its known range. |
| San Benito poppy (*Eschscholzia hypecoides*) | CRPR 4.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| Trumpet-throated gilia (*Gilia tenuiflora* ssp. *Amplifaucalis*) | CRPR 4.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Monterey cypress (*Hesperocyparis macrocarpa*) | CRPR 1B.2[9] | Observed | • This species is not native in the HCP area. |
| Mesa horkelia (*Horkelia cuneata* var. *Puberula*) | CRPR 1B.1 | Observed[10] | • This species was last documented north of Oso Flaco Lake in 1973.<br>• Recently this species has only been observed in the HCP area by Surprise Lake in the very southern portion of the HCP area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*) | CRPR 1B.1 | Observed | • This species has only been documented in the Pismo Dunes Natural Preserve and Phillips 66 Leasehold area and in the very southern portion of the HCP area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Southwestern spiny rush (*Juncus acutus* ssp. L*eopoldii*) | CRPR 4.2 | Observed | • This species has only been documented in Meadow Creek, Pismo Dunes Natural Preserve, and vegetation islands; therefore, it has a limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G5. This ranking indicates that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| Blushing layia (*Layia erubescens*) | CRPR 1B.2 | Observed | • This species has only been documented from one location in the Phillips 66 Leasehold area; therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities. |

[9] Only considered a special-status plant where they naturally occur.
[10] Last observed in 1973 north of Oso Flaco Lake.

**Table 2**: Special-status plants not included in the HCP

| Species | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
|---|---|---|---|
| Jones' layia (*Layia jonesii*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area.<br>• The distribution of this species is north of Avila Beach, and the HCP area is out of its known range. |
| Large-flowered leptosiphon (*Leptosiphon grandiflorus*) | CRPR 4.2 | Low | • This species is not known to occur within the HCP area.<br>• The nearest occurrences of this species are near San Luis Obispo and south of Santa Maria. |
| Spring lessingia (*Lessingia tenuis*) | CRPR 4.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Fuzzy prickly phlox (*Linanthus californicus* ssp. *tomentosus*) | CRPR 4.2 | Observed | • This species has only been documented in the Pismo Dunes Natural Preserve, South Oso Flaco, the Phillips 66 Leasehold, and in the very southern portion of the HCP area; therefore, it is unlikely to be affected by covered activities.<br>• This taxon is given a Global Ranking of G5T3. This ranking indicates the taxon may be vulnerable but not imperiled; therefore, this taxon is not likely to be federally listed during the permit term. |
| Small-leaved lomatium (*Lomatium parvifolium*) | CRPR 4.2 | Low | • This species is not known to occur in the HCP area, and limited habitat is present for this species within the HCP area.<br>• This species is given a Global Ranking of G3. This ranking indicates the species may be vulnerable but not imperiled; therefore, this species is not likely to be federally listed during the permit term. |
| San Luis Obispo County lupine (*Lupinus ludovicianus*) | CRPR 1B.1 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area. |
| Slender bush-mallow (*Malacothamnus jonesii* var. *gracilis*) | CRPR 1B.1 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Fragrant-snow bush-mallow (*Malacothamnus jonesii* var. *niveus*) | CRPR 4.3 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| Dunedelion (*Malacothrix incana*) | CRPR 4.3 | Observed | • This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| Palmer's monardella (*Monardella palmeri*) | CRPR 1B.2 | None | • This species is not known to occur in the HCP area and occurs at elevations higher than those within the HCP. |
| Southern curly-leaved monardella (*Monardella sinuata* ssp. *sinuata*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area. |
| Crisp monardella (*Monardella undulata* ssp. *crispa*) | CRPR 1B.2 | Observed | • This species is widespread in the HCP area and is given a Global Ranking of G3T2. The T2 ranking indicates that the subspecies is imperiled or threatened. In addition, it was given a rank of 2 in the USFWS 1993 review of plant taxa for listing as endangered or threatened species, which means the USFWS determined that proposing to list the species as endangered or threatened may be appropriate, but more information and/or surveys are needed to obtain sufficient information to list the species. Therefore, the USFWS may determine that listing is warranted during the permit term. It is not included as a covered species, however, because it is currently unlisted and will continue to be monitored over the permit term. Should it be listed, CDPR will evaluate effects of the covered activities and consult with USFWS on the need to add the species to the HCP via an amendment. |
| San Luis Obispo monardella (*Monardella undulata* ssp. *undulata*) | CRPR 1B.2 | Observed | • This species is fairly widespread in the HCP area and is given a Global Ranking of G2. The G2 ranking indicates that the species is imperiled and at high risk of extinction due to a very restricted range, very few populations, steep declines, or other factors. Furthermore, it was given a rank of 2 in the USFWS 1993 review of plant taxa for listing as endangered or threatened species, which means the USFWS determined that proposing to list the species as endangered or threatened may be appropriate, but more information and/or surveys are needed to obtain sufficient information to list the species. Therefore, the USFWS may determine that listing is warranted during the permit term. It is not included as a covered species, however, because it is currently unlisted and will continue to be monitored over the permit term. Should it be listed, CDPR will evaluate effects of the covered activities and consult with USFWS on the need to add the species to the HCP via an amendment. |

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| California spineflower (*Mucronea californica*) | CRPR 4.2 | Observed | • This species has only been documented in the Pismo Dunes Natural Preserve, South Oso Flaco, and the Phillips 66 Leasehold; therefore, it is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G3. This ranking indicates that this species is vulnerable, but not imperiled; therefore, this species is not likely to be federally listed during the permit term. |
| Spreading navarretia (*Navarretia fossalis*) | FT, CRPR 1B.1 | None | • The HCP area is outside the known range for this species. |
| Coast woolly-heads (*Nemacaulis denudata* var. *denudata*) | CRPR 1B.2 | Observed[11] | • This species has only been observed in the Oso Flaco Lake area and the vegetation islands, therefore, this species has limited distribution in the HCP area and is unlikely to be affected by covered activities. |
| Adobe yampah (*Perideridia pringlei*) | CRPR 4.3 | Low | • This species is not known to occur within the HCP area.<br>• This species is given a Global Ranking of G4. This ranking indicates that this species is uncommon, but not rare; therefore, this species is not likely to be federally listed during the permit term. |
| South coast branching phacelia *Phacelia ramosissima var. austrolitoralis* | CRPR 3.2 | Observed | • Observed as recently as 2022. Common throughout Park in dune scrub habitat.<br>• This taxon is given a Global Ranking of G5T3. This ranking indicates the taxon may be vulnerable but not imperiled; therefore, this taxon is not likely to be federally listed during the permit term. |
| Monterey pine (*Pinus radiata*) | CRPR 1B.1[12] | Observed | • Not native in the HCP area. |
| Torrey pine (*Pinus torreyana* ssp. *torreyana*) | CRPR 1B.2[11] | Observed | • Not native in the HCP area. |

[11] Documented in CNDDB as occurring north of Oso Flaco Lake near the boundary with OHV activity in 2000.
[12] Only considered a special-status plant where they naturally occur.

| Table 2: Special-status plants not included in the HCP | | | |
|---|---|---|---|
| **Species** | Listing Status[1] | Potential to Occur in HCP Area | Omission Rationale |
| Hickman's popcorn flower (*Plagiobothrys chorisianus* var. *hickmanii*) | CRPR 4.2 | Observed | • This has only been documented within some vegetation islands, the Phillips 66 Leasehold, and near Maidenform; therefore, it is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G3T3. This ranking indicates that this species is vulnerable, but not imperiled; therefore, this species is not likely to be federally listed during the permit term. |
| Sand almond (*Prunus fasciculata* var. *punctata*) | CRPR 4.3 | Observed | • This has only been documented within the Phillips 66 Leasehold; therefore, it has a limited distribution in the HCP area and is unlikely to be affected by covered activities.<br>• This species is given a Global Ranking of G5T4. This ranking indicates that this species is widespread; therefore, this species is not likely to be federally listed during the permit term. |
| Hoffmann's sanicle (*Sanicula hoffmannii*) | CRPR 4.3 | Low | • This species is not known to occur within the HCP area.<br>• The nearest occurrences of this species are north of Avila Beach and south of Point Sal. |
| Black-flowered figwort (*Scrophularia atrata*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and this species mostly occurs on older sand dunes than are present in the HCP area. |
| Chaparral ragwort (*Senecio aphanactis*) | CRPR 2B.2 | Low | • This species is not known to occur within the HCP area.<br>• The nearest occurrences of this species are north of Avila Beach and near Vandenberg Village. |
| Blochman's ragwort (*Senecio blochmaniae*) | CRPR 4.2 | Observed | • This species is given a Global Ranking of G3. This ranking indicates that this species is vulnerable, but not imperiled; therefore, this species is not likely to be federally listed during the permit term. |
| San Bernardino aster (*Symphyotrichum defoliatum*) | CRPR 1B.2 | Low | • This species is not known to occur in the HCP area, and limited suitable habitat for this species is present in the HCP area. |

[1]Listing Status Designations:

FE: Federal endangered
FT: Federal threatened
FPT: Federal proposed threatened
SE: State endangered
SR: State rare
CRPR 1B: Considered to be rare, threatened, or endangered in California and elsewhere
CRPR 2: Considered to be rare, threatened, or endangered in California, but more common elsewhere
CRPR 4: Watch List

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# Appendix B. Superintendent's Orders and Other District Guidelines

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**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**SUPERINTENDENT POSTED ORDERS**
UPDATED 2024

| ORDER NO. | ORDER TITLE |
|---|---|
| 002 | UNATTENDED VEHICLE |
| 003 | KITE SURFING |
| 004 | REFUSE DISPOSAL |
| 005 | VEHICLE OPERATION |
| 006 | CAMPING LIMITS |
| 007 | MOTOR VEHICLE USE FEE |
| 008 | CAMPFIRE |
| 011 | GENERATORS |
| 012 | OSO FLACO PARKING |
| 016 | CURFEW |
| 017 | DOGS |
| 022 | DRONES |
| 026 | KITES |
| 027 | EJECTION |
| 032 | E-BIKES |
| 033 | RESTRICTED AREAS |
| 034 | DAY USE |
| 035 | RESTRICTED AREAS \| POST 6 |

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-002-2024**

January 1, 2024

UNATTENDED VEHICLES

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Vehicles left standing and unattended as a result of being disabled, vandalized, having been involved in an accident or other circumstances will be considered hazards and attractive nuisances.

2. Vehicles left standing and unattended and are under imminent threat where said vehicle will be inundated by creek water flow or tidal ocean water, will be considered hazards and attractive nuisances.

3. Said vehicles will be subject to tow and storage at vehicle owner's expense.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Vehicle Code Sections 21113 and 22651(n); California Code of Regulations, Title 14, Division 3, Sections 4300, 4326, 4350, 4355 and 4356. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-002-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-002-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Vehicle Code Sections 21113 and 22651(n); California Code of Regulations, Title 14, Division 3, Sections 4300, 4326, 4350, 4355 and 4356. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-003-2024**

January 1, 2024

KITE BOARDING/SURFING

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Kite boarding and kite surfing activities may occur from Pismo Creek south to Pier Avenue. The landing and launching of kite boarding and kite surfing equipment is permitted as follows:
   - Dry land launching and landing and open water Kite Surfing is permitted between Pismo Creek and Pier Ave.
   - Wet launching and landing and Kite Surfing over open water is permitted south of Pier Ave. Wet launching and landing is described as launching and landing where the entire kite equipment is in/above the rolling water area of the beach.
   - Launching or landing is prohibited south of beach post marker #6.
   - Open water Kite Surfing is prohibited south of beach marker post #6.

2. Kite boarders and kite surfers shall be familiar with all laws, rules and regulations governing the sport, safety measures and practices.

3. Kite boarders and kite surfers shall not prevent, obstruct, or otherwise interfere with vehicle travel and access.

4. Kite boarding/surfing activities may be revoked at any time by any Lifeguard or Peace Officer if activities are determined to be a danger to others, a disturbance to the public or a disturbance to natural resources.

5. Land boarding, kite buggies or any other devices which are propelled by a kite or sail over land are prohibited.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District
History: Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4319 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-003-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-003-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4319 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-004-2024**

January 1, 2024

REFUSE DISPOSAL

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. No person shall import any litter, domestic, agricultural or commercial garbage or refuse, for the express purpose of disposing such material in State Park trash containers or dumpsters.

2. No person shall climb on or into trash containers, dumpsters, nor remove, separate or dislodge the contents inside in total or in part.

3. No person shall place petroleum waste products, batteries, or toxic substances in trash containers or dumpsters.

4. No person shall place ignited or smoldering materials or coals inside any trash container or dumpster.

5. No person shall dispose of wastewater containing formaldehyde into the wastewater dump stations, trash containers or dumpsters.

6. No person shall dispose of wastewater or appropriate refuse without first making payment of appropriate facility use fees.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Health and Safety Code Section 25203; California Code of Regulations, Title 14, Sections 4300, 4302, 4310, 4324 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-004-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-004-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Health and Safety Code Section 25203; California Code of Regulations, Title 14, Sections 4300, 4302, 4310, 4324 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-005-2024**

January 1, 2024

VEHICLE OPERATION

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

Vehicle operations are ***prohibited*** as follows:

1. Pismo State Beach, Grand Avenue, where posted closed to motor vehicles, north to the northern property boundary of Pismo State Beach.
2. Oceano Dunes State Vehicular Recreation Area (SVRA), known as the Oso Flaco Lake Natural Area; from the southern boundary of the off-highway vehicle riding area south, to the southern property boundary of Oceano Dunes SVRA.
3. Any area permanently or temporarily fenced and/or posted closed to vehicle operation.

Vehicle operations are ***approved*** as follows:

4. Pismo State Beach, Grand Avenue, where posted closed to vehicles, south to beach marker post #2, is restricted to street-legal vehicles only. Off-highway vehicles are prohibited from vehicle operation.
5. Pismo State Beach from beach marker post #2 and Oceano Dunes SVRA, south to the southern boundary of the off-highway vehicle riding area, street-legal and off-highway vehicles, with appropriate off-highway motor vehicle registration are approved to operate.

Vehicle operations ***Arroyo Grande Creek***:

6. It is prohibited to cross Arroyo Grande Creek in any other manner, other than by crossing the creek as close to the ocean waterline as possible and parallel to the ocean waterline.
7. Driving upstream or downstream in the creek channel or in any other manner in the creek channel is prohibited.
8. It is prohibited to cross Arroyo Grande Creek when posted closed, or water depth is greater than twelve inches as measured closest to the ocean waterline.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District
History: Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-005-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-005-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-006-2024**

January 1, 2024

CAMPING TERM LIMIT

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Oceano Dunes State Vehicular Recreation Area and Pismo State Beach (Oceano and North Beach campgrounds) are collectively restricted to an occupancy limit of 30 days by the same person, equipment, or vehicles in any calendar year.

2. No person, or persons, equipment, or vehicles that have occupied a campsite(s) for the established 30-day limit within the District may register in any other campground of the District until the next calendar year and the expiration of forty-eight (48) hours from the day when the limit was reached.

3. No person, or persons, equipment, or vehicles shall occupy a campsite(s) at Pismo State Beach (Oceano and North Beach campgrounds) for more than fifteen (15) consecutive days.

4. No person, or persons, equipment, or vehicles shall occupy a campsite(s) at Oceano Dunes State Vehicular Recreation Area for more than fifteen (15) consecutive days.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Revised 2021

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4326 and 4455. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-006-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-006-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4326 and 4455. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-007-2024**

January 1, 2024

MOTOR VEHICLE USE FEE

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Payment of fees are required for motor vehicles entering portions, or areas of lands owned or administered by the Department of Parks and Recreation within Pismo State Beach and Oceano Dunes State Vehicular Recreation Area.

2. No vehicle shall enter, attempt to enter, or be present in the park without the driver or registered owner making a reasonable effort to pay any use fee that may apply. The driver or registered owner of any vehicle entering or remaining in the park shall have a valid pass displayed at all times while the vehicle is in the park.

3. Valid passes are those issued by the Department of Parks and Recreation, Oceano Dunes District or their authorized agents. An issued pass (day use or camping) may not be transferred to another vehicle.

4. Park access may be restricted, denied, or revoked at anytime to ensure the health and safety of persons, property, and wildlife on lands administered by the Department of Parks and Recreation.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-007-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-007-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-008-2024**

January 1, 2024

CAMPFIRES

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Campfires (including ground fires and warming fires) are prohibited north of Grand Avenue.

2. Campfires are prohibited within fifty (50) feet of any restroom facility or picnic table.

3. Campfires are permitted south of Grand Avenue and within Oceano Dunes SVRA.

4. Campfires are permitted between the shoreline and beach, to the western edge of the foredunes. Campfires are prohibited within any vegetated dune areas, including Pismo Dunes Natural Preserve and Oso Flaco Lake area.

5. Only wood and untreated wood products, free of metal, petroleum products or other toxic substances shall be used for campfires, beach fires, or recreational fires.

6. Campfires, beach fires, or recreational fires shall not be larger than three (3) feet in diameter and two (2) feet in height.

7. No person shall import, transport, or possess any wood, plastic, or fiber pallet.

8. No person shall ignite, burn, or maintain any wood, plastic, or fiber pallet fire.

9. No person shall light, build, use or maintain a fire during the hours of 10:00 PM to 7:00 AM except in the open use portion of Oceano Dunes State Vehicular Recreation Area, south of beach marker post #2 and being registered and having camping fees paid.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District
History: Revised 2021

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4310, 4311 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-008-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-008-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
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Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4310, 4311 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-011-2024**

January 1, 2024

GENERATORS

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

This order applies to Oceano Dunes State Vehicular Recreation Area and modifies restrictions on use of a gasoline powered generator set by CCR 4320 (c). The generator use hours are extended to coincide more closely with the times campers usually rise and bed down and to accommodate use of electric medical assistive devices. Generator use is hereby restricted as follows:

1. No person shall operate a gasoline powered generator which emits sound which is, or is likely to be, disturbing to others between the hours of 10:00 PM and 8:00 AM.

2. Generators may operate between the hours of 8:00 AM and 10:00 PM.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Revised 2020
Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4320 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-011-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-011-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4320 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-012-2024**

January 1, 2024

OSO FLACO

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Oso Flaco Lake parking lot is closed to parking of motorized and non-motorized vehicles between the hours of sunset and 7AM.

2. No person shall park, stand or stop a vehicle in violation of posted hours.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Revised 2020
Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4358 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-012-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-012-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4358 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-016-2024**

January 1, 2024

CURFEW

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. No juvenile shall remain or enter Oceano Dunes District in violation of this curfew.

2. Curfew shall apply to all juveniles except as follows:
   a. One who is accompanied by a parent or guardian,
   b. One who is part of a group permitted to occupy a unit or portion thereof and who is supervised by at least one responsible adult for each fifteen juveniles.
   c. One who is lawfully camping, having furnished to the department written consent of and the full name, residence number, and telephone number of the juvenile's parent or guardian, with the inclusive dates for which permission is granted to camp at the unit involved.

3. Curfew shall apply between the hours of 10:00PM to 7:00AM, seven days a week.

4. A juvenile is defined as any person under the age of 18 years.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Revised 2021
Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4317 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-016-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-016-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4317 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-017-2024**

January 1, 2024

DOGS

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Pismo Dunes Natural Preserve: Dogs are prohibited. The Pismo Dunes Natural Preserve is defined as that area bounded on the north by Arroyo Grande creek, on the east by the state park boundary fence located approximately ½ mile inland from the beach that extends south to a point approximately 1½ miles from Arroyo Grande Creek, on the south by a boundary fence that extends west approximately ½ mile and on the west by a boundary fence that extends north approximately 1 ½ miles to Arroyo Grande Creek.

2. Oso Flaco Lake Natural Area: Dogs are prohibited. The Oso Flaco Lake Natural area is defined as that area bounded on the north by the south boundary of the Oceano Dunes SVRA, on the east by boundary fencing and signage, on the south by the north boundary of the Guadalupe-Nipomo Dunes National Wildlife Refuge and on the west by the Pacific Oceano.

3. All other beach areas are open to dogs under the following conditions:
    a. Dogs must be restrained on a leash of no more than six feet in length.
    b. Dogs must be at all times under the immediate control of a person.
    c. No person shall keep a noisy, vicious, or dangerous dog or animal or one which is disturbing to other persons, after he/she has been asked by a peace officer to leave.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Revised 2020
Revised 2021

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4312 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-017-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-017-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4312 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-022-2024**

January 1, 2024

DRONES

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

***Prohibited Use***

1. Between March 1 through September 30, Drones are prohibited to operate at Pismo State Beach, south of Pier Avenue and Oceano Dunes SVRA, including all areas of the Oso Flaco Lake area.
2. Drones are prohibited from being operated within Pismo Dunes Natural Preserve at all times.

***Approved Use***

3. Between October 1 through February 28, Drones are approved to operate at Pismo State Beach, Pismo Creek, south to and including Oceano Dunes SVRA, including all areas of the Oso Flaco Lake area.
4. Where approved to operate, Drone operators are required to know, understand and comply with all applicable rules, regulations and laws directing and controlling unmanned aircraft systems. Operators may visit the Federal Aviation Administration online resources for Information regarding safety guidance.
5. Drone operators may at any time, be directed to terminate operations due to public safety, public health, public benefit or natural resource concerns.
6. This order also applies to any device capable of flight, controlled from the ground or water, by remote control.

***Drone Operation defined***. Any person who launches, lands, flies, operates or otherwise controls a drone over the lands and facilities of the Department of Parks and Recreation, Oceano Dunes, whether physically located on those lands, or located outside of those lands.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent

History:
Revised 2020
Revised 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4304, 4316, 4319, 4351 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-022-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-022-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4304, 4316, 4319, 4351 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-026-2024**

January 1, 2024

KITES

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

***Prohibited Use***

1. Between March 1 through September 30, Kites are prohibited from being flown/operated at Pismo State Beach, south of Pier Avenue and Oceano Dunes SVRA including all areas of the Oso Flaco Lake area.

2. Kites are prohibited from being flown/operated within Pismo Dunes Natural Preserve at all times.

***Approved Use***

3. Between October 1 through February 28, Kites are approved to be operated at Pismo State Beach and Oceano Dunes SVRA including all areas of the Oso Flaco Lake area.

4. Kite operators may at any time, be directed to terminate operations due to public safety, public health, public benefit or natural resource concerns.

5. This order also applies to any device capable of flight, controlled from the ground or water, whether by attached control device or free flying.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
0858CF4A091A404...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4319 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**

DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-026-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-026-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4319 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-027-2024**

January 1, 2024

EJECTION

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

California Code of Regulations, Title 14, Division 3, Code 4300 (e) states, the privilege of any person to be present in any unit under control of the Department of Parks and Recreation is hereby expressly conditioned upon compliance by that person with all applicable laws and regulations. In addition to other penalties prescribed by law, violation of any law or regulation shall subject the violator to ejection from the unit in which the violation occurs.

1. A violation of any law or regulation may subject the violator to ejection from all units of Oceano Dunes District, to include Pismo State Beach, Pismo Dunes Natural Area and Oceano Dunes SVRA, including all areas of Oso Flaco Lake, regardless of where the violation occurred.

2. An ejection due to a violation of any law or regulation shall be for a period of twenty-four (24) hours.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449.

Nothing herein shall affect any existing private contract or property rights.

Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
Reviewed 2021

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-027-2024**
January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-027-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
8858CF4A091A404...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-032-2024**

January 1, 2024

E-BIKES

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. All areas of Pismo State Beach and Oceano Dunes SVRA open to motor vehicle access and recreation are hereby open to e-bike access and recreation.

2. E-bikes are prohibited in areas which are also prohibited to vehicles.
   a. Exception, e-bikes are permitted on Pismo State Beach north of Grand Avenue, north of the area closed to motor vehicles.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
8858CF4A691A404...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
New 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4305, 4306, 4307, 4308 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-032-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-032-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4305, 4306, 4307, 4308 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-033-2024**

January 1, 2024

RESTRICTED AREAS

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. All restoration, habitat exclosure, habitat protection, cultural resource, and other areas protected by fence, where posted, are off-limits to all forms of public access.

2. All area boundaries shall be identified by metal wire fence, rope, or other means and/or a combination thereof. All areas shall be identified and signed by "closed" or other similar signs, indicating the area is posted closed to all forms of public access.

3. No person shall access, enter, or occupy a posted closure area, or allow or operate a vehicle in a designated closure area, or allow dogs, horses, or other animals under their control to enter a designated closure area.

4. No person shall camp, park, or stop a motor vehicle within 100 feet of a closure area where signs prohibiting such activities are posted. No person shall attach, affix, or hang any material on any fencing or signpost demarking a closure area.

5. Exceptions to fencing may occur in areas where tidal action prevents the extension of the fence line and where fencing cannot be maintained, "closed" signs will be placed at intervals of not less than 50 feet apart, or as close as is reasonable to the water's edge.

6. State and local law enforcement officers, fire suppression agencies, permitted groups or persons, employees of the department in the performance of their duties or approved persons conducting official business may be exempt from this order.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CE4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District
History: New 2022

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4305, 4306, 4307, 4308 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-033-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-033-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4305, 4306, 4307, 4308 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-034-2024**

January 1, 2024

DAY USE

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. Pismo State Beach and Oceano Dunes State Vehicular Recreation Area (SVRA) are open to vehicular access and use (Day Use) between 7:00 AM to 10:00 PM. Vehicles operating, standing, stopping or parking on Pismo State Beach between 10:00 PM to 7:00 AM is prohibited and a violation of this order.

2. Camping or overnight accommodations on Pismo State Beach (the area north of beach marker post #2) is prohibited.

3. Oceano Dunes SVRA is the designated camping area. Each vehicle shall be registered with the Department for overnight accommodations to remain in the park between 10:00 PM and 7:00 AM. A valid camping receipt, affixed to the vehicle's front windshield and clearly visible is required. All other vehicles are prohibited from use, parking, standing, or stopping.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6858CF4A691A464...

Kevin Pearce, District Superintendent
Oceano Dunes District

History:
New 2022
Revised 2024

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4326 and 4451. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-034-2024**

January 1, 2024

NOTICE OF POSTING

I hereby declare that on January 1, 2024, ORDER NO. 554-034-2024, hereto attached, was posted at the offices of those units where it is to be in effect, as well as at other locations, which were determined necessary by the District Superintendent, Oceano Dunes District.

I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce, District Superintendent
Oceano Dunes District

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4302, 4326 and 4451. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-035-2024**

January 1, 2024

RESTRICTED AREAS | POST 6

The following lands and facilities of the Department of Parks and Recreation, Oceano Dunes District are hereby subject to the following provisions:

1. The area referenced as the Seasonal Bird Exclosure, located within Oceano Dunes State Vehicular Recreation Area, is hereby closed to all public access until such time as this Posted Order is rescinded or amended.

2. The Seasonal Bird Exclosure is defined as that area beginning in the north at the Post 6 boundary, extending south to the southern extent of Oceano Dunes SVRA, south of Post 8, from the west including all shoreline and wave slope areas, extending to the east, along the north-south line of -120.627270 (approximate with slight deviations).

3. The Seasonal Bird Exclosure will be constructed, identified and protected by metal wire fence, rope, or other means and/or a combination thereof. All areas shall be identified and signed by "closed" or other similar signs, indicating the area is posted closed to all forms of public access.

4. No person shall access, enter, or occupy the Seasonal Bird Exclosure area, or allow or operate a vehicle in the Seasonal Bird Exclosure area, or allow dogs, horses, or other animals whether or not under their control, to enter the Seasonal Bird Exclosure area.

5. No person shall camp, park, or stop a motor vehicle within 100 feet of the Seasonal Bird Exclosure area where signs prohibiting such activities are posted. No person shall attach, affix, or hang any material on any fencing or signpost demarking the Seasonal Bird Exclosure area.

6. Exceptions to fencing may occur in areas where tidal action prevents the extension of a fence line and where fencing cannot be maintained, whereby "closed" signs will be placed at intervals of not less than 50 feet apart, or as close as is reasonable to the water's edge.

7. State and local law enforcement officers, fire suppression agencies, permitted groups or persons, employees of the department in the performance of their duties or approved persons conducting official business may be exempt from this order.

Exceptions to this order may be granted in writing by the District Superintendent or designee, Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449. Nothing herein shall affect any existing private contract or property rights. Nothing herein shall be construed in derogation of other provisions of law.

DocuSigned by:
Kevin Pearce
6358D4AA91A464...

Kevin Pearce, District Superintendent
Oceano Dunes District
History: New 2023

*Authority: California Public Resources Code Sections 5001, 5003 and 5008; California Code of Regulations, Title 14, Division 3, Sections 4300, 4305, 4306, 4307, 4308 and 4326. This Order is posted in the Oceano Dunes District Office, 340 James Way, Suite 270, Pismo Beach, CA, 93449 in accordance with the State of California, California Code of Regulations, Title 14, Division 3, Section 4301 (i).*

**STATE OF CALIFORNIA**
DEPARTMENT OF PARKS AND RECREATION

OCEANO DUNES DISTRICT
**ORDER NO. 554-035-2024**

January 1, 2024

NOTICE OF POSTING

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I declare under penalty of perjury that the foregoing is true and correct.

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Kevin Pearce
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Kevin Pearce, District Superintendent
Oceano Dunes District

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# Appendix C. Impacts to Covered Species from Recovery Permit Activities

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# Appendix C. Impacts to Covered Species from Recovery Permit Activities

Any impacts associated with management activities undertaken pursuant to a USFWS 10(a)(1)(A) Recovery Permit (e.g., TE-815214-10) are not included in incidental take numbers described in the HCP. Rather, those impacts to covered species will continue to be addressed directly with the USFWS as part of permitted recovery activities. This appendix describes these impacts.

## C.1 Impacts to SNPL Due to SNPL Recovery Permit Activities

The HCP's conservation program integrates ongoing management intended to protect and recover SNPL (Chapter 5).[1] Currently, all SNPL Recovery Permit activities are conducted under a USFWS 10(a)(1)(A) permit and CDFW MOU (Appendix D). This management program has been successful at protecting and enhancing SNPL populations and enhancing reproductive success to levels that allow for population growth (section 3.3.1.5.1).

Recovery Permit-related impacts could occur if SNPL individuals or eggs are injured, killed, captured, or otherwise harmed by Recovery Permit actions designed to protect and recover the species. The majority of Recovery Permit activities that could result in impacts to SNPL occur during the breeding season, since management efforts are focused on this portion of SNPL life history. Recovery Permit activities that could result in impacts are described in section 4.3.1.2.1. These activities include, but are not limited to the following actions and potential impacts: Banding, which requires capturing SNPL chicks (and potentially adults in the future), could result in injury of SNPL individuals. Handling eggs to float them could result in an egg cracking, and use of seasonal exclosure and/or symbolic fencing to protect nesting SNPL from predators could result in an individual being depredated. Installation, removal, and hand maintenance of seasonal exclosure and symbolic fencing could disturb nesting or brooding SNPL. The use of small single-nest or mini exclosures could result in predators keying in on the exclosures and killing or injuring SNPL. Monitors entering the Exclosures or other active nest areas could cause the direct loss of eggs or chicks if either is stepped on. Monitors could disturb attending adults or broods to the extent that eggs are left vulnerable to predators or inclement weather, and chicks could be separated from the attending adult and abandoned; malnourished; or left vulnerable to predators, inclement weather, or at risk of a monitor's vehicle striking a chick along the closed shoreline or other closed buffer area. Similarly, effects of predator management (e.g., hazing, live trapping, or lethal removal), which may require a predator specialist to enter the Exclosures and/or remain in an area for a prolonged period of time, are similar to the effects of monitoring activities. Habitat enhancement, which requires collecting, transporting, and installing materials (e.g., enhancing wrack, adding woodchips) can also have effects similar to those of monitoring. These recovery-related actions, which incorporate the ongoing conservation program measures and AMMs, may impact all life stages of SNPL. The following synopsis describes past incidences of management-related SNPL impacts in the HCP area.

### C.1.1 Impacts to Adults and Juveniles

To date, very few SNPL adults/juveniles in the HCP area have been banded, and only for replacing worn bands or after rehabilitation. However, banding of adults/juveniles could occur for other purposes in the future. The number of adults/juveniles that could be captured during banding over the permit term is unknown at this time, but for reference, the annual mean minimum number of breeding adults in the

[1] Cross references in this appendix that do not begin with "C" are referring to the Draft HCP.

HCP area from 2002 to 2023 was 157 breeding adults (Table 3-4). Of those individuals, a portion are already banded;[2] therefore, not all adults in the HCP area will need to be captured for banding.

Adult and/or juvenile SNPL in the HCP area are at times found with an injury or illness. As part of the ongoing management program, these individuals are sometimes captured and/or brought to an approved wildlife facility for rehabilitation.[3] This has occurred in 13 of 19 years from 2005 to 2023 (years without events: 2007, 2008, 2010, 2011, 2013, and 2023). The highest number of adults/juveniles that were captured and/or brought to an approved wildlife facility occurred in 2017 when five adults and/or juveniles were captured due to illness or injury (i.e., three adults/juveniles with leg injuries, one juvenile with a wing injury, and one sick juvenile). All but one of these individuals[4] were removed from the HCP area and brought to an approved wildlife facility.

Lethal impacts or harm of adults/juveniles could occur during Recovery Permit activities if an individual is 1) killed or injured by a predator in a small single-nest exclosure or mini-exclosure (adult only); 2) killed or injured by collision with the top or sides of an exclosure (adult or juvenile); or 3) killed or injured during banding activities. Injuries could occur during banding activities, specifically trapping adult birds; however, because an experienced bander will conduct the banding, an injury due to banding is expected to be an infrequent event.

Although exclosures help to protect nests from being depredated, the use of small single-nest or mini exclosures may make the SNPL nest location more visible and may result in predators spotting nests more easily. In addition, adults and juveniles can become tangled or entrapped in the mesh top of the exclosures and/or run into the symbolic fencing or seasonal exclosure fencing while flying. Between 2002 and 2023, five instances of adults dying at small single-nest or mini exclosures were documented, possibly due to predation.

### C.1.2 Impacts to Chicks

As part of the management in the HCP area, CDPR staff and monitors must enter the Exclosures to band SNPL and conduct other management-related activities. CDPR staff and contracted staff band a large portion of the hatched chicks within the HCP area each breeding season. Although chicks must be captured for banding, no chicks have been reported as injured or killed during banding activities. The number of chicks that will be captured during banding over the permit term is unknown at this time, but for reference, CDPR has banded between 156 and 423 SNPL chicks each year from 2003 to 2023.

CDPR staff salvages and rescues chicks in the HCP area each year and brings them to an approved wildlife facility to be reared in captivity when they are found injured, ill, or abandoned (see AMM 90).[5] At times, CDPR also warms injured or sick chicks in a brooder on-site if the chick is expected to recover quickly and can be reunited with an attending adult. The most chicks that have been captured in a year and brought to captive rearing and/or placed in a brooder overnight was in 2017 when five chicks were captured for this purpose. These ongoing salvage and rescue actions, and the associated impacts, are part of the HCP area's existing Recovery Permit activities and separate from AMM 22. When continuing to implement salvage and rescue of eggs and chicks (AMM 90), CDPR staff are not subject to the take limits included with AMM 22.

[2] Banded birds included previously banded chicks that have returned and/or SNPL that have immigrated from other locations.
[3] Currently, CDPR conducts salvage and rescue activities in coordination with the USFWS when these activities are required.
[4] One juvenile was found with a large feather attached to the left leg and restricting movement. The bird was captured, and the feather was removed. The bird was released immediately after removing the feather.
[5] Currently, CDPR conducts salvage and rescue activities in coordination with the USFWS when these activities are required.

Chicks have not been documented as being injured or killed during Recovery Permit activities. However, hand maintenance of a fence or entering the Exclosures on foot to monitor nests or for banding activities could disturb adults and their broods, which could cause chicks to be separated from attending adults. In addition, although unlikely, monitors in vehicles can disturb chicks, which could cause chicks to become separated from adults and/or risk a monitor's vehicle striking a chick along the closed shoreline or other closed buffer area. Chicks that are separated from attending adults are more vulnerable to starvation, depredation, and inclement weather. Chicks have been documented being separated from adults during Recovery Permit activities in the HCP area in the past. In the HCP area chicks will often return to the attending adult, or some of these chicks have been rescued and either reunited with the attending adult or brought to a captive rearing facility. However, if the chicks are not located soon after the disturbance, they could possibly be injured or killed.

Chicks can also be killed or injured by a predator in a small single-nest exclosure or mini exclosure if the exclosure makes the nest more visible to the predator. Chicks are thought to have been killed by a predator in association with a small single-nest/mini exclosure[6] in the HCP area on at least two occasions: in 2005 when three chicks were killed at North Oso Flaco Exclosure, and in 2016 when three chicks associated with a mini-exclosure were killed by a loggerhead shrike in South Oso Flaco.

### C.1.3 Impacts to Eggs

As part of the conservation program, SNPL eggs that have been abandoned are sometimes moved to another nest with non-viable eggs or brought to an approved wildlife facility to be captive reared (AMM 90).[7] These eggs have typically been abandoned due to adult mortality (e.g., predation), being buried in sand during high winds, being overwashed by high tide, or other unknown reasons. The highest number of abandoned nests that were transferred to another nest and/or brought to an approved wildlife facility was in 2021 when 13 nests or 30 eggs were removed from the HCP area and brought to an approved facility for captive rearing; none were transferred to another nest in 2021 (Table C-1).

**Table C-1. Summary of Impacts to SNPL Eggs from Recovery Permit Activities, 2001-2023.**

| Year | Captive rearing | Transferred to nest | Suspected depredation at single-nest exclosure | Injury during monitoring activities | Total |
|---|---|---|---|---|---|
| 2001 | 0 | 0 | 0 | 2 | 2 |
| 2002 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 5 | 0 | 0 | 0 | 5 |
| 2004 | 2 | 0 | 3 | 0 | 5 |
| 2005 | 0 | 0 | 3 | 0 | 3 |
| 2006 | 5 | 0 | 15 | 0 | 20 |
| 2007 | 0 | 0 | 3 | 0 | 3 |
| 2008 | 0 | 0 | 21 | 0 | 21 |
| 2009 | 0 | 0 | 17 | 0 | 17 |
| 2010 | 0 | 0 | 15 | 0 | 15 |

[6] The predation event was not observed, and it cannot be confirmed that the predator keyed in on the exclosure.
[7] Currently, CDPR conducts salvage and rescue activities in coordination with the USFWS when these activities are required.

| Table C-1. Summary of Impacts to SNPL Eggs from Recovery Permit Activities, 2001-2023. | | | | | |
|---|---|---|---|---|---|
| **Year** | **Captive rearing** | **Transferred to nest** | **Suspected depredation at single-nest exclosure** | **Injury during monitoring activities** | **Total** |
| 2011 | 1 | 0 | 10 | 0 | 11 |
| 2012 | 7 | 0 | 3 | 0 | 10 |
| 2013 | 4 | 3 | 0 | 0 | 7 |
| 2014 | 20 | 0 | 0 | 0 | 20 |
| 2015 | 0 | 0 | 0 | 1 | 1 |
| 2016 | 2 | 6 | 0 | 0 | 8 |
| 2017 | 12 | 2 | 0 | 1 | 15 |
| 2018 | 14 | 0 | 0 | 0 | 14 |
| 2019 | 8 | 0 | 0 | 0 | 8 |
| 2020 | 2 | 0 | 0 | 0 | 2 |
| 2021 | 30 | 0 | 3 | 0 | 33 |
| 2022 | 15 | 0 | 0 | 0 | 15 |
| 2023 | 4 | 0 | 0 | 0 | 4 |
| **Total** | **131** | **11** | **93** | **4** | **239** |

Loss of eggs can occur at a large and small single-nest or mini exclosure if those exclosures make it easier for predators to spot nests, and adults incubating nests can become easy prey. Eggs can also be cracked or broken during handling (e.g., to float, assess them for signs of hatch, or mark eggs to determine abandonment) as part of the conservation program, although this has only been documented as occurring twice, once in 2015, when one egg broke open while a monitor was trying to unbury it, and then in 2017, when one egg was damaged while handling it for floating purposes. In addition, death, injury, and/or prolonged/frequent disturbance of nesting adults caused by Recovery Permit actions can lead to nest abandonment and, therefore, result in loss of eggs. Mortality/injury of adults may occur during Recovery Permit-related activities if an adult is 1) killed or injured by a predator keying in on a large or small single-nest exclosure or mini exclosure; or 2) killed or injured by collision with the top or sides of an exclosure. Prolonged or frequent disturbance of adults can occur during management-related activities when monitors enter an active nest area and/or install a single-nest exclosure. In 2001, two nests with one egg each in the open riding area were abandoned following the installation of single-nest exclosures.

Determining the number of nests that fail due to adult mortality and/or abandonment is difficult. Each year, there are a number of nests where monitors suspect failure due to adult mortality and/or abandonment; however, the cause of mortality and/or abandonment is often not determined. In most years between 2001 and 2023, anywhere from 3 to 15 eggs were lost each year, and it was thought that these losses could be due to predation or an adult abandoning a nest at a small single-nest exclosure or mini exclosure, including during installation. The highest number of eggs thought to be lost in a small single-nest/mini exclosures occurred in 2008, when 21 eggs were depredated and/or abandoned at single-nest exclosures (Table C-1). At least three of these occurrences were within the same area in South Oso Flaco.

## C.2 Impacts to CLTE Due to CLTE Recovery Permit Activities

The HCP's conservation program integrates ongoing management actions intended to protect and recover CLTE (Chapter 5). Currently, all CLTE Recovery Permit activities are conducted under a USFWS 10(a)(1)(A) permit and CDFW MOU (Appendix D). The management program has been successful at protecting and enhancing CLTE populations and enhancing reproductive success to levels that allow for population growth (section 3.3.2.4).

Recovery Permit-related impacts could occur if CLTE individuals or eggs are injured, killed, or otherwise harmed by management actions designed to protect and recover CLTE. Recovery Permit activities are not anticipated to result in injury or mortality of CLTE within aquatic foraging habitat. Recovery Permit activities that could result in impacts to CLTE within terrestrial habitat are described in section 4.4.1.2.1. These activities include, but are not limited to, the following actions and potential impacts: Banding could result in injury of CLTE chicks. Hand maintenance of seasonal exclosure and symbolic fencing could disturb nesting or attending CLTE. Monitors entering the Southern Exclosure or other active nest areas could cause the direct loss of eggs or chicks if they are stepped on. Monitors could disturb attending adults or broods to the extent that eggs are left vulnerable to predators or inclement weather, and chicks could be separated from the attending adult and either abandoned; malnourished; or left vulnerable to predators, inclement weather, nearby territorial aggressive adults, or risk of a monitor's vehicle striking a chick along the closed shoreline or other closed buffer area. Handling eggs to float them could result in an egg cracking, and the use of a single-nest exclosure could result in predators keying in on the exclosures and killing or injuring CLTE. Similarly, effects of predator management (e.g., hazing, live trapping, or lethal removal), which may require a predator specialist to enter the Exclosures and/or remain in an area for a prolonged period of time, are similar to the effects of monitoring activities. Habitat enhancement, which requires collecting, transporting, and installing materials (e.g., enhancing wrack, adding woodchips) can also have effects similar to those of monitoring. These recovery-related actions, which incorporate the ongoing conservation program measures and AMMs, may impact all life stages of CLTE. The following synopsis describes past incidences of management-related CLTE impacts in the HCP area.

### C.2.1 Impacts to Adults and Juveniles

No adults or juveniles have been directly observed being injured or killed from Recovery Permit-related activities. Overall, exclosure fencing has been demonstrated to protect CLTE adults/juveniles from predation and human disturbance in the HCP area. The exclosure fences are considered a recovery activity, and CDPR is specifically authorized under the recovery permit to install the large seasonal exclosure and other nest protection. Any instances when adult or juvenile CLTE are incidentally taken by fence strikes are covered under the HCP and not through the Recovery Permit.

### C.2.2 Impacts to Chicks

Recovery Permit activities have greatly increased CLTE reproductive success in the HCP area since 2001. As part of the conservation program in the HCP area, CDPR staff and monitors enter the Southern Exclosure to band chicks and conduct other management-related activities. CDPR staff does not capture CLTE chicks for captive rearing. CDPR staff and contracted staff band a large portion of hatched CLTE chicks within the HCP area each breeding season. Although no chicks have been reported as injured or killed during banding activities, chicks are captured in order to conduct the banding activities. Between 2003 and 2023, CDPR has banded between 25 and 101 CLTE chicks each year.

Entering the Southern Exclosure for monitoring activities or hand maintenance of a fence can disturb adults causing CLTE to launch and vocalize and may draw their attention away from the nest or cause them to abandon the nest and leave chicks vulnerable to predation, inclement weather, or starvation. In

addition, monitoring activities can flush chicks into the open riding area, and a monitor may need to pick up the chicks and move them back to the safety of the exclosure. For example, in 2013 two chicks moved into the open riding area during banding activities and had to be picked up by a monitor and moved to safety. In addition, although it has not been documented in the HCP area to date, adults could be depredated at a single-nest exclosure if a predator keys in on the exclosure, thus leaving the chicks unattended and exposed to inclement weather and/or predation.

### C.2.3 Impacts to Eggs

Recovery Permit activities have greatly increased CLTE reproductive success in the HCP area since 2001. Abandoned CLTE eggs in the HCP area are not brought to a captive rearing facility because captive rearing of CLTE is currently not an option. However, when a nest with eggs is found abandoned, CDPR currently replaces non-viable eggs from an active nest with the abandoned eggs, if possible. CDPR will continue to do this in the future.

No Recovery Permit-related activities have resulted in a monitor stepping on a nest and crushing eggs. In addition, no CLTE nests are known to have been abandoned due to an adult being disturbed by Recovery Permit activities or an adult nesting within a single-nest exclosure being depredated; however, these events may go undocumented and may occur in the HCP area. Hand repair of an exclosure fence or monitors entering the nesting colony have the potential to cause CLTE to launch and vocalize and may draw the attention of CLTE away from nests or cause them to abandon the nest, which could potentially leave the eggs vulnerable to predation and inclement weather. Eggs can be cracked or broken during handling (e.g., when monitors assess them for signs of hatch or mark eggs to determine abandonment) as part of the management program. Handling eggs for floating purposes is a new activity under the Recovery Permit, and although future loss as a result of floating is unknown, it is expected to be low and similar to SNPL where only one SNPL egg has ever been damaged.

## C.3 Impacts to SWPT Due to Recovery Permit Activities

The following activities implemented to further recovery of covered animal species could impact SWPT:

- Tidewater goby and salmonid surveys (CA-13)
- Monitoring and management for listed herpetological resources (CA-14)

It is anticipated the activities discussed in this section will be covered by a future amendment to applicable USFWS Recovery Permits.

Funnel traps set out for SWPT (if conducted), CRLF dipnet/seine surveys (if conducted), and tidewater goby and salmonid surveys can potentially result in injury or mortality of SWPT. Although AMMs are implemented to minimize loss of SWPT from these activities, mortality and/or injury could still occur. Adults/sub-adults/juveniles and eggs could be injured or killed/crushed each year due to these recovery activities.

Funnel traps will be used to survey for SWPT. CLRF dipnet/seine surveys are not regularly conducted in the HCP area but may be conducted, if necessary. Funnel traps are designed to collect SWPT, and dipnet/seine surveys could result in incidental capture of hatchling, juvenile, or adult SWPT. Predators can target traps and kill or injure SWPT. In addition, at times, an aquatic species cannot be identified during visual surveys and may need to be captured to identify the species accurately.

## C.4 Impacts to CRLF Due to Recovery Permit Activities

The following activities implemented to further recovery of covered animal species could impact CRLF:

- Tidewater goby and salmonid surveys (CA-13)

- Monitoring and management for listed herpetological resources (CA-14)

Although AMMs are implemented to minimize loss of CRLF from these activities, mortality and/or injury could still occur. Adults/sub-adults/juveniles, tadpoles, and egg masses could be injured or killed each year due to CRLF dipnet/seine surveys and/or tidewater goby and salmonid surveys.

CRLF dipnet/seine surveys are not regularly conducted in the HCP area but may be conducted, if necessary. Dipnet/seine surveys result in capture of larval CRLF. In addition, at times, an amphibian species cannot be identified during visual surveys and may need to be captured to accurately identify the species. CRLF adult/sub-adults/juveniles and tadpoles may be captured each year during dipnet/seine surveys, if they occur.

## C.5 Impacts to WSF Due to Recovery Permit Activities

The following activities implemented to further recovery of covered animal species could impact WSF:

- Installation and maintenance of SNPL and CLTE protection fences (CA-12a)
- SNPL and CLTE monitoring and management (CA-12b)
- Tidewater goby and salmonid surveys (CA-13)
- Monitoring and management for listed herpetological resources (CA-14)

It is anticipated the activities discussed in this section will be covered by a future amendment to applicable USFWS Recovery Permits. Although AMMs are implemented to minimize loss of WSF from these activities, mortality and/or injury could still occur.

Heavy equipment activity associated with installation, maintenance, and removal of the seasonal exclosure has the potential to crush dispersing or aestivating WSF. Habitat management in the seasonal exclosure will also involve heavy equipment, which could cause vibrations or noise that could impact dispersing or aestivating WSF. Heavy equipment could crush aestivating individuals, or vibration from heavy equipment could force individuals out of aestivation, causing them to expend energy and making them vulnerable to predators or exposure to elements.

Adults/sub-adults/juveniles, tadpoles, and egg masses could be injured or killed each year due to WSF dipnet/seine surveys, and tidewater goby and salmonid surveys. CLRF dipnet/seine surveys are not regularly conducted in the HCP area but may be conducted, if necessary. Dipnet/seine surveys could result in capture of egg masses or larval WSF. In addition, at times, an amphibian species cannot be identified during visual surveys and may need to be captured to accurately identify the species.

## C.6 Impacts to Tidewater Goby Due to Recovery Permit Activities

Tidewater gobies are captured during surveys conducted to monitor the population. Between 2005 and 2023, anywhere from zero to tens of thousands of tidewater gobies have been captured during each individual survey. CDPR estimates that hundreds of thousands of tidewater gobies could be captured annually during multiple fisheries surveys.

Impacts to tidewater gobies in the form of injury or death during capture and handling could also occur from species monitoring, as identification of tidewater goby or CRLF tadpoles requires seining or dipnetting in tidewater goby habitat at Arroyo Grande Creek and Estuary and Pismo Creek Lagoon. Similarly, dipnetting or other survey methods involving capture may be implemented for SWPT monitoring. Mortality or injury can occur if a tidewater goby becomes tangled in a seine or dipnet or is trampled during survey work (including those that may be trampled when inside a burrow).

Between 2008 and 2023, a maximum of three individuals were documented as being incidentally harmed during fisheries surveys. No tidewater goby has been documented as being incidentally harmed during herpetological surveys to date.

# Appendix D. Permits

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NATIVE ENDANGERED & THREATENED SP.
RECOVERY - E & T WILDLIFE
**Permit Number:** ES815214
**Version Number:** 10
**Effective:** 2022-07-12 **Expires:** 2027-07-11

**Issuing Office:**

**Department of the Interior**

**U.S. FISH AND WILDLIFE SERVICE**

ES Sacramento Permit Office
2800 Cottage Way, Suite W-2606
Sacramento, California 95825-1846
permitsR8ES@fws.gov

**Digitally signed by**

**Permittee:**

OCEANO DUNES DISTRICT
340 JAMES WAY, SUITE 270
PISMO BEACH, CA 93449
US

Authority: Statutes and Regulations: 16 U.S.C. 1539 (a), 16 U.S.C. 1533 (d), 16 U.S.C 703-712 50 CFR 17.22, 50 CFR 17.32, 50 CFR 21.23, 50 CFR 21.27, 50 CFR 13

**Location where authorized activity may be conducted:**

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

**Reporting requirements:**

See permit conditions for reporting requirements

**Authorizations and Conditions:**

A. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accordance with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local tribal, or other federal law.

C. Valid for use by permittee named above.

# SPECIAL TERMS AND CONDITIONS

Oceano Dunes District

1. Previous Permit Issuance

This permit was previously issued on April 22, 2016 (permit number TE-815214-9). The Special Terms and Conditions set forth in that permit are hereby superseded by this renewal with changes.

2. Permit Acceptance

Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the "General Permit Procedures and Permit Regulations for Native Endangered and Threatened Wildlife Species Permits". These regulations may be accessed at title 50 of the Code of Federal Regulations (CFR) National Archives. The respective regulations are as follows: 50 CFR Part 13, 50 CFR 17.21 and 17.22 (endangered wildlife) and/or 50 CFR 17.31 and 17.32 (threatened wildlife), and/or 50 CFR Part 13, 50 CFR 17.61 (endangered plants), and/or 50 CFR 17.62 (threatened plants).

3. Authorized Take

The permittee is authorized to take: harass by survey, locate and monitor nests, use remote sensing cameras near nests, float eggs, remove non-viable eggs, remove viable eggs from abandoned nests, replace non-viable eggs with viable eggs from abandoned nests, transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing, move eggs a short distance for preservation from natural elements, capture and band adults and chicks, conduct rescue activities, release, erect fence and nest exclosures, and control predators (western snowy plover [*Charadrius nivosus nivosus*] (Pacific Coast population Distinct Population Segment)); harass by survey, locate and monitor nests, use remote sensing cameras near nests, float eggs, remove non-viable eggs, remove viable eggs from abandoned nests, replace non-viable eggs with viable eggs from abandoned nests, transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing, move eggs a short distance for preservation from natural elements, capture and band chicks, conduct rescue activities, release, erect fence and nest exclosures including a chick fence, and control predators (California least tern [*Sterna antillarum browni*]); harass by survey, capture, handle, and release (California red-legged frog [*Rana aurora draytonii*]); harass by survey, capture, handle, photograph (as vouchering tool), release, and collect voucher specimens (tidewater goby [*Eucyclogobius newberryi*]).

All authorized activities are with endangered and/or threatened species for scientific purposes that promote recovery, enhancement of propagation, or survival of the species, as specified in the permittee's February 11, 2021, permit renewal with changes, and in accordance with the Special Terms and Conditions stated in this permit.

4. Authorized Geographic Areas

Permitted activities are restricted to the following geographic areas in California:

a. For western snowy plover and California least tern:

i. San Luis Obispo and Santa Barbara Counties.

b. For California red-legged frog and tidewater goby:

i. Area of responsibility of Ventura Field Office.

This permit does not authorize access to Federal, Tribal, State, local government, or private lands as it is the responsibility of the permittee to obtain landowner permission prior to commencing permitted activities on such lands.

5. Service Contacts

For information regarding Pacific Southwest region (California, Nevada and the Klamath Basin portion of Oregon) Ecological Services programs and offices – including contacts for the U.S. Fish and Wildlife Service (Service) Regional Office and Fish and Wildlife Offices (Field Offices), as well as jurisdictional boundaries – please refer to the information available at the Pacific Southwest United States Fish and Wildlife Service website, and/or at the Pacific Southwest Recovery Permitting webpage under 'Permitting Offices and Contacts'.

The applicable Field Office to this permit is as follows:

Ventura Fish and Wildlife Office (Ventura Field Office)

6. 15-Day Notification

Notifications to conduct activities at the above authorized geographic area(s) pursuant to this permit shall be submitted by email to the Ventura Field Office Recovery Permit Coordinator at least 15 days *prior* to conducting such activities.

The 15-day Notification (notice) shall include, as appropriate:

a. An explanation of the purpose of the study and a clear description of methods to be employed, including the names of field personnel, and the number and dates of surveys and/or collection, the location of project, and name of the county (if applicable);

b. The number of individuals proposed to be captured and/or collected (if applicable);

c. A map (at a minimum, a 1:24,000 scale U.S. Geological Survey (USGS) topographical map) depicting the location of the authorized activity;

d. The Assessor's Parcel Number (APN) for the site, the name of the property, and the name of property owner and the respective contact details (if available);

e. Geographic information system (GIS) data depicting the survey site or global positioning system (GPS) coordinates (if possible);

f. A description of the capture and marking techniques (if applicable); and

g. The permit number.

Fifteen (15) days after the Service's receipt of the notice, the permittee may commence activities authorized by this permit, unless authorization is denied by the Service. If the permittee is denied authorization to conduct the proposed activities, a request for reconsideration may be submitted to the Regional Ecological Services Program Leader for the Pacific Southwest Region:

a. Pacific Southwest Regional Office: U.S. Fish and Wildlife Service, Endangered Species Permit Office, 2800 Cottage Way, Room W-2606, Sacramento, CA 95825-1846 (email: permitsR8ES@fws.gov).

The procedures specified in 50 CFR 13.29(b) shall be followed.

7. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (List) are authorized to independently conduct activities under this permit. Each named individual shall be responsible for compliance with the Special Terms and Conditions in this permit. The List shall be retained with these Special Terms and Conditions.

To request changes to the List, the permittee shall submit requests via email to the Ventura Field Office Recovery Permit Coordinator at least 30 calendar days prior to the requested effective date. The request shall be signed and dated by the permittee and include the following information:

a. The permit number;

b. The name of each new individual to be appended to the List;

c. The resume and qualifications statement of each new individual, detailing their education, training, and experience with authorized species and authorized activities in this permit, or similar species and activities, and type of activity for which authorization is being requested (table recommended);

d. Letters of reference for each new individual, which address the individual's qualifications and aptitude for the specific activities and each authorized species to be conducted in independent status. The names, titles, organizations, email

addresses, and phone numbers of each reference writer shall be provided in each letter; and

e. The names of any individuals to be deleted from the List.

The permittee shall include the current updated version of the List with this recovery permit once it is received from the Ventura Field Office.

Note: This procedure is for personnel changes to the List only. For requests to renew and/or amend this permit, a complete application and appropriate processing fee shall be submitted through the Service's electronic permitting website (ePermits) available at the ePermits Public Portal.

8. Taking of the California red-legged frog (frog):

The permittee is authorized to conduct presence/absence surveys for adult, juvenile, and larval frogs through harass by survey, capture, handle, and release within the geographic boundaries specified above, and the time limitation specified in the permit, provided that:

a. The permittee conducts all surveys in accordance with the approved *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* (Guidance), dated August 2005, unless authorized in advance by the Ventura Field Office Recovery Permit Coordinator.

b. If water conditions allow that visual surveys are feasible and adequate, only visual survey methods will be employed. Snorkeling and walking through shallow water may be used during visual sampling.

c. For presence/absence surveys, if positive identification of the frog is made at a site, no capture and handling will be done.

d. If adults, juveniles, or larvae cannot be positively identified through visual surveys then individuals may be captured by hand or dip-netting and the permittee will implement the following measures:

i. Handling will be done in an expedient manner with minimal harm to the individuals being handled. Handling of frogs will be done with wet hands.

ii. The hands and arms of all workers handling frogs will be free of lotions, creams, sunscreen, oils, ointment, insect repellent, or any other material that may harm frogs.

iii. Larval frogs will not be handled out of the water for longer than 30 seconds unless rewetted and will not be retained for longer than 5 minutes for processing.

iv. If captured frogs exhibit signs of distress (*e.g.*, lack of response to stimuli or erratic behavior), they will be immediately released at the point of capture.

v. All captured frogs will be released at the point of capture unless that location puts them in imminent danger. Frogs that are necessary to relocate shall be placed in the closest suitable habitat.

vi. The number of frogs to be captured is no more than 30 adults per habitat location per year.

e. No egg masses may be disturbed or injured in any manner for any activity authorized in this permit.

f. Amplexing pairs of frogs will not be captured, handled, or disturbed.

g. Frogs will not be removed from the wild and held in captivity for any reason unless prior approval is acquired by the Ventura Field Office Recovery Permit Coordinator or unless the severity of an injury to the frog obviates immediate care. Animals will be transported according to accepted methods, in moist cloth bags or in terrarium with moisture gel or non-cellulose sponge to minimize desiccation.

h. Information on new localities for the frog will be immediately reported via email to the Ventura Field Office Recovery Permit Coordinator and the California Natural Diversity Database – as specified in the 'California Natural Diversity Database' section – within 3 working days of their discovery.

i. When working in potential frog habitats, such as freshwater streams, vernal pools, agricultural canals, and stock ponds, the permittee will be aware of all areas known to support co-occurring endangered and threatened species, including: tidewater gobies (*Eucyclogobius newberryi*), California freshwater shrimp (*Syncaris pacifica*), California tiger salamanders (*Ambystoma californiense*), and giant garter snakes (*Thamnophis gigas*). The permittee will take suitable precautions to avoid injuries and mortalities to these species, up to and including avoidance of the area.

j. Mutilation marking schemes (*e.g.*, toe clip), marking with an invasive technique (*e.g.*, PIT-tagging), biological sampling, translocation, use of anesthetics, swabbing for chytrid fungus, relocation during habitat restoration, and collecting voucher specimens are *not* authorized pursuant to this recovery permit.

k. Within 45 days following completion of a presence/absence survey, a survey report shall be submitted to the Ventura Field Office Recovery Permit Coordinator that includes:

i. On the cover page of the report, include the title, location, permit number, permittee name and their respective contact details, date and time frame of the activity, and date of preparation on the report.

ii. A map (at a minimum, a 1:24,000 scale USGS topographic map) depicting the location and boundary of the survey area(s);

iii. A qualitative description of the plant communities (including dominant species and habitat quality) on and adjacent to the survey area;

iv. A complete description of survey methods including the names of personnel, the number of acres surveyed per biologist per survey-day, the number and dates of surveys, survey routes, the temperature and weather conditions at the beginning and end of each survey, and how frequently recorded vocalizations (where authorized) were used, if at all;

v. The number, age, and sex of all sensitive species detected, and these data shall also be plotted on 1:24,000 scale map(s) of the survey area;

vi. The assessor's parcel number for the site, the name of the property, and the name of property owner and contact details (if possible);

vii. GIS data or GPS coordinates (if possible);

viii. A conclusion section that specifically provides recommendations for recovery of the species;

ix. Other pertinent observations made during survey efforts; and

x. The following certification statement signed by each surveyor(s) performing activities in independent status pursuant to this permit: "*I certify that the information in this survey report and attached exhibits fully and accurately represents my work.*" The date of signature and the surveyor's permit number shall be included.

xi. All survey reports shall be submitted electronically following the 'Electronic Reporting Requirements' section.

9. Taking of the tidewater goby (goby):

The permittee is authorized to harass by survey, capture, handle, photograph (as a vouchering tool), release, and collect voucher specimens within the geographical area specified above, and the time limitation specified within the permit, provided that:

a. In an effort to minimize the spread of pathogens and invasive species that may be transferred because of permitted activities, surveyors shall follow the conditions

outlined below for disinfecting equipment and clothing before and after entering a wetland.

i. All organic matter shall be removed from nets, traps, boots, vehicle tires and all other surfaces that have been exposed to water or potentially contaminated sediments.

ii. Boots, nets, traps, hands, etc., shall be scrubbed with a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128 (1 to 60), or a 3 to 6 percent sodium hypochlorite solution. Equipment shall be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland shall be avoided (*e.g.*, clean in an area at least 100 feet from aquatic features). Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, *etc*.) shall be disposed of safely, and if necessary, taken back to the lab for proper disposal.

b. As applicable, the permittee shall follow the tidewater goby survey protocol guidelines included in Appendix F of the Service's 2005 *Recovery Plan for the Tidewater Goby* (*Eucyclogobius newberryi*).

c. A visual survey for amphibian egg masses must be conducted prior to sampling for gobies in areas where amphibian eggs could be present. If amphibian egg masses are observed, the area must be avoided.

d. Gobies may be weighed, measured, sexed, examined and/or photographed for general condition and other demographic purposes. Handling will be done in an expedient manner with minimal harm to the individuals being handled.

e. Gobies shall be released as near as possible to the point of capture unless otherwise authorized via email by the Ventura Field Office Recovery Permit Coordinator.

f. If water conditions and data requirements are such that visual surveys for gobies are feasible and adequate, only visual survey methods shall be used to determine the presence and the approximate number of gobies in an area. Snorkeling and walking through shallow water may be used during visual surveys. The permittee shall take note and avoid all areas previously known to support the burrows of gobies to the extent practicable.

g. If water conditions or data requirements are such that visual surveys for gobies are not feasible or adequate, gobies may be captured. The survey methods shall be selected to minimize potential injury or mortality to gobies and potential disturbance or damage to breeding areas.

i. Capture with dip nets or seine nets shall be achieved with woven mesh size no greater than 4 millimeters in width. If seines or hand-towed ichthyoplankton nets are used, care shall be taken to avoid incidental injury or mortality to gobies that may be caught and suffocated in algal mats. All algae removed from the net shall be returned to the water at the survey site as expeditiously as possible in the event that gobies may remain within the algae.

ii. For each individual seine haul in a seine survey, the following information must be recorded: the specific location within the slough, lagoon, or estuary; the species (*i.e.*, fish, amphibians, and invertebrates) that are captured in each seine haul; and the numbers of each species.

iii. Minnow trapping, throw trapping, or artificial burrow trapping may be conducted according to the survey methods described in Appendix F of the recovery plan for the species.

h. During all sampling activities, the permittee shall separate gobies from other fish species in order to prevent predation to the maximum extent practicable.

i. Handling shall require minimal exposure out of water. The bagged portion of seines and nets shall remain in the water until all tidewater gobies are removed, or tidewater gobies are transferred to a shallow container(s) of clean water taken from the survey site and placed in a shaded location that will not result in exposure to extreme temperatures.

j. If gobies are removed from the water at the sample site, they shall be placed gently into a shallow container(s) (*e.g.*, bucket) of clean water taken from the survey site. Each container(s) shall be aerated if the water temperature exceeds 20 degrees Centigrade or if gobies are anticipated to remain in the container over 30 minutes. No other species shall be placed in the container(s) occupied by gobies. All captured gobies shall be returned to the site of capture in good condition as soon as possible and as near as possible to the point of capture. Return gobies from the container to point of capture by gently pouring them back into the water at the site of capture.

k. Any gobies exhibiting signs of physiological stress shall be released immediately at point of capture.

l. Disturbance and damage to goby burrows, eggs, and young shall be minimized by using the smallest and lightest seines as practicable for the sample location.

m. Electrofishing is not authorized by this permit. Electrofishing methods are prohibited in known and potential goby habitat.

n. Gobies shall not be anesthetized or marked at any time unless approved in writing by the Ventura Field Office Recovery Permit Coordinator.

o. Prior to activities that may involve handling gobies, the permittee and any assistants shall ensure that their hands are free of sunscreen, lotion, and insect repellent.

p. The permittee shall contact the Ventura Field Office Recovery Permit Coordinator within one week if catch rates or overall population sizes at a given locality are, or appear to be, appreciably lower than those of previous years.

q. Sampling efforts for determining only presence shall cease upon a determination that gobies are present in the area under consideration, unless vouchering is allowed.

r. If gobies are identified at a previously unoccupied or extirpated location, the permittee is authorized to take a limited number of voucher specimens, provided that:

i. Unless this permit authorizes otherwise, collection of voucher specimens shall be restricted to sites not included in the list of occupied locations in the recovery plan and reported extirpated locations. This list may be periodically updated by the Service.

ii. Capture of voucher specimens shall be achieved using the methods described in the above terms and conditions.

iii. The number of voucher specimens taken from any drainage shall not exceed the lesser of 1 percent of the population of that drainage, or five individuals. A maximum of 100 voucher specimens may be collected from all drainages in total per the permit's duration (5 years).

iv. If any gobies are incidentally injured or killed during permitted activities, those individuals shall be preserved as voucher specimens and shall count toward the limit for voucher specimens.

v. Gobies taken as voucher specimens shall be euthanized in a humane manner and provided to a designated repository within 120 days of collection. Each specimen shall be accompanied with supporting data, including collector's name and contact details, permit number, date collected, specific location, and a brief description of the method of preservation.

vi. The Ventura Field Office Recovery Permit Coordinator shall be notified within 3 business days of the number of voucher specimens taken, the locations, and the reason for the taking.

s. Within 45 days following completion of a survey, a report shall be submitted to the Ventura Field Office Recovery Permit Coordinator, that includes the following:

i. On the cover page of the report, include the title, location, permit number, permittee name and their respective contact details, date and time frame of the activity, and date of preparation on the report.

ii. A map (at a minimum, a 1:24,000 scale USGS topographic map) depicting the location of the survey area and sampling locations, and a table that provides the Universal Transverse Mercator coordinates of the sampling locations;

iii. A complete description of survey methods including the names of personnel, the amount of area surveyed, seine net size, distance seined, the number and dates of surveys, the temperature and weather conditions at the beginning and end of each survey;

iv. A qualitative description of the aquatic community, including dominant emergent and submergent plant species and habitat quality on and adjacent to the survey area (we recommend including one or more representative photographs);

v. Habitat characteristics (*e.g.*, cover, riparian zone, benthos and bottom description), including status of the lagoon/estuary (open to the ocean, or closed) and water quality observations (*e.g.*, water temperature, dissolved oxygen, salinity, depth, flow rate, and pH of the water);

vi. The presence of tidewater goby nests/burrows, fry and young, and reproductive condition (based on color and external form);

vii. The number, size, weight, age (adult, juvenile, or unknown), and sex of all captured tidewater gobies;

viii. For each individual seine haul in a seine survey, the following information must be provided: the specific location within the slough, lagoon, or estuary; a list of the species (fish, amphibians, and invertebrates) that were captured in each seine haul; and the numbers of each species;

ix. A conclusion section that specifically provides recommendations for recovery of the species.

x. Other pertinent observations made during survey efforts; and

xi. The following certification statement signed by each surveyor(s) performing activities in independent status pursuant to this permit: "*I certify that the information in this survey report and attached exhibits fully and accurately represents my work.*" The date of signature and the surveyor's permit number shall be included.

xii. All survey reports shall be submitted electronically following the 'Electronic Reporting Requirements' section.

10. Taking of the western snowy plover (plover):

The permittee is authorized to conduct population surveys, locate and monitor nests, use remote sensing cameras near nests, band adults and plover chicks near the nest and release, handle and float eggs to determine incubation stage, remove non-viable eggs, remove viable eggs from abandoned nests, replace non-viable eggs with viable eggs from abandoned nests, transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing, move eggs a short distance for preservation from natural elements, conduct rescue activities, erect fence exclosures, and conduct predator control activities within the geographic boundaries specified above, and the time limitation specified in the permit, provided that:

a. Disturbance to nesting plovers shall be avoided during certain climatic conditions, such as high wind and extreme cold or heat. Attempts shall be made to minimize the amount of time spent in plover nesting areas.

b. Activities are conducted in such a way that the safety of individual plovers and their nests, eggs, and young are not compromised.

c. Remote sensing cameras may be used near nests as described in the permittee's amendment application dated February 11, 2021.

d. Chicks are captured by hand, preferably near the nest (*e.g.*, within 30 feet) when possible, and shall be released at the capture site within 20 minutes, as long as the release would not compromise the safety of the chick. Rescue activities are exempt.

e. Not more than 20 minutes shall be spent on any single day attempting to capture an individual chick. Chicks shall not be pursued for more than 2 minutes in a single capture attempt. Rescue activities are exempt.

f. Chicks shall not be disturbed if the ambient temperature, measured 3 inches above the sand, exceeds 85 degrees Fahrenheit. Rescue activities are exempt.

g. Individual(s) banding and color-marking chicks must first obtain a valid Federal Migratory Bird Banding Permit with auxiliary color-marking authorization from the Ventura Field Office. All banding and color-marking are done under valid a Federal Migratory Bird Banding Permit with auxiliary color-marking authorization. The use of specific colors for color-banding shall be coordinated with the USGS, Biological Resources Division, Bird Banding Laboratory, Patuxent Wildlife Research Center, Gabrielson Lab, 12100 Beech Forest Road, Laurel, Maryland 20708-0422 (telephone: 301-497-5942).

h. No more than four bands (including an aluminum Service band) are attached per chick, with no more than two bands per leg.

i. Abandoned plover eggs may be collected from the wild provided that:

   i. The permittee shall confirm that the eggs are abandoned. To confirm if eggs are abandoned, the permittee shall unbury unattended egg(s) if they are buried in sand, create a nest scrape, smooth the sand around the egg(s), and check the egg(s) a minimum of once every 12 hours over a period of at least 24 hours to look for signs of nest attendance. If no adult plover tracks are sighted around the egg(s) in that time period, and there are no other signs of nest attendance by adults, then the permittee may collect the egg(s). Other methodologies may be allowed upon receiving approval by the Service.

   ii. The permittee may lightly mark the top of egg(s) with a soft-tipped marker to determine if the egg(s) are being turned, which is a sign of active incubation. The permittee may place a camera at the nest to confirm abandonment. If camera confirms nest is not attended for 24 hours, the eggs may be collected.

j. When possible, all efforts will be made to replace non-viable eggs from active nests with viable eggs from abandoned nests. All remaining abandoned viable snowy plover eggs may be collected for captive rearing. No collection of viable eggs from active nests is authorized.

k. Eggs may be moved a short distance for preservation from natural elements (*e.g.* high water, shifting sand, wind-blown) or away from an exclosure/fence.

l. For predator control activities, the use of vehicles shall be restricted to the shoreline in the area closed to the public.

m. A final report shall be submitted to the Ventura Field Office as specified in the ‘Annual Reports’ section for each project specific survey conducted for the plover.

n. Within 45 days following completion of a presence/absence survey, a survey report shall be submitted to the Ventura Field Office Recovery Permit Coordinator that includes:

i. On the cover page of the report, include the title, location, permit number, permittee name and their respective contact details, date and time frame of the activity, and date of preparation on the report.

ii. A map (at a minimum, a 1:24,000 scale USGS topographic map) depicting the location and boundary of the survey area(s);

iii. A qualitative description of the plant communities (including dominant species and habitat quality) on and adjacent to the survey area;

iv. A complete description of survey methods including the names of personnel, the number of acres surveyed per biologist per survey-day, the number and dates of surveys, survey routes, the temperature and weather conditions at the beginning and end of each survey, and how frequently recorded vocalizations (where authorized) were used, if at all;

v. The number, age, and sex of all sensitive species detected, and these data shall also be plotted on 1:24,000 scale map(s) of the survey area;

vi. The assessor's parcel number for the site, the name of the property, and the name of property owner and contact details (if possible);

vii. GIS data or GPS coordinates (if possible);

viii. A conclusion section that specifically provides recommendations for recovery of the species;

ix. Other pertinent observations made during survey efforts; and

x. The following certification statement signed by each surveyor(s) performing activities in independent status pursuant to this permit: "*I certify that the information in this survey report and attached exhibits fully and accurately represents my work.*" The date of signature and the surveyor's permit number shall be included.

xi. All survey reports shall be submitted electronically following the 'Electronic Reporting Requirements' section.

11. Taking of the California least tern (tern):

The permittee is authorized to conduct population surveys, locate and monitor nests, use remote sensing cameras near nests, and capture, band, and release chicks, handle and

float eggs to determine incubation stage, remove non-viable eggs, remove eggs from abandoned nests, replace non-viable eggs with viable eggs from abandoned nests, transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing, move eggs a short distance for preservation from natural elements, conduct rescue activities, erect fence exclosures including a chick fence, and conduct predator control activities within the geographic boundaries specified above, and the time limitation specified in the permit, provided that:

a. Disturbance to nesting terns shall be avoided during certain climatic conditions, such as high wind and extreme cold or heat. Attempts shall be made to minimize the amount of time spent in tern nesting areas.

b. Activities are conducted in such a way that the safety of individual terns and their nests, eggs, and young are not compromised.

c. Capture, banding, marking, and handling of adult terns is not authorized under this permit. Rescue activities are exempt.

d. When entering the nesting colony for any purpose, activities shall be conducted as unobtrusively as possible and with the least amount of disturbance to the colony.

e. Remote sensing cameras may be used near nests as described in the permittee's amendment proposal dated January 4, 2011.

f. Chicks are captured by hand, preferably near the nest (*e.g.,* within 30 feet) when possible, and shall be released at the capture site within 20 minutes, as long as the release would not compromise the safety of the chick. Rescue activities are exempt.

g. Not more than 20 minutes shall be spent on any single day attempting to capture an individual chick. Chicks shall not be pursued for more than 2 minutes in a single capture attempt. Rescue activities are exempt

h. Chicks shall not be disturbed if the ambient temperature, measured 3 inches above the sand, exceeds 85 degrees Fahrenheit. Rescue activities are exempt.

i. Chicks are to be banded before release. Individual(s) banding and color-marking chicks must first obtain a valid Federal Migratory Bird Banding Permit with auxiliary color-marking authorization from the Ventura Field Office. All banding and color-marking shall be done under a valid Federal Migratory Bird Banding Permit with auxiliary color-marking authorization. The use of specific colors for color-banding shall be coordinated with the USGS, Biological Resources Division Bird Banding Laboratory, Patuxent Wildlife Research Center, Gabrielson Lab, 12100 Beach Forest Road, Laurel, Maryland 20708-0422 (telephone: 301-497-5942).

j. No more than two bands (including an aluminum Service band and a color band) are attached per chick, with no more than one band per leg.

k. Eggs may be floated to estimate hatching date only if this cannot be done using other monitoring data.

l. Abandoned tern eggs may be collected from the wild provided that:

i. The permittee shall confirm that the eggs are abandoned. To confirm if eggs are abandoned, the permittee shall unbury unattended egg(s) if they are buried in sand, create a nest scrape, smooth the sand around the egg(s), and check the egg(s) a minimum of once every 12 hours over a period of at least 24 hours to look for signs of nest attendance. If no adult tern tracks are sighted around the egg(s) in that time period, and there are no other signs of nest attendance by adults, then the permittee may collect the egg(s). Other methodologies may be allowed upon receiving approval by the Service.

ii. The permittee may also lightly mark the top of egg(s) with a soft-tipped marker to determine if the egg(s) are being turned, which is a sign of active incubation. The permittee may place a camera at the nest to confirm abandonment. If camera confirms nest is not attended for 24 hours, the eggs may be collected.

m. When possible, all efforts will be made to replace non-viable eggs from active nests with viable eggs from abandoned nests. All remaining abandoned viable tern eggs may be collected for captive rearing. No collection of viable eggs from active nests is authorized.

n. Eggs may be moved a short distance for preservation from natural elements (*e.g.* high water, shifting sand, wind-blown) or away from an exclosure/fence.

o. The permittee is authorized to erect a chick fence with approval from the Ventura Field Office on a case-by-case basis.

p. For predator control activities, the use of vehicles shall be restricted to the shoreline in the area closed to the public.

q. A final report shall be submitted to the Ventura Field Office as specified in the ‘Annual Reports’ section for each project specific survey conducted for the tern.

r. Within 45 days following completion of a presence/absence survey, a survey report shall be submitted to the Ventura Field Office Recovery Permit Coordinator that includes:

i. On the cover page of the report, include the title, location, permit number, permittee name and their respective contact details, date and time frame of the activity, and date of preparation on the report.

ii. A map (at a minimum, a 1:24,000 scale USGS topographic map) depicting the location and boundary of the survey area(s);

iii. A qualitative description of the plant communities (including dominant species and habitat quality) on and adjacent to the survey area;

iv. A complete description of survey methods including the names of personnel, the number of acres surveyed per biologist per survey-day, the number and dates of surveys, survey routes, the temperature and weather conditions at the beginning and end of each survey, and how frequently recorded vocalizations (where authorized) were used, if at all;

v. The number, age, and sex of all sensitive species detected, and these data shall also be plotted on 1:24,000 scale map(s) of the survey area;

vi. The assessor's parcel number for the site, the name of the property, and the name of property owner and contact details (if possible);

vii. GIS data or GPS coordinates (if possible);

viii. A conclusion section that specifically provides recommendations for recovery of the species;

ix. Other pertinent observations made during survey efforts; and

x. The following certification statement signed by each surveyor(s) performing activities in independent status pursuant to this permit: "*I certify that the information in this survey report and attached exhibits fully and accurately represents my work.*" The date of signature and the surveyor's permit number shall be included.

xi. All survey reports shall be submitted electronically following the 'Electronic Reporting Requirements' section.

12. Exclosure Authorization

The permittee is authorized to erect exclosures around all tern and plover nests within the geographic boundaries specified above, and the time limitation specified within the permit, provided that:

a. The permittee follows exclosure protocols established for Oceano Dunes State Vehicular Recreation Area by the Ventura Field Office. Exclosures may be used for plovers as previously approved by the Ventura Field Office; and

b. Tern and plover adults, chicks, and eggs are not handled.

13. Minor Deviations

Minor deviation from the stipulated Special Terms and Conditions may be authorized on a case-by-case basis when approved in writing by the Ventura Field Office Recovery Permit Coordinator unless an amendment to this permit would be required. Changes that would require an amendment to this recovery permit may include, but are not limited to, changes in study plan or research proposal, location, activity, type of take, or species to be covered by the permit.

14. Other Authorizations

This permit does not cover any activities authorized pursuant to a biological opinion or habitat conservation plan.

15. Incidental Take of Other Listed Species

This permit does not authorize take of federally protected species that are not specifically authorized pursuant to this permit. However, the Service acknowledges that incidental (*i.e.,* non-targeted, unintended) take of a co-occurring, federally protected species could potentially occur while conducting certain permitted activities. To avoid incidental take, the following conditions apply to all unauthorized federally protected species:

a. Each individual authorized pursuant to this permit shall be knowledgeable about potentially co-occurring protected species that may occur throughout the habitats in which permitted activities are conducted. Additionally, individuals shall be observant and cautious to the extent practicable in order to minimize, to the maximum extent practicable, avoidable take.

b. Any federally protected animal that the permittee is not authorized to take pursuant to this permit but is incidentally captured while conducting authorized activities, shall be released unharmed immediately at the point of capture.

c. During authorized activities, if an incidental injury or mortality occurs to a federally protected species not authorized in this permit, the permittee shall follow instructions specified in the 'Reporting Injuries and Mortalities' section.

d. The Service requests that any incidental encounters, sightings, and/or capture of protected wildlife be reported to the appropriate state's database (*e.g.*, California Natural Diversity Database, Nevada Natural Heritage Program) or as directed by the Service.

16. Incidental Injury or Mortality of Authorized Species

In the event individuals are unintentionally injured or killed under this recovery permit during the performance of authorized activities, the permittee shall:

a. Notify the Ventura Field Office Recovery Permit Coordinator by telephone or email within 24 hours. Within 3 working days (or when back from remote field locations), the permittee shall follow-up such notification by email to the Pacific Southwest Regional Recovery Permit Coordinator and to the Ventura Field Office Recovery Permit Coordinator.

b. With the written follow-up, the permittee shall provide a more detailed, complete accounting of the circumstances that led to such injury or mortality. A description of the changes in protocols that shall be implemented to reduce the likelihood of such injury or mortality from happening again should be included as appropriate. The incident shall also be fully discussed in the Annual Summary Report that is subsequently submitted, as specified in the 'Annual Reports' section.

c. This written report shall also be sent via email to the California Department of Fish and Wildlife's (CDFW) California Endangered Species Act (CESA) Memorandum of Understanding (MOU) Coordinator, Attention: CESA MOU Coordinator, Wildlife Diversity Program (currently Justin Garcia; Justin.Garcia@wildlife.ca.gov; telephone: 916-207-4957), in addition to the CDFW MOU contact named in your CESA MOU or as named in your Scientific Collecting Permit.

d. Dead specimens and/or appropriate parts of dead specimens that are taken pursuant to this section shall be preserved in accordance with standard museum practices. Within 120 days, the preserved specimen(s) shall be properly labeled and deposited with one of the designated repositories specified below. The permittee shall supply the repository with a copy of this permit to validate that the specimens supplied to the museum were taken pursuant to a permit. Collection data (*e.g.*, dates and location) and depositions of carcasses by the permittee shall be reported in the subsequent Annual Summary Report submitted (see 'Annual Reports' section). Also, the salvage specimen may be used for research purposes *only* when approved by the Ventura Field Office Recovery Permit Coordinator in advance. Requests for specimens to be used for research shall include information that demonstrates the research will have recovery value to the species in order to be approved. Any specimens used for research activities shall be documented in the subsequent Annual Summary Report.

17. Salvage Authorization

The permittee is authorized to salvage all authorized species' carcasses and provide them to one of the designated repositories within 120 days by following 'Designated

Repositories' section. The permittee shall supply the repository with a copy of this permit to validate that the specimens supplied to the institution were taken pursuant to a permit issued by the Service. Any specimens salvaged shall be documented and specified in the Annual Summary Report (see the 'Annual Reports' section) submitted to the Ventura Field Office Recovery Permit Coordinator.

18. Designated Repositories

Designated repositories may be found in the Pacific Southwest Repository Locator document.

Additional repositories may be approved on a case-by-case basis in advance, with approval by email from the Ventura Field Office Recovery Permit Coordinator.

19. California Natural Diversity Database

California Natural Diversity Database forms shall be completed, as appropriate, for each protected species addressed herein and submitted to the Biogeographic Data Branch, CDFW, 1700 9th Street, 4th Floor, Sacramento, California 95811

20. Regarding All Documents, Drafts, and Other Information

All reports or other documents that include information gathered under the authority of this permit (*e.g.*, reports prepared by consulting firms for their clients, theses, or scientific journal articles) shall reference this permit number. Copies of such documents shall be provided via email to the Ventura Field Office Recovery Permit Coordinator upon their completion. Draft documents, raw/field data, and other information resulting from work conducted under the authority of this permit shall be submitted to the Service upon request.

21. Annual Reports

Two types of reports shall be submitted to the Ventura Field Office Recovery Permit Coordinator by January 31, following each year this permit is in effect as specified below. Note electronic reporting requirements below.

a. Annual Summary Report:

i. In order to track, document, and assess all activities conducted pursuant to this permit, we request submission of the Annual Summary Report form (FWS Form 3-2530) that summarizes all the activities conducted pursuant to this permit during the previous calendar year. The permittee may submit their own report document in lieu of the Service's form, however all information requested in the Annual Summary Report form (FWS Form 3-2530) shall be provided. Activities that are continuous (*e.g.*, never-ending, overlapping in two or more calendar years), shall be reported each year the

activity is in effect to the Ventura Field Office Recovery Permit Coordinator.

ii. If no permitted activities occur, statements of no activity may be sent in the body of an email to the Ventura Field Office Recovery Permit Coordinator.

iii. Annual Summary Reports, and emails stating no activity, shall be submitted by January 31, following each year this permit is in effect. See the 'Electronic Reporting Requirements' section for more information.

b. Comprehensive Project Report:

i. For each project-specific activity conducted pursuant to this permit not addressed in special survey reporting requirements above, the permittee shall submit a comprehensive project report to the Ventura Field Office Recovery Permit Coordinator in the following format:

A. On the cover page of the report, include the title, location, permit number, permittee name and contact details, date and time frame of the activity, and date of preparation on the report;

B. An introduction section addressing reasons and objectives for taking the species;

C. A methodology section which includes an overview of the study design and methods used to collect and analyze data;

D. A results section that provides and summarizes the data collected, including information on any other federally listed species detected while conducting activities authorized under this permit; and

E. A conclusion section that specifically provides recommendations for recovery of the species and any plans for future studies. Activities that are continuous (*i.e.*, overlapping in two or more calendar years), shall be reported each year the activity is in effect to the Ventura Field Office Recovery Permit Coordinator.

ii. The comprehensive project report shall include, but not be limited to:

A. Summary presentations and brief discussions of survey and monitoring results;

B. Locations sampled or study area(s) delineated on a 7.5-minute U.S. Geological Survey topographic map at 1:24,000 scale. The name of the USGS map identified;

C. The names of all personnel conducting the activity, respective contact information, and associated permit numbers;

D. The results of all sampling efforts, including the numbers and life stage of each listed species observed, dates of observation, and estimates of population sizes; and

E. Other pertinent observations made during sampling efforts regarding the status or ecology of the species.

22. Electronic Reporting Requirements

All reports shall be submitted electronically. Reports shall satisfy the following:

a. Paper reports are no longer accepted.

b. Each report shall be saved as one PDF only. Zipped files, other file formats, and Excel spreadsheets are not accepted (unless the Ventura Field Office Recovery Permit Coordinator previously arranged for receipt of this format from you).

i. One exception: Statements of no activity may still be sent in the body of an email.

c. Standard 8.5 x 11 size pages are to be used in all submitted reports. Maps and figures may include, but not exceed page sizes larger than 11 x 17.

d. Each report shall "stand alone" from any correspondence or transmittal and shall contain the permittee name, the respective contact details, and permit number at minimum. Only reports for activities conducted pursuant to this recovery permit shall include this permit number. Do not identify your permit number in any other reports for activities not authorized under this permit.

e. Emails are limited to 25 megabytes in size. If emails with attachments exceed this size limitation, please: (1) send the attachments in separate emails (but do not break up individual reports; again, only one PDF per report), (2) try the Optimize PDF tool if it is available in your version of Adobe, or (3) submit them via an alternative method agreed upon by the Ventura Field Office Recovery Permit Coordinator (the Service's FileShare program). Again, do not zip the file(s) and do not send file formats other than PDF. Links for file download and thumb drives are not accepted.

f. Unless a report is revised, please send each report only once. Do not send duplicates.

g. Please only send GIS files if the Field Office Recovery Permit Coordinator previously arranged for receipt of these data from you.

h. Please include your recovery permit number, 815214-10, in the subject line or body of all emails.

23. Failure to comply with reporting requirements may result in non-renewal or suspension/revocation of this permit.

****End of Special Terms and Conditions

**United States Department of the Interior**
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

# LIST OF AUTHORIZED INDIVIDUALS

Oceano Dunes District, 815214-10.3

1. Individuals authorized to independently conduct activities with California red-legged frog:

   Shane Emerson, Tara Kerrs, Stephanie Little, Scott Soares and Michelle Winn.

2. Individuals authorized to independently conduct activities with tidewater goby:

   Gena Lasko, Stephanie Little and Douglas Rischbieter.

3. Individuals authorized to independently conduct the following activities with western snowy plover and California least tern: population surveys; locate and monitor nests; capture, recapture, and release individuals; band; handle and float eggs to determine incubation stage for the western snowy plover and California least tern; remove non-viable eggs; remove viable eggs from abandoned nests; replace non-viable eggs with viable eggs from abandoned nests; transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing; conduct rescue activities (including transfer of rescued individuals to an approved facility); erect and monitor fence and nest exclosures including a chick fence; use remote sensing cameras near nests; and move eggs a short distance for preservation from natural elements or away from an exclosure/fence:

   Douglas George.

4. Individuals authorized to independently conduct the following activities with western snowy plover and California least tern: population surveys; locate and monitor nests and chicks; capture, recapture, and release individuals; band; handle and float eggs to determine incubation stage; conduct rescue activities (including transfer of rescued individuals to an approved facility); install nest exclosures for western snowy plovers; use remote sensing cameras near nests; and move eggs a short distance for preservation from natural elements:

   Jaimie Miller.

5. Individuals authorized to independently conduct the following activities with western snowy plover and California least tern: population surveys, locate and monitor nests, use remote sensing cameras near nests, and erect and monitor fence and nest exclosures including a chick fence:

   Tamar Carmona, Amber Clark, Nicole Gaudenti, Ronnie Glick, Kailyn Gunther, Joanna Iwanicha, Daniel Johnson, Stephanie Little, Mariela Martinez, Paul Phelps, Mattie Reddell, Sarah Robinson, Ryan Slack, Amanda Sprague, Jose Velazquez and Jessica Wagner.

6. Individuals authorized to independently conduct the following activities with western snowy plover: capture, recapture, release, and band western snowy plover.

   Amber Clark.

7. Individuals authorized to independently handle eggs to check for hatching cracks for California least tern, handle and float eggs to determine incubation stage for western snowy plover; remove viable eggs from abandoned nests; replace non-viable eggs with viable eggs from abandoned nests; transfer viable eggs from abandoned nests to a permitted facility for hatching and captive rearing; move eggs a short distance for preservation from natural elements; and conduct rescue activities (including transfer of rescued individuals to an approved facility):

   Amber Clark, Joanna Iwanicha, Mariela Martinez, Mattie Reddell, Sarah Robinson and Ryan Slack.

8. Individuals authorized to independently conduct the following activities with western snowy plover and California least tern: population surveys, locate and monitor nests, and erect and monitor the fence exclosure:

   Emilia Caballero, Benjamin Wagner.

9. Individuals authorized to independently conduct the following activities with western snowy plover and California least: population surveys from the shoreline that is closed to the public, monitor nests from the shoreline that is closed to the public, and inspect and maintain the fence from the shoreline that is closed to the public:

   Griffin Davies, Camille Hidalgo, Kyle La Fever, Zaina Nasrallah, Madyson Slaven, Kayli Tibbs, and Juliana Trunzo.

10. Under the direction of Douglas George or an individual listed under 7 above, individuals authorized to conduct the following activities with western snowy plover and California least tern: remove eggs from abandoned nests, transfer viable eggs from abandoned nests to an approved facility for hatching and captive rearing, and conduct rescue activities (including transfer of rescued individuals to an approved facility):

Emilia Caballero, Tamar Carmona, Griffin Davies, Ronnie Glick, Nicole Gaudenti, Camille Hidalgo, Daniel Johnson, Stephanie Little, Zaina Nasrallah, Paul Phelps, Madyson Slaven, Amanda Sprague, Kayli Tibbs, Jose Velazquez, Benjamin Wagner and Jessica Wagner.

11. Individuals authorized to conduct predator control activities under the direction of an individual listed in 3, 4 or 5 above, including use of a vehicle along the shoreline and on foot in the area closed to the public:

    Daniel Biteman, Kevin Estrada, Robert Johnson, Barry Lowry, Steven Manley, Charles Richards, Alexander Shaefer, Thadeus Sternberg and Paul Young.

Supervised individuals may conduct activities pursuant to this permit only under the direct on-site supervision of the above authorized individuals. “On-site supervision” is defined as a supervised individual conducting activities within 3 meters (9.8 feet) of an independently authorized individual.

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Samantha Lantz, Ph.D.
Assistant Field Supervisor
Ventura Fish and Wildlife Office

This List is valid only if it is dated on or after the permit signature date. The associated recovery permit is considered invalid without this List attached.

NATIVE ENDANGERED SPECIES RECOVERY

**Permit Number:** ES101154

**Version Number:** 4

**Effective:** 2025-04-14 **Expires:** 2030-04-13

**Issuing Office:**

**Department of the Interior**

**U.S. FISH AND WILDLIFE SERVICE**

ES Sacramento Permit Office
2800 Cottage Way, Suite W-2606
Sacramento, California 95825-1846
permitsR8ES@fws.gov

**Digitally signed by**

Field Supervisor, Ventura Fish and Wildlife Office

**Permittee:**

DOUGLAS RISCHBIETER
1180 ANNA LEE WAY, BOX 94
ARNOLD, CA 95223-0094
US

Authority: Statutes and Regulations: 16 U.S.C. 1539 (a) 50 CFR 17.22, 50 CFR 13

**Location where authorized activity may be conducted:**

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

**Reporting requirements:**

See permit conditions for reporting requirements

**Authorizations and Conditions:**

A. General conditions set out in Subpart D of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accordance with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable Foreign, State, Local, Tribal, or other Federal law.

C. Valid for use by permittee named above.

# SPECIAL TERMS AND CONDITIONS

Douglas C. Rischbieter

1. Previous Permit Issuance

   This permit previously took effect on September 9, 2019 (legacy permit number TE101154-3). The Special Terms and Conditions of that permit are hereby superseded by this renewal.

2. Permit Acceptance

   Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the "General Permit Procedures and Permit Regulations for Native Endangered and Threatened Wildlife Species Permits". These regulations may be accessed at title 50 of the Code of Federal Regulations (CFR) National Archives. The respective regulations are as follows: 50 CFR Part 13, 50 CFR 17.22 (endangered wildlife) and/or 50 CFR 17.32 (threatened wildlife), and/or 50 CFR Part 13, 50 CFR 17.62 (endangered plants), and/or 50 CFR 17.72 (threatened plants).

3. Authorized Take

   The permittee is authorized to take (harass by survey, capture, handle, photograph (as vouchering tool), release and collect voucher specimens (including for genetic analyses)) the tidewater goby (*Eucyclogobius newberryi*).

   All authorized activities are with endangered and/or threatened species for scientific research, or enhancement of propagation or survival (*i.e.*, recovery) purposes, as specified in the permittee's May 21, 2024 permit renewal request and in accordance with the Special Terms and Conditions stated in this permit.

4. Authorized Geographic Areas

   Permitted activities are restricted to the following geographic areas in California:

   a. Throughout the range of the species.

   This permit does not authorize access to Federal, Tribal, State, local government, or private lands as it is the responsibility of the permittee to obtain landowner permission prior to commencing permitted activities on such lands.

5. Service Contacts

   For information regarding Pacific Southwest region (California, Nevada and the Klamath Basin portion of Oregon) Ecological Services programs and offices – including contacts for the U.S. Fish and Wildlife Service (Service) Regional Office and Fish and Wildlife

Offices (Field Offices), as well as jurisdictional boundaries – please refer to the information available at the Pacific Southwest United States Fish and Wildlife Service website, and/or at the Pacific Southwest Recovery Permitting webpage under 'Field Office Contacts'.

The applicable Field Offices to this permit are as follows:

Arcata Fish and Wildlife Office (Arcata Field Office)

Bay-Delta Fish and Wildlife Office (Bay-Delta Field Office)

Carlsbad Fish and Wildlife Office (Carlsbad Field Office)

Sacramento Fish and Wildlife Office (Sacramento Field Office)

Ventura Fish and Wildlife Office (Ventura Field Office)

6. 15-Day Notification

Notifications to conduct activities at the above authorized geographic area(s) pursuant to this permit shall be submitted by email to the applicable Field Office Recovery Permit Coordinator at least 15 days *prior* to conducting such activities.

The 15-day Notification (notice) shall include, as appropriate:

a. An explanation of the purpose of the study and a clear description of methods to be employed, including the names of field personnel, and the number and dates of surveys and/or collection (if applicable), the location of project, and name of the county;

b. The number of individuals proposed to be captured and/or collected (if applicable);

c. A map (at a minimum, a 7.5-minute U.S. Geological Survey (USGS) topographic map at 1:24,000 scale) depicting the location of the authorized activity. USGS maps shall be provided at their original scale (i.e., not zoomed out or in from 1:24,000). Please clip to the area of interest while retaining the scale. As map page sizes may not exceed 11 x 17 inches, multiple USGS maps may need to be prepared to accurately depict all locations. The name of the USGS map(s) shall be identified;

d. One set of latitude/longitude WGS84 coordinates of the approximate centroid of the area of activity. Multiple centroids may be needed for disjunct areas of activity more than one mile apart or linear areas;

e. The Assessor's Parcel Number (APN) for the site (if available), the name of the property, and the name of property owner and the respective contact details;

f. Geographic information system (GIS) data depicting the survey site (if requested);

g. A description of the capture and marking techniques (if applicable); and

h. The permit number.

After 15 days following the Service's receipt of the notice, the permittee may commence activities authorized by this permit, unless authorization is denied by the Service. Deviations from standard survey protocols must be authorized.

If the permittee is denied authorization to conduct the proposed activities, a request for reconsideration may be submitted to the Regional Threatened and Endangered Species Lead for the Pacific Southwest Region at the Pacific Southwest Regional Office: U.S. Fish and Wildlife Service, Endangered Species Permit Office, 2800 Cottage Way, Room W-2606, Sacramento, CA 95825-1846 (email: permitsR8ES@fws.gov). The procedures specified in 50 CFR 13.29(b) shall be followed.

7. Authorized Individuals

Only individuals on the attached List of Authorized Individuals (List) are authorized to independently conduct activities under this permit. Each named individual, and the associated permit holder, shall be responsible for compliance with the Special Terms and Conditions in this permit. The List shall be retained with these Special Terms and Conditions.

To request changes to the List, the permittee shall review the Pacific Southwest Region's minimum qualifications document, if available, for each requested species and/or activity. The permittee shall submit requests via email to the applicable Field Office Recovery Permit Coordinator at least 90 calendar days prior to the requested effective date. The request shall be signed and dated by the permittee and include the following information:

a. The permit number;

b. The name of each new individual to be appended to the List;

c. The resume and qualifications statement of each new individual, detailing their education, training, and experience with authorized species and authorized activities in this permit, or similar species and activities, and type of activity for which authorization is being requested (table recommended). Refer to the applicable Minimum Qualifications documents when detailing experience (if applicable);

d. Letters of reference from a supervising party for each new individual, which address the individual's qualifications and aptitude for the specific activities and each authorized species to be conducted in independent status. The names, titles, organizations, email addresses, and phone numbers of each reference writer shall be provided in each letter; and

e. The names of any individuals to be deleted from the List.

The permittee shall include the current updated version of the List with this recovery permit once it is received from the applicable Field Office Recovery Permit Coordinator. Note: This procedure is for personnel changes to the List only. For requests to renew and/or amend this permit, a complete application and appropriate processing fee shall be submitted through the Service's electronic permitting website (ePermits) available at the ePermits Public Portal.

8. Aquatic Surveying

The permittee will disinfect sampling and field gear to minimize the spread of pathogens as follows:

a. Sampling and field gear will be disinfected after exiting one aquatic habitat and before entering the next aquatic habitat unless the waters are hydrologically connected to one another.

b. All organic matter (i.e., mud, snails, algae, etc.) will be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Rinse cleaned items with sterilized (*e.g.*, boiled or treated) water before leaving each survey site.

c. Boots, nets, traps, hands, etc., will be scrubbed with a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 3 to 6 percent sodium hypochlorite solution and thoroughly rinsed clean with water between study sites. Equipment will be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of aquatic habitats will be avoided (e.g., clean in an area at least 100 feet from aquatic features). Care will be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

d. Used cleaning materials (liquids, etc.) will be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves will be retained for safe disposal in sealed bags.

9. Taking of the tidewater goby (goby):

The permittee is authorized to take gobies by survey, capture, handle, photograph (as vouchering tool), release, and collect voucher specimens (including for genetic analysis)

within the geographical area specified above, and the time limitation specified within the permit, provided that:

a. As applicable, the permittee shall follow the survey guidelines included in Appendix F of the Service's Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*).

b. A visual survey for amphibian egg masses must be conducted prior to sampling for gobies in areas where amphibian eggs could be present. If amphibian egg masses are observed, the area must be avoided.

c. Gobies may be weighed, measured, sexed, examined and/or photographed for general condition and other demographic purposes. Handling will be done in an expedient manner with minimal harm to the individuals being handled.

d. Gobies shall be released as near as possible to the point of capture unless otherwise authorized in writing via email by the applicable and Ventura Field Office Recovery Permit Coordinator(s).

e. If water conditions and data requirements are such that visual surveys for gobies are feasible and adequate, only visual survey methods shall be used to determine the presence and the approximate number of gobies in an area. Snorkeling and walking through shallow water may be used during visual surveys. The permittee shall take note and avoid all areas previously known to support the burrows of gobies to the extent practicable.

f. If water conditions or data requirements are such that visual surveys for gobies are not feasible or adequate, gobies may be captured. The survey methods shall be selected to minimize potential injury or mortality to gobies and potential disturbance or damage to breeding areas.

g. Capture with dip nets or seine nets shall be achieved with woven mesh size no greater than 4 millimeters in width. If seines or hand-towed ichthyoplankton nets are used, care shall be taken to avoid incidental injury or mortality to gobies that may be caught and suffocated in algal mats. All algae removed from the net shall be returned to the water at the survey site as expeditiously as possible in the event that gobies may remain within the algae.

    i. For each individual seine haul in a seine survey, the following information must be recorded: the specific location within the slough, lagoon, or estuary; the species (fish, amphibians, and invertebrates) that are captured in each seine haul; and the numbers of each species.

    ii. Minnow trapping, throw trapping, or artificial burrow trapping may be conducted according to the survey methods described in Appendix F of the recovery plan for the species.

h. During all sampling activities, the permittee shall separate gobies from other fish species in order to prevent predation to the maximum extent practicable.

i. Handling shall require minimal exposure out of water. The bagged portion of seines and nets shall remain in the water until all gobies are removed, or gobies are transferred to a shallow container(s) of clean water taken from the survey site and placed in a shaded location that will not result in exposure to extreme temperatures.

j. If gobies are removed from the water at the sample site, they shall be placed gently into a shallow container(s) (*e.g.*, bucket) of clean water taken from the survey site. Each container(s) shall be aerated if the water temperature exceeds 20 degrees Centigrade or if gobies are anticipated to remain in the container over 30 minutes. No other species shall be placed in the container(s) occupied by gobies. All captured gobies shall be returned to the site of capture in good condition as soon as possible and as near as possible to the point of capture. Return gobies from the container to point of capture by gently pouring them back into the water at the site of capture.

k. Any gobies exhibiting signs of physiological stress shall be released immediately at point of capture.

l. Disturbance and damage to goby burrows, eggs, and young shall be minimized by using the smallest and lightest seines as practicable for the sample location.

m. Electrofishing is not authorized by this permit. Electrofishing methods are prohibited in known and potential goby habitat.

n. Gobies shall not be anesthetized or marked at any time unless approved in writing by the applicable Field Office Recovery Permit Coordinator.

o. Prior to activities that may involve handling gobies, the permittee and any assistants shall ensure that their hands are free of sunscreen, lotion, and insect repellent.

p. The permittee shall contact the applicable and Ventura Field Office Recovery Permit Coordinator(s) within one week if catch rates or overall population sizes at a given locality are, or appear to be, appreciably lower than those of previous years.

q. Sampling efforts for determining only presence shall cease upon a determination that gobies are present in the area under consideration, unless vouchering is allowed.

r. If gobies are identified at a previously unoccupied or extirpated location, the permittee is authorized to take a limited number of voucher specimens, provided that:

    i. Unless this permit authorizes otherwise, collection of voucher specimens shall be restricted to sites not included in the list of occupied locations in the recovery plan and reported extirpated locations. This list may be periodically updated by the Service.

ii. Capture of voucher specimens shall be achieved using the methods described in the above terms and conditions.

iii. The number of voucher specimens taken from any drainage shall not exceed the lesser of 1 percent of the population of that drainage, or five individuals. A maximum of 100 voucher specimens may be collected from all drainages in total per the permit's duration (5 years).

iv. If any gobies are incidentally injured or killed during permitted activities, those individuals shall be preserved as voucher specimens and shall count toward the limit for voucher specimens.

v. Gobies taken as voucher specimens shall be euthanized in a humane manner and provided to a designated repository (refer to the 'Designated Repositories' section below) within 120 days of collection. Each specimen shall be accompanied with supporting data, including collector's name and contact details, permit number, date collected, specific location, and a brief description of the method of preservation.

vi. The applicable and Ventura Field Office Recovery Permit Coordinator(s) shall be notified within 3 business days of the number of voucher specimens taken, the locations, and the reason for the taking.

s. The permittee may collect voucher specimens for genetic analyses, with prior written authorization from the applicable and Ventura Field Office Recovery Permit Coordinators(s), not to exceed 2 percent of the population of that drainage, or 50 individuals. Gobies collected for genetic analyses shall be provided to Dr. David Jacobs at the University of California, Los Angeles within 120 days of collection.

t. Within 45 days following completion of the last final survey, a report shall be submitted to the applicable and Ventura Field Office Recovery Permit Coordinator(s) following the directions in the '45-Day Survey Report' section below and the following:

i. A qualitative description of the aquatic community, including dominant plant species and habitat quality on and adjacent to the survey area;

ii. A complete description of survey methods including the names of personnel, the amount of area surveyed, seine net size, distance seined, the number and dates of surveys, the temperature and weather conditions at the beginning and end of each survey;

iii. The habitat characteristics (e.g., cover, riparian zone, benthos and bottom description), including status of the lagoon/estuary (open to the ocean, or closed) and water quality observations (e.g., water temperature, dissolved oxygen, salinity, depth, flow rate, and pH of the water);

iv. The presence of goby nests/burrows, fry and young, and reproductive condition (based on color and external form);

v. The number, size, weight, age (adult, juvenile, or unknown), and sex of all captured gobies; and

vi. For each seine haul when a seine is used, the following shall be provided: the specific location within the lagoon/estuary, and a list of the species (fish, amphibians, and invertebrates) that were captured and the numbers of each.

10. 45-Day Survey Report

Within 45 days following completion of the final presence/absence survey for tidewater goby, a survey report shall be submitted to the applicable Field Office Recovery Permit Coordinator. For surveys with negative results and for incomplete surveys (e.g., projects put on hold or withdrawn) a survey report is still required. Survey reports shall include:

a. On the cover page of the report, include the title, location, permit number, permittee name and their respective contact details, date and time frame of the activity, and date of preparation on the report.

b. A map (at a minimum, a 7.5-minute U.S. Geological Survey (USGS) topographic map at 1:24,000 scale) depicting the location and boundary of the survey area(s). USGS maps shall be provided at their original scale (i.e., not zoomed out or in from 1:24,000). Please clip to the area of interest while retaining the scale. As map page sizes may not exceed 11 x 17 inches, multiple USGS maps may need to be prepared to accurately depict all locations. The name of the USGS map(s) shall be identified;

c. A qualitative description of the plant communities (including dominant species and habitat quality) on and adjacent to the survey area;

d. A complete description of survey methods including the names of personnel, the number of acres surveyed per biologist per survey-day, the number and dates of surveys, survey routes, the temperature and weather conditions at the beginning and end of each survey;

e. The number, age, and sex of all sensitive species detected, and these data shall also be plotted on 1:24,000 or closer (e.g., 1:5,000) scale map(s) of the survey area, with the scale identified on the map. As maps may not exceed 1:24,000 scale (e.g., 1:36,000 scale) and 11 x 17 inches, it may be necessary to prepare multiple maps to accurately depict all information. All occurrence information shall be labeled so that the reader can associate the map with the findings in the report about individuals, pairs, or groups (as applicable). Maps shall be either topographic with elevation contours identified, or aerial photography with roads and place names identified (if available). Surface features on the map shall be

readable and not masked out by other supplied information, such as plant communities. A North Arrow shall be included on all maps;

f. The assessor's parcel number for the site, the name of the property, and the name of property owner and contact details (if possible);

g. GIS data or GPS coordinates (if possible);

h. A conclusion section that specifically provides recommendations for recovery of the species;

i. Other pertinent observations made during survey efforts; and

j. The following certification statement signed by each surveyor performing activities in independent status pursuant to this permit: "*I certify that the information in this survey report and attached exhibits fully and accurately represents my work.*" The date of signature and the surveyor's permit number shall be included.

k. All survey reports shall be submitted electronically following the 'Electronic Reporting Requirements' section.

11. Minor Deviations

Minor deviation from the stipulated Special Terms and Conditions may be authorized on a case-by-case basis when approved in writing by the applicable Field Office Recovery Permit Coordinator unless an amendment to this permit would be required. Changes that would require an amendment to this recovery permit may include, but are not limited to, changes in study plan or research proposal, location, activity, type of take, or species to be covered by the permit.

12. Other Authorizations

This permit does not cover any activities authorized pursuant to a biological opinion or habitat conservation plan. Such activities must be authorized by the applicable Field Office that wrote the biological opinion and issued the section 10(a)(1)(B) incidental take permit, based on a habitat conservation plan or other qualified conservation benefit agreement.

13. Incidental Take of Other Federally Protected Species

This permit does not authorize take of federally protected species that are not specifically authorized pursuant to this permit. However, the Service acknowledges that incidental (*i.e.,* non-targeted, unintended) take of a co-occurring, federally protected species could

potentially occur while conducting certain permitted activities. To avoid incidental take, the following conditions apply to all unauthorized federally protected species:

a. Each individual authorized pursuant to this permit shall be knowledgeable about co-occurring protected species that may occur throughout the habitats in which permitted activities are conducted. Additionally, individuals shall be observant and cautious to the maximum extent practicable in order to minimize the risk of avoidable take.

b. Any federally protected animal that the permittee is not authorized to take pursuant to this permit but is incidentally captured while conducting authorized activities, shall be released unharmed immediately at the point of capture.

c. During authorized activities, if an incidental injury or mortality occurs to a federally protected species not authorized in this permit, the permittee shall follow instructions specified in the 'Incidental Injury or Mortality of Authorized Species' section.

d. The Service requests that any incidental encounters, sightings, and/or capture of protected wildlife be reported to the appropriate state's database (*e.g.*, California Natural Diversity Database, Nevada Natural Heritage Program) or as directed by the Service.

14. Incidental Injury or Mortality of Authorized Species

In the event individuals are unintentionally injured or killed under this recovery permit during the performance of authorized activities, the permittee shall:

a. Notify the applicable Field Office Recovery Permit Coordinator by telephone or email within 24 hours. Within three working days (or when back from remote field locations), the permittee shall follow-up with a written account to the Pacific Southwest Regional Recovery Permit Coordinator and to the applicable Field Office Recovery Permit Coordinator.

b. With the written follow-up, the permittee shall provide a more detailed, complete accounting of the circumstances that led to such injury or mortality. A description of the changes in protocols that shall be implemented to reduce the likelihood of such injury or mortality from happening again should be included, if appropriate. If not appropriate, please explain. The incident shall also be fully discussed in the Annual Summary Report that is subsequently submitted, as specified in the 'Annual Reports' section.

c. This written report shall also be sent via email to the California Department of Fish and Wildlife's (CDFW) California Endangered Species Act (CESA) Memorandum of Understanding (MOU) Coordinator, Attention: CESA MOU

Coordinator, Wildlife Diversity Program (currently Justin Garcia; Justin.Garcia@wildlife.ca.gov; telephone: 916-207-4957), in addition to the CDFW MOU contact named in your CESA MOU or as named in your Scientific Collecting Permit.

d. Dead specimens and/or appropriate parts of dead specimens that are taken pursuant to this section shall be preserved in accordance with standard museum practices. Within 120 days, the preserved specimen(s) shall be properly labeled and deposited with one of the designated repositories specified below. The permittee shall supply the repository with a copy of this permit to validate that the specimens supplied to the museum were taken while conducting activities covered by a permit. Collection data (*e.g.*, dates and location) and depositions of carcasses by the permittee shall be reported in the subsequent Annual Summary Report submitted (see 'Annual Reports' section). The salvage specimen may be used for research purposes *only* when approved by the applicable Field Office Recovery Permit Coordinator in advance. Requests for specimens to be used for research shall include information that demonstrates the research will have recovery value to the species in order to be approved. Any specimens used for research activities shall be documented in the subsequent Annual Summary Report.

15. Salvage Authorization

The permittee is authorized to salvage all authorized species' carcasses and provide them to one of the designated repositories within 120 days by following 'Designated Repositories' section. The permittee shall supply the repository with a copy of this permit to validate that the specimens supplied to the institution were taken pursuant to a permit issued by the Service. Any specimens salvaged shall be documented and specified in the Annual Summary Report (see the 'Annual Reports' section) submitted to the applicable Field Office Recovery Permit Coordinator.

16. Designated Repositories

Designated repositories may be found in the Pacific Southwest Repository Locator document.

Additional repositories may be approved on a case-by-case basis in advance with approval by email from the applicable Field Office Recovery Permit Coordinator.

17. California Natural Diversity Database

California Natural Diversity Database forms shall be completed, as appropriate, for each protected species addressed herein (including observations on or off lands under Federal jurisdiction) and submitted to the Biogeographic Data Branch, CDFW, 1700 9th Street, 4th Floor, Sacramento, California 95811.

18. Regarding All Documents, Drafts, and Other Information

All reports or other documents that include information gathered under the authority of this permit (*e.g.*, reports prepared by consulting firms for their clients, theses, or scientific journal articles) shall reference this permit number. Copies of such documents shall be provided via email to the applicable Field Office Recovery Permit Coordinator upon their completion. Draft documents, raw/field data, and other information resulting from work conducted under the authority of this permit shall be submitted to the Service upon request.

19. Annual Reports

In order to track, document, and assess all activities conducted pursuant to this permit, we recommend submission of the Annual Summary Report form (FWS Form 3-2530) that summarizes all of the activities conducted pursuant to this permit during the previous calendar year. This report form will be available on the Pacific Southwest Recovery Permitting webpage under 'Annual Summary Report Form' a few weeks prior to the end of the calendar year. The permittee may submit their own annual summary report document in lieu of the Service's form; however, all information requested in the Annual Summary Report form (FWS Form 3-2530) shall be provided. Activities that are continuous (*e.g.*, never-ending, overlapping in two or more calendar years), shall be reported each year the activity is in effect. Annual Summary Reports shall be submitted on ePermits, between January 1 – January 31 of the following calendar year.

If no permitted activities occur, a statement of no activity will be noted in ePermits using the applicable Report Record associated with the permit. Please use the "No Activity" button, available between January 1 – January 31 of the following calendar year.

20. Electronic Reporting Requirements

All reports shall be submitted electronically. Reports shall satisfy the following:

a. Paper reports are no longer accepted.

b. Each report shall be saved as one PDF only. Zipped files, other file formats, and Excel spreadsheets are not accepted (unless the applicable Field Office Recovery Permit Coordinator previously arranged for receipt of this format from you).

    i. One exception: No Activity reporting will follow specific instructions in ePermits.

c. Standard 8.5 x 11 size pages are to be used in all submitted reports with the exception of page sizes up to 11 x 17 for maps and figures.

d. Each report shall "stand alone" from any correspondence or transmittal and shall contain the permittee name, the respective contact details, and permit number at

minimum. Only reports for activities conducted pursuant to this recovery permit shall include this permit number. Do not identify your permit number in any other reports for activities not authorized under this permit.

e. Emails are limited to 25 megabytes in size. If emails with attachments exceed this size limitation, please: (1) send the attachments in separate emails (but do not break up individual reports; again, only one PDF per report), (2) try the Optimize PDF tool if it is available in your version of Adobe, or (3) submit them via an alternative method agreed upon by the applicable Field Office Recovery Permit Coordinator (*i.e.*, DVD, CD, the Service's FileShare program). Again, do not zip the file(s) and do not send file formats other than PDF. Links for file download and thumb drives are not accepted.

f. Unless a report is revised, please submit each report only once. Do not send duplicates.

g. Please only send GIS files if the applicable Field Office Recovery Permit Coordinator previously arranged for receipt of these data from you.

h. Please include your recovery permit number, 101154-4, in the subject line or body of all emails.

21. Failure to comply with reporting requirements may result in non-renewal or suspension/revocation of this permit.

****End of Special Terms and Conditions

**United States Department of the Interior**
U.S. FISH AND WILDLIFE SERVICE
Pacific Southwest Region
2800 Cottage Way, Room W-2606
Sacramento, California 95825-1846

# LIST OF AUTHORIZED INDIVIDUALS

Douglas C. Rischbieter, 101154-4

1. Individuals authorized to independently conduct all activities pursuant to this permit:

   Gena Lasko and Douglas C. Rischbieter.

Supervised individuals may conduct activities pursuant to this permit only under the direct on-site supervision of the above authorized individuals. “On-site supervision” is defined as a supervised individual conducting activities within 3 meters (9.8 feet) of an independently authorized individual.

Catherine Darst, Field Supervisor
Ventura Fish and Wildlife Office

This List is valid only if it is dated on or after the permit signature date. The associated recovery permit is considered invalid without this List attached.

State of California – Department of Fish and Wildlife

**SCIENTIFIC COLLECTING PERMIT, SPECIFIC USE – Renewal**

DFW 1379SR

**Renewal**

Base Specific Use Permit ID: **S-190250002-19028-001**

Specific Use Renewal ID: **S-190250002-19028-001-01**

Reference Title: **Oceano Dunes Specific Use SCP**

Renewed Effective Date: **7/10/2023**

Renewed Expiration Date: **7/9/2026**

**Permitholder**

SC-190250002: Ronnie Glick

ronnie.glick@parks.ca.gov

340 James Way, Suite 270,

Pismo Beach, California 93449

Preferred Phone Number: 805-773-7180

Alternate Phone Number:

Permitholder Affiliation: Senior Environmental Scientist Supervisor for Oceano Dunes District

By signing this renewal, the Permitholder agrees to the following:

*"I certify that I have read, understand, and agree to abide by the applicable provisions of the Fish and Game Code, and Title 14, Section 650, CCR, and will abide by all the conditions and attachments of the issued permit. I understand I am legally responsible for ensuring all persons working under this permit will be adequately supervised, and comply with the requirements noted above. I further understand that if I fail to provide required reports, my permit may be suspended or revoked pursuant to Title 14, Section 650, CCR, and the Fish and Game Code."*

Permitholder Signature:_____ Date:_____

**California Department of Fish and Wildlife (CDFW) – Terrestrial Wildlife**
**Authorizations and Conditions for Scientific Collecting Permit (SCP)** **Individual**
**Principal Investigator: Ronnie Glick**
**CA Department of Parks and Recreation**

This permit (S-190250002-19028-001) was previously issued on September 10, 2019. The terms and conditions (13 pages dated October 28, 2020) set forth in that permit are hereby superseded by this renewal.

**Authorizations and conditions based on your online SCP renewal application entitled "Oceano Dunes Specific use SCP" submitted to CDFW on August 29, 2022, on file with the CDFW Wildlife Branch.**

**Authorized Terrestrial Wildlife and Activities:**

The permittee is authorized to take (***capture and release***) the monarch butterfly (*Danaus plexippus plexippus*) in accordance with the conditions below.

The permittee is authorized to take (***capture, measure, weigh, mark (small mammals only), and release***) amphibians, reptiles, and small mammals (***excluding Threatened, Endangered, CESA-Candidate, Fully Protected, Species of Special Concern, and other Prohibited Wildlife in Condition #2***) – but including the following California Species of Special Concern: southwestern pond turtle *(Actinemys pallida*), western spadefoot (*Spea hammondii*), two-striped gartersnake (*Thamnophis hammondii*), Blainville's horned lizard (*Phrynosoma blainvillii*), and northern legless lizard (*Anniella pulchra*) – in accordance with the conditions below.

The permittee is authorized to ***sacrifice*** the house mouse (*Mus musculus*) and black rat (*Rattus rattus*) in accordance with the conditions below.

***Take*** of western snowy plover (*Charadrius nivosus nivosus*) and California red-legged frog (*Rana draytonii*) is authorized in accordance with the most current amendment of federal recovery permit ES-815214 on which you are named, and in accordance with the additional conditions below.

The permittee is authorized to ***salvage*** dead reptiles, amphibians, mammals and birds in accordance with your current federal Migratory Bird permit MB-153500 and the additional conditions below.

**Authorized Locations:**

Permitted activities are restricted to the following geographic areas in California:

a. San Luis Obispo and Santa Barbra counties; primarily at Oceano Dunes State Vehicular Recreation Area, Pismo State Beach, and Guadalupe Nipomo Dunes National Wildlife Refuge.

**Other Permits:**
You shall obtain and maintain during the term of this SCP any federal, state and/or other permit(s) required to conduct the activities authorized herein. Although the provisions of the federal permit(s), other permit(s) and this SCP may vary, the more restrictive conditions prevail. Copies of your federal permit(s) or other research-related permits (e.g., State Parks, landowner access agreements), and any amendments, shall be provided to the Department contacts (see below), and the names of all authorized sub-permittees shall be provided for the permit(s). See also SCP Standard Condition L.

***Take*** of California least tern (*Sternula antillarum browni*) is authorized in accordance with the most current amendment of federal permit ES-815214 on which you are named, and in accordance with the Memorandum of Understanding on which you are named (i.e.,

Principal Investigator: Ronnie Glick, California Department of Parks and Recreation; issued on March 10, 2010 or any later amendments).

You shall carry all required documents, permits and MOUs, along with your SCP, with you while conducting all authorized activities.

**CDFW Contacts:**

The primary Department contact for this terrestrial wildlife permit is the Wildlife Branch SCP Coordinator (Chad Hirano, Environmental Scientist, Chad.Hirano@wildlife.ca.gov, (916) 539-6321).

The CDFW contact for the monarch butterfly is Dr. Hillary Sardiñas (Senior Environmental Scientist (Specialist), Hillary.Sardinas@wildlife.ca.gov, (916) 387-5148).

The CDFW contact for the Amphibian and Reptile Species of Special Concern is Laura Patterson (Senior Environmental Scientist (Specialist), Laura.Patterson@wildlife.ca.gov.

The CDFW contact for the western snowy plover is Esther Burkett (Senior Environmental Scientist (Specialist), Esther.Burkett@wildlife.ca.gov, (916) 531-1594).

For CDFW Regional contacts, see Condition #17 below.

**Conditions to Scientific Collecting Permit**
**S-190250002-19028-001-01**

1. **When a Memorandum of Understanding is needed**

   Intentional take or possession of species listed as Threatened, Endangered, or Candidate under the California Endangered Species Act (CESA), or intentional take or possession of Fully Protected species, is not authorized without a Memorandum of Understanding (MOU) from CDFW on which you are specifically named.

   To apply for a State MOU, contact the CDFW Terrestrial Wildlife Research MOU Coordinator, Justin Garcia (Justin.Garcia@wildlife.ca.gov), for study proposal requirements.

2. **Prohibited Wildlife**

   Intentional take or possession of Federally-listed species is not authorized without a valid federal permit **and** additional written authorization from CDFW, on which you are specifically named or otherwise authorized.

   Except as authorized above, intentional capture of Amphibian and Reptile Species of Special Concern (ARSSC), sea turtles (Family Cheloniidae) and Yellow-bellied seasnake (*Hydophis [=Pelamis] platurus*) requires an amendment to your SCP.

   Except as authorized above, intentional capture of California Terrestrial and Vernal Pool Invertebrates of Conservation Concern list (17 pages dated June 2017) (TICP) requires an amendment to your SCP.

   Intentional capture of mammal (e.g., woodrat) nests, Mammal Species of Special Concern (MSSC), opossum (Didelphimorphia), rabbits, hares and pika (Lagomorpha), bats (Chiroptera), carnivores (Carnivora, e.g., foxes, raccoon, marten, fisher, badger, otters, bobcat, mountain

lion), ungulates (Perissodactyla and Artiodactyla, e.g., deer, elk, antelope, bighorn sheep), beaver (Castoridae) and porcupine (Erethizontidae) requires an amendment to your SCP.

Intentional take of non-target birds is not authorized without valid federal permit(s) **and** an amendment to your SCP. Additionally, take of bird nests and eggs, Bird Species of Special Concern (BSSC), ducks, geese and swans (Anatidae), gallinaceous birds (Galliformes, e.g., quail, grouse and Wild turkey), hummingbirds (Trochilidae), rails, cranes and allies (Gruiformes), auks, murres and puffins (Alcidae), gulls, terns and skimmers (Laridae), tube-nosed swimmers (Procellariiformes, e.g., albatrosses and petrels), cormorants (Phalacrocoracidae), pelicans (Pelecanidae), herons, bitterns and egrets (Ardeidae), ibises (Threskiornithidae), vultures, hawks and allies (Accipitriformes), owls (Strigiformes) and falcons (Falconiformes) all require an amendment to your SCP.

For the purpose of this permit, non-target wildlife includes Prohibited Wildlife (noted above) and animals other than the authorized monarch butterfly, amphibians, reptiles, small mammals, and birds (authorized terrestrial wildlife).

Incidentally-captured individuals of non-target wildlife taxa shall be released at the capture site immediately, once identified, without further handling, unless otherwise authorized for activity(ies) on that species or subspecies in this permit, or state MOU.

Activities with inland fisheries or marine species requires additional SCP approvals from the CDFW Fisheries Branch and/or Marine Region SCP review programs.

**3. Location of Field Activities**

Your field activities may be located in a special status natural community or in an area that provides habitat for a non-target special status plant or animal. It is your responsibility to determine whether or not implementation of your field activities could have potential adverse impacts to a listed or special status plant or animal or special status natural community. To minimize potential impacts, compile relevant biological information in the general study area prior to conducting field activities or research. Generally, identify vegetation and habitat types occurring in your study area based on biological and physical properties of the site and surrounding ecological subregion[1], unless a larger assessment area is appropriate. Conduct a Rarefind or CNDDB Quick Viewer search and check with other reliable resources for known occurrences of special status plants, animals, or natural communities at the site before conducting your research. Contact the Wildlife Branch SCP Coordinator (Chad.Hirano@wildlife.ca.gov) if non-target special status plant or animal species are likely to be encountered or are being handled or disturbed.

You shall check with the landowner to determine if any other researchers are permitted to conduct activity(ies) in the same site or area. Prior to entering CDFW lands to conduct the activity(ies) described herein, you shall first receive additional written authorization from the Reserve Manager. See also SCP Standard Condition E & D.

**4. Notification of Field Activities**

Prior to conducting field activities pursuant to this permit, notification shall be submitted to the CDFW Wildlife Branch SCP Coordinator (Chad.Hirano@wildlife.ca.gov) and CDFW Regional

[1] U.S. Forest Service Ecological Subregions of California

contacts (see Condition #17, below), in an electronic format via e-mail, at least 14 days prior to conducting activities. See also Standard Condition F.

In addition to sending the Notification of Field Work or Activity form (DFW 1379b), notifications for such research[2] activities shall include: (a) an explanation of the purpose of the study and a clear description of methods, including survey and marking techniques; (b) the number of surveys and dates of activities; (c) the extent of the area to be surveyed; (d) a map depicting the location of the research site(s); and (e) the names of personnel conducting the activities.

After 14 days of the CDFW's receipt of the notification, the permittee may commence activities authorized by this permit unless authorization is denied by CDFW. Any separate written authorizations that you receive from CDFW for activities shall become conditions of your SCP and shall remain attached to the SCP at all times while conducting the research (including hard copies of authorizations received via email).

Any requests to conduct activities that are not authorized herein will require an amendment to this SCP.

**5. Protocol for Disinfecting Equipment**

To reduce the likelihood of disease transmission, you shall employ the "Decontamination Protocol for Field Work with Amphibians and Reptiles in Canada" (10 pages dated May 2017 or most recent revision), using methods that are effective against chytrid fungi, ranaviruses and snake fungal disease.

**6. Monarch Butterfly**

**a. Capture and Handling**

You may survey for monarchs using appropriate methods to avoid incidental injury or mortality to monarchs. Surveys shall be conducted in accordance with the most recent survey guidelines approved by the Department, or, otherwise in common or accepted use.

Passive visual surveys are the preferred method for gathering monarch data when feasible. Any habitat element (e.g., vegetation) moved to survey for monarchs shall be placed back exactly where they were found to avoid negative impacts on habitat conditions.

Monarchs may be captured by hand when necessary to move monarchs from pathways within Pismo State Beach. All captured monarchs shall be released at the point of capture, unless that location puts them in imminent danger, in which case they shall be placed in nearby suitable habitat, preferably within 50 feet of the original locality.

To reduce the likelihood of disease transmission, you shall employ the decontamination protocols using methods that are effective against diseases. When moving between sampling locations, wash hands and decontaminate collection equipment (i.e., gloves) using bleach or ethanol. UV light (sunlight) may also be used Spray equipment with ethanol or 10% dilute

[2] For SCPs, "**research**" means scientific investigation, and may include educational components such as training. Research *also* includes surveys or inventories to assess the potential for, or to monitor actual project impacts on wildlife resources, as required by environmental documents, permits, or other legal authorizations.

bleach. To enhance effectiveness of sanitation treatments, ensure bleach is new and has not been degraded by sunlight.

**b. Non-Target Wildlife**

Incidentally captured individuals of non-target TVPICP or other wildlife taxa shall be released at the capture site immediately, once identified, without further handling.

**c. Incidental Injury or Mortality**

You shall report any incidental injury or mortality of a listed, candidate, or conservation priority invertebrate to Chad Hirano (Chad.Hirano@wildlife.ca.gov) and Dr. Hillary Sardiñas (Hillary.Sardinas@wildlife.ca.gov) within three (3) days, and you shall provide a written report of the incident within ten (10) days via email.

**7. <u>Reptiles and Amphibians</u>**

You shall make a reasonable effort to coordinate with other researchers who may be conducting research on California red-legged frog, southwestern pond turtle, western spadefoot, two-striped gartersnake, Blainville's horned lizard, and northern legless lizard (athorized ARSSC) in the same locations to avoid duplicate work and to avoid impacts to local populations, and to share information on individually-marked individuals and their movements.

**a. Capture and Handling**

The authorized methods of capture for reptiles and amphibians (excluding turtles) are: hand, dip net, and coverboards.

Only hand capture or dipnet is authorized for turtles. Your standard authorization does not authorize live traps (e.g., turtle traps). To set other types of live traps for reptiles and amphibians (e.g., western pond turtles), you shall have explicit authorization via an SCP amendment.

Capture methods shall avoid disturbing native reptile and amphibian eggs and egg masses. Amplexing or mating pairs of native amphibians and reptiles shall not be captured, handled, or disturbed.

Amphibians shall be handled with wet hands that are free of lotions, creams, sunscreen, oils, ointment, insect repellent or any other material that may harm them.

You shall process individuals expediently. Larval amphibians shall not be handled out of the water for longer than 30 seconds unless rewetted, and shall not be retained for longer than five (5) minutes for processing. Adult and juvenile amphibians and reptiles shall be released immediately if they exhibit signs of excessive physiological stress or if handling time exceeds one (1) hour.

All amphibians and reptiles shall be released at the point of capture, unless that location puts them in imminent danger, in which case they shall be placed in a nearby refugium sufficient to protect them.

Any habitat element (e.g., rocks, boulders, and logs) moved to survey for reptiles or amphibians shall be placed back exactly where they were found to avoid negative impacts on habitat conditions.

All capture and handling methods utilized shall follow standard practices and ensure no undue disturbance of the authorized ARSSC and other wildlife species.

**b. Prohibited Wildlife**

Threatened, Endangered, CESA-candidate, or amphibian and reptile species of special concern (ARSSC) that are incidentally captured shall be immediately released at the site of capture and reported to the California Natural Diversity Database at least annually.

**c. Incidental Injury or Mortality**

You shall report any incidental injury or mortality of a listed, candidate, or fully protected amphibian or reptile, and ARSSC to Laura Patterson (Laura.Patterson@wildlife.ca.gov) within three (3) days, and you shall provide a written report of the incident within ten (10) days via email.

**8. Small Mammals**

**a. Precautions for COVID-19 and Rabbit Hemorrhagic Disease Virus (RHDV2)**

The conditions outlined in the following notice letters shall apply for all mammal activities, as appropriate for this permit: "*Notice of Changes to Scientific Collecting Permit (SCP) and Memorandum of Understanding (MOU) Authorizations, and Handling Precautions for Bats and other Mammals*" dated May 6, 2020; and "*Notice of Changes to Scientific Collecting Permits (SCP) and Memorandums of Understanding (MOU) Authorizations and Information Related to Rabbit Hemorrhagic Disease Virus Serotype 2 (RHDV2)*" dated June 11, 2020.

**b. Capture and Handling**

The authorized method of small mammal capture is by using live-traps (e.g., Sherman- or Tomahawk-brand) of appropriate size to avoid capture of medium-sized mammals or carnivores.

You shall have sufficient experience or training under an individual with mammal trapping experience before independently setting traps. When conducting presence/absence surveys using live-traps for small mammals (for this purpose, species in mammalian families Talpidae, Soricidae, Cricetidae, Dipodidae, Geomyidae, Heteromyidae, Muridae, and Sciuridae), you shall employ all reasonable measures to avoid injury to or mortality of individuals, particularly of special status species or subspecies (*e.g.*, using traps of sufficient size and adjusting trap doors to create a gap to accommodate tails of kangaroo rats or pocket mice).

To avoid the risk of Hantavirus, we recommend handling mammals in open areas and using a respirator when cleaning traps.

Traps shall be clearly labeled with your permittee number (SC-190250002). See also SCP Standard Condition M.

When working in squirrel colonies, report any Burrowing owls (*Athene cunicularia*) seen on the California Native Species Field Survey Form and contact Esther Burkett at Esther.Burkett@wildlife.ca.gov to report the owl location(s).

All small mammals shall be released at the point of capture, unless that location puts them in imminent danger, in which case they shall be placed in a nearby refugium sufficient to protect them.

**c. Marking**

You may mark small mammals (***excluding mammal species/taxa identified in Conditions #1 and #2***) in accordance with your SCP justification, as conditioned below. You may clip hair for genetic samples, and you may mark a single ear of each adult and adult-size juvenile with an appropriate size ear tag (e.g., fingerling tags applied to small kangaroo rats or pocket mice). Tags shall not burden the individual or make it vulnerable to injury or predation.

**d. Biotelemetry**

You may attach a radio collar to adult and adult-sized juvenile Lompoc kangaroo rats. The collar shall not exceed 3% of the body weight of the individual. If using VHF radios, you shall not use the Department frequency range 159.000 – 160.999. You shall coordinate radio frequencies with Regional Department staff in your study area (David Hacker, David.Hacker@wildlife.ca.gov for San Luis Obispo County; and Rebecca Barboza, Rebecca.Barboza@wildlife.ca.gov, 562-754-9741) and with other researchers who may be working with the same frequencies in the same areas to avoid potential overlap.

**e. Prohibited Wildlife**

Mammal species of special concern (MSSC) that are incidentally captured shall be reported to CNDDB at least annually. You may not continue to trap at a site where MSSC or listed small mammals are captured without additional written authorization via an SCP amendment and/or a MOU for capturing and handling the species.

**f. Incidental Injury or Mortality**

You shall report any incidental injury or mortality of a listed, candidate, or fully protected mammal, and MSSC to Dr. Scott Osborn (Scott.Osborn@wildlife.ca.gov) within three (3) days, and you shall provide a written report of the incident within ten (10) days via email.

**9. <u>Sacrifice of Non-Native Black Rat and House Mouse</u>**

You shall send notification prior to starting invasive species program work to the Department Invasive Species Program (Invasives@wildlife.ca.gov), and the appropriate Department regional contact (see Condition #17, below).

Sacrifice of non-native house mouse and black rat is authorized to reduce competition and predation on special concern species. Collection limits do not apply to take of the non-native, invasive small mammals.

To remove non-native mammals, you are authorized to use live box traps (e.g., Sherman- or Tomahawk-brand). The use of snap traps is not authorized.

You shall have the expertise to distinguish all life stages of non-native mammals from listed and special concern species or subspecies that may co-occur at your site, using field techniques. If in doubt, do not sacrifice. The use of firearms to kill mammals is prohibited.

Non-native mammals shall be sacrificed using humane euthanasia guidelines (American Veterinary Medical Association 2020). All carcasses shall be properly disposed of via burial or incineration or donated to an educational or public institution. Animals sacrificed using MS-222 shall not be disposed of in the wild.

You shall send notification to the Invasive Species Program for any non-native amphibians and mammals encountered and correctly identified.

**10. Birds – Nest Monitoring**

You shall first attempt to conduct monitoring using methods that do not disturb the breeding behavior of the birds; for example, utilize binoculars or spotting scopes. You may closely approach nests of common species, excluding species noted in the paragraph below. For these non-special status species, you shall determine if the adults are present at the nest and approach the nest while the adults are away, only if necessary. If you disturb adults, nestlings, fledglings, or nesting activity, you shall exit the area and observe from a distance that no longer causes disturbance. You shall avoid monitoring nests during bad weather to prevent eggs from chilling, overheating, and abandonment. You shall be responsible to determine whether or not a Migratory Bird Treaty Act permit from the U.S. Fish and Wildlife Service is required for your activities.

You may not conduct nest monitoring for bird species noted in Condition #2 of this SCP. Nest monitoring of these special status birds will require an amendment to this SCP. You shall submit an amendment request detailing the purpose of the work and describing the specific methods to be used. Your amendment request shall also contain your resume/CV describing your specific expertise and length of experience in conducting nest monitoring work on the requested species, or a similar species. Copies of all appropriate federal permits shall also be included in the amendment request.

You may not conduct nest monitoring for species listed in Condition #1 of this SCP, unless you are named on a State MOU or otherwise authorized by the Department.

**11. Western Snowy Plover**

You are authorized to conduct the following scientific research activities on the western snowy plover (plover), a California Bird Species of Special Concern, within San Luis Obispo and Santa Barbara counties:

a. Locate and monitor (observe and closely approach for purposes of seeing and counting contents and following progress of) nests;
b. Capture, measure, weigh, and band (must obtain or be a subpermitee on a valid Federal Bird Banding Permit) and auxiliary mark nestlings, fledged young and adults;
c. Float eggs and collect non-viable eggs from abandoned nests;
d. Use cameras in plover nesting areas for monitoring;
e. Place mini-exclosures over plover nests;
f. Transport abandoned plover eggs and sick / injured birds to Department-approved rehabilitation facilities; and
g. Salvage dead or moribund plovers.

**a. Prior to Conducting Field Activities**

Prior to conducting plover work at a site which you previously have not studied during the current field season, you shall contact the landowner to determine if other researchers are working at the site. You shall not conduct work on a site under known active study by another permit-holder for the plover, unless the Department contact and the U.S. Fish and Wildlife Service (Service) allow it via written correspondence.
You shall coordinate with other shorebird researchers to avoid duplicative work and undue disturbance of local shorebird populations, and to share information on individually marked plovers and known nest sites.

**b. Capture, Handling, and Release of Snowy Plovers**

You shall conduct surveys and monitoring using protocols approved by the Service for the plover.

You shall accomplish the authorized activities without unduly disturbing eggs, nestlings, or adult plovers. All reasonable efforts shall be made to avoid destruction or abandonment of any active nest, or take of eggs, chicks, fledglings, or adults. Nest monitoring shall be conducted as far as possible from the nest or colony utilizing binoculars and a spotting scope whenever possible.

The authorized capture methods for plovers are approved exclosures, drop traps, walk-in traps, monofilament snare mats, and hand capture. You shall monitor nets and traps continuously while in operation and remove plovers and other non-target species as soon as they are caught. Traps shall be closed if high numbers of birds are captured and cannot be processed in a timely manner.

Each unmarked plover will be marked with a unique combination of colored leg bands and an individually numbered aluminum USGS leg band (must obtain Federal Bird Banding Permit). Bands of appropriate size will be used to minimize irritation and injury. Each plover shall be aged, sexed, and measured (wing chord, weight, tarsus, tail, and culmen length) and examined for external signs of parasites and disease. During processing, each bird will be handled for a maximum of 15 minutes to minimize stress.

All plovers shall be released at the point of capture, unless that location puts them in imminent danger, in which case they shall be placed in a nearby location sufficient to protect them.

All surveying methods utilized shall follow standard practices and ensure no undue disturbance, harm, or harassment of the authorized plovers or other shorebirds.

**c. Incidental Injury or Mortality**

You shall report any incidental injury or mortality of a plover or any non-target species to Esther Burkett (Esther.Burkett@wildlife.ca.gov) and Kyle Rice (Kyle.Rice@wildlife.ca.gov) within three (3) days, and you shall provide a written report of the incident within ten (10) days via email.

Should any one serious injury (i.e., compromising survival in the wild) or mortality of the plover occur, all work shall cease immediately. Before any additional work can be authorized, consultation shall occur between you and the Department contact. The Department contact will need time to consult internally and possibly externally before authorizing any additional work. Any serious injury or mortality shall also be discussed in your Annual Reports below.

**12. Injured Wildlife**

All injured wildlife may be delivered to a rehabilitator licensed by the Department, in accordance with California Code of Regulations Title 14, Section 679. For further information regarding facilities authorized to temporarily house injured wildlife species that may be encountered on the project site(s), contact the Department's Wildlife Rehabilitation Program Coordinator, Heather Perry (Heather.Perry@wildlife.ca.gov, 916-317-0229).

**13. Salvage of Terrestrial Wildlife**

You may salvage monarchs, birds, mammals, amphibians, and reptiles incidentally killed during permitted activities or encountered dead in the field, as specified below. There is no limit to the number of salvaged wildlife.

Salvaged specimens of CESA-listed, CESA-Candidate, and Fully Protected species require disposition instructions from CDFW (contact Justin Garcia, Justin.Garcia@wildlife.ca.gov). Federally-listed species require authorization and disposition instructions from the U.S. Fish and Wildlife Service (Service).

Prior to salvaging monarchs for OE testing, photograph the specimen to document the condition. Salvaged specimens of CESA-listed, CESA-Candidate, and TICP species require instructions from the Department (contact Dr. Hillary Sardiñas, Hillary.Sardinas@wildlife.ca.gov). Preserve the specimen(s) by immediately placing it in a freezer in a sealed container (e.g., microcentrifuge tube). The specimen shall be shipped to the CDFW genetics lab on ice: 1701 Nimbus Rd Suite D, Rancho Cordova, CA 95670. For additional information you may contact WILAB@wildlife.ca.gov.

You may not salvage bats (Order Chiroptera) or marine mammals unless additionally authorized. Salvage of mountain lions (*Puma concolor*) or their parts is prohibited by law. Black bears (*Ursus americanus*) may not be salvaged without obtaining additional authorization from the CDFW's regional law enforcement office and the regional wildlife management supervisor. Salvage of other big game species (i.e., feral pig (*Sus scrofa*), deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), pronghorn antelope (*Antilocapra americana*), and bighorn sheep (*Ovis canadensis*)) is not authorized without obtaining additional written approval from the Big Game Program (contact Chad.Hirano@wildlife.ca.gov).

You may collect unviable bird eggs and abandoned nests (**excluding nests and eggs of raptors, vultures, pelicans, herons, egrets, swans, cranes, seabirds, Threatened, Endangered, CESA-Candidate, and Fully Protected species**). However, you may collect unviable eggs of raptors, herons, and egrets that have been dislodged from a nest and found on the ground.

You may salvage, for the purpose of display at the State Parks Nature Center, only one of each California Species of Special Concern specimen. Additional salvaged specimens shall be donated to a museum or university collection.

You shall leave specimens that are unsuitable for donation at the site or shall completely destroy them through burial or incineration. You shall obtain additional permission to salvage on private or public property from the landowner or custodian of that property.

**14. Disposition and Labeling of Specimens**

You shall securely label each salvaged specimen or collected sample with the following information: (a) date of collection; (b) location of the specimen (GPS coordinates and datum); (c) species name; (d) unique identification number; (e) physical condition; (f) cause of mortality, if known; (g) name and affiliation of the person who collected the specimen; and (h) the permit number(s) and expiration date(s) under which the specimen was collected.

You shall deposit all salvaged specimens in a public scientific or educational institution in California within one month of acquisition (e.g., Museum of Vertebrate Zoology, University of California, Berkeley, CA; California Academy of Sciences, San Francisco, CA; Western Foundation of Vertebrate Zoology, Camarillo, CA; Santa Barbara Museum of Natural History,

Santa Barbara, CA; University of California Santa Barbara Center for Biodiversity; California Polytechnic University, San Luis Obispo, CA).

To validate the specimens were collected pursuant to this permit, a copy of the Transfer of Possession – Chain of Custody form (DFW 1379c) shall accompany any salvaged specimens or samples when transferred to another person or entity.

**15. Terrestrial Plants**

Terrestrial plants are exempt from the requirements of a SCP. However, a SCP does not authorize take or possession of a plant listed as rare, threatened, endangered, or a candidate species pursuant to the Native Plant Protection Act (NPPA) or the California Endangered Species Act (CESA). To obtain a Voucher Collecting Permit to collect state-listed plants for identification purposes, or to apply for a scientific, educational or management permit for state-listed plants, please visit the CDFW Native Plant Program webpage and/or email nativeplants@wildlife.ca.gov. A property owner's permission is necessary to collect plant species. You may need a permit to work in the vicinity of state-listed plants even if you are not collecting them.

**16. Reporting Requirements**

Abstracts, reports, and other publications shall be submitted to the Wildlife Branch SCP Coordinator (Chad.Hirano@wildlife.ca.gov) and the CDFW contact(s) noted below, in an electronic format (such as a pdf file), which is the preferred format. ***All required reporting information shall also be uploaded into the SCP Portal (see Section 1b of the online permit file).***

For additional reporting requirements, see the MOU (e.g., for California least tern) on which you are named.

If no activities were conducted with any or all species authorized under the SCP during the previous year and/or term of your permit, you shall state this in writing in your annual report and/or MWR form.

**a. Annual Report for Western Snowy Plover, ARSSC, and Invasive Species Sacrifice:**
You are required to submit an annual report, in an electronic format, describing the results and significant findings of your research on:

- Western snowy plover to Esther Burkett (Esther.Burkett@wildlife.ca.gov);
- Southwestern pond turtle, western spadefoot, two-striped gartersnake, Blainville's horned lizard, California red-legged frog, and northern legless lizard to Laura Patterson (Laura.Patterson@wildlife.ca.gov); and
- House mouse and black rat sacrifice to Dr. Scott Osborn (Scott.Osborn@wildlife.ca.gov).

The annual reports shall be submitted on or before **January 31st** of the year following each year of research. The reports shall follow standard scientific format (Title, Date, Author(s) and Affiliation(s), Introduction, Study Area (with map), Methods, Results, Discussion, and Literature Cited). Photographs may be included as needed, or as an Appendix.

i. Western Snowy Plover: The reports shall also include, but not be limited to, the following information.

   a. the dates of field work, site name, and names of all workers;
   b. date observed or detected;

c. number and location of each individual plover on each survey route and any nests that were detected and monitored (GPS coordinates and datum), and a map(s) depicting the locations;
d. habitat description and coordinates of all survey stations;
e. detailed identification information for any marked plovers observed (eg., band number, original banding location and date, color and alphanumeric code of any auxiliary-banded birds, notation on which leg(s) of the plover bands were found);
f. a description of the number, causes, and location of any incidental injuries or mortalities; and
g. the date and location of reposition of each salvable or injured specimen.

ii. ARSSC: The annual report(s) shall include, but not be limited to, the following information for all ARSSC captured and/or observed:

a. the dates of field work, site name, and names of all workers;
b. date observed and captured;
c. number and location of animals observed or handled, any pond turtle nests that were detected or monitored (GPS coordinates and datum);
d. a map depicting the locations of the survey/research site(s);
e. a map indicating the locations of detections and/or locations where animals were captured and released;
f. information on individual health, condition, sex, maturity/estimated age, size, and morphometric measurements;
g. detailed identification information for any captured and/or marked animals (e.g., numbering codes and assignments of scute notches, and a photograph of the carapace/plastron);
h. habitat description, including photographs of sites where animals were detected and sites where any relocation may have occurred;
i. estimates of population size, distribution, and relative density, if feasible;
j. any information regarding movements and habitat use;
k. a description of the number, causes, and location of any incidental injuries or mortalities;
l. the date and location of reposition of each salvable or injured specimen; and
m. other information important for conservation of the ARSSC along with a description of known threats to the species and any management recommendations.

iii. House mouse and black rat: The reports for non-native species removal work shall include, but not be limited to, the following information:

a. The dates of field work, site name, and names of all workers;
b. Location of each collection location by county, and by GPS coordinates and datum;
c. Numbers of non-native mammals captured, and not released, at each site by date;
d. Efficacy of non-native mammal removal, conservation/recovery value, and benefitted species; and
e. Any management recommendations. Provide a map with the collection locations clearly depicted.

iv. Federally-Listed Species: You shall submit a copy of your survey report(s) and annual report required by the U.S. Fish and Wildlife Service (Service) for the federally-listed Western snowy plover and California red-legged frog, in lieu of reporting information requested above.

**b. Mandatory Wildlife Report (MWR) Form:**
You shall report all take (e.g., capture) of the authorized wildlife, including incidental take of non-target species, on the Mandatory Wildlife Report (MWR) form within 30 days of expiration of the permit.

For invertebrates: you are required to report any vernal pool invertebrates, and terrestrial invertebrates of conservation priority, but all other terrestrial invertebrates are exempt from SCP reporting requirements.

When you submit your annual scientific reports for the research described above, please also include the MWR form and any CNDDB data that have been submitted to CDFW. There is no need to repeat the more detailed information contained in your CNDDB forms on the MWR form.

**c. Other Reports:**
For activities associated with this SCP, you shall also provide copies of abstracts you may prepare for any papers you present, or copies of any papers you prepare for popular articles or scientific journals, or copies of any periodic, annual, or final report that you prepare or assist in preparing for a client or other third party.

**d. California Natural Diversity Database (CNDDB):**
For any Threatened, Endangered, Candidate, Fully Protected, Species of Special Concern or other CDFW Special Animals encountered and correctly identified, you shall send occurrence data to the CNDDB. You shall submit point data to the CNDDB at least annually. You shall submit data using CNDDB's Online Field Survey Form. If you cannot access the Online Field Survey Form or receive permission from the primary CDFW contact, data may also be submitted on the standard CNDDB Field Survey Forms, or in an electronic spreadsheet with an attached map depicting locations of observations. Include known threats to the species in your submittal. A cross reference to your annual report(s) shall also be included.

**e. Reporting Compliance and Data Exchange**
It is mutually understood that there will be a free exchange of data and information during the course of study covered by this SCP. Draft documents, raw/field data, photographs, notes, and other information resulting from work conducted under the authority of this SCP shall be submitted to the CDFW contacts upon request. Failure to comply with reporting requirements may result in non-renewal or suspension/revocation of this SCP.

**17. Regional Office Notification and Report Circulation**

You shall send notification to the appropriate CDFW Regional biologist(s) and law enforcement contact(s) listed below for field activity(ies) in the county(ies) below (see Condition #4, above). You should have a specific survey or study before conducting any activities authorized by this SCP, and notify the regional contact(s) prior to the start of each new survey and/or study. Submit electronic copies of any reports produced or required by this permit, within two weeks of completion, to the Regional biologist contact(s) listed below, as appropriate for the counties of your activities.

**Central Region (4):**

San Luis Obispo
Crystal Sinclair, Crystal.Sinclair@wildlife.ca.gov, (559) 243-4014

**South Coast Region (5):**

Santa Barbara
Kyle Rice, Kyle.Rice@wildlife.ca.gov, (858) 354-1065

For reptiles and amphibians only:
Jennifer Pareti, Jennifer.Pareti@wildlife.ca.gov, (661) 414-4985

For **Law Enforcement** contacts, send notifications to the appropriate CDFW Regional office email address:
Central Region (4): Reg4sec@wildlife.ca.gov
South Coast Region (5): AskR5@wildlife.ca.gov

**18. Standard Provisions**

The attached provisions shall also be followed: Standard Conditions for All Scientific Collecting Permits (Attachment #1: 2 pages dated July 01, 2017).

**19. List of Authorized Individuals**

All personnel independently conducting activity(ies) for your study(ies) shall carry a copy of this SCP and be named on your SCP List of Authorized Individuals (LAI; Attachment #2).

The Principal Investigator may request to change or add Authorized Individuals to be named on the LAI by submitting a Specific Use SCP Amendment application with the following information: a) name of the individual; b) species the individual will be working with; c) activities the individual will conduct; d) whether or not these activities will be conducted independently or under direct supervision (within three meters); and e) resumes/CVs and statements of qualifications that describe the individual's experience with the species, and experience with the methods to be employed in the study(ies). Letters of recommendation may also be required as supplemental information.

**20. Term**

This Individual Specific Use SCP shall be in your possession while conducting the activities described above, and is valid for three (3) years from the date of issuance (see SCP Cover Letter).

You may use the Specific Use SCP Amendment form for any modifications to your research in the future.

Minor deviation from the stipulated terms and conditions may be authorized on a case-by-case basis when approved by the CDFW contact unless an amendment to this permit would be required.

Should you have any questions, please contact the Wildlife Branch SCP Coordinator (Chad.Hirano@wildlife.ca.gov).

_____
Permitholder Signature

_____
SCP Reviewer
CDFW Wildlife Branch

State of California - Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Wildlife Branch
Wildlife Diversity Program
P.O. Box 944209
Sacramento, CA 94244
http://www.wildlife.ca.gov

***GAVIN NEWSOM, Governor***
***CHARLTON H. BONHAM, Director***

**Expiration Date: see SCP Cover Letter**

**Attachment 2**
**LIST OF AUTHORIZED INDIVIDUALS**

**Ronnie Glick**
**S-190250002-19028-001-01**
**CA Department of Parks and Recreation**

**July 10, 2023**

1. Individuals authorized to conduct scientific research activities as specified below pursuant to this Wildlife Branch Individual Specific Use Scientific Collecting Permit (SCP):

   Principal Investigator:

   Ronnie Glick (SC-190280010)

   Authorized Individuals:

   Stephanie J. Little (SC-190280010), Joanna M. Iwanicha (SC-190450005), Amber Clark (SC-190360004), Ryan S. Slack (SC-190520003), Sarah A. Robinson (SC-190290003), Mattie R. Bishop (SC-190460002), Benjamin T. Wagner (SC-190040006), and Douglas C. Rischbieter (SC-223400005)

2. The Principal Investigator is authorized to independently conduct all wildlife research activities pursuant to this permit, and shall have adequate supervision over all individuals named on this list. The Principal Investigator is responsible for all reporting requirements.

3. After receiving adequate training and experience with the authorized species and methods, as determined by the Principal Investigator, the Authorized Individual(s) listed above may conduct activities pursuant to this SCP without the direct supervision of the Principal Investigator.

   - This LAI does ***not*** cover species listed under the California Endangered Species Act (CESA) or the Endangered Species Act (ESA). Please refer to the Memorandum of Understanding and federal recovery permit, on which you are named, to review individuals who have been authorized to independently conduct work on species listed under CESA and ESA.

4. Field Assistants shall work under the direct, on-site supervision, *i.e.*, within 3 meters, of the Principal Investigator or an Authorized Individual and may assist on research efforts, until such time as the Principal Investigator can certify in writing to the Department, and the Department responds favorably, that the individual may work independently.

5. A SCP amendment form shall be submitted, approved, and returned to you by the Department before you can add or remove personnel from this list. A request to elevate a Field Assistant(s) to Authorized Individual(s) does not require a formal amendment form and fee.

6. This list, the Specific Use SCP and any amendments shall be in the possession of all individuals independently conducting work in the field.

_____
Permitholder Signature

_____
SCP Reviewer
CDFW Wildlife Branch

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# Appendix E. Representative Photographs

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**Photo 1:** Southward view of Oceano Dunes State Vehicular Recreation Area (SVRA) backdunes (March 2023).

**Photo 2:** Arroyo Grande Creek with street-legal vehicles driving on the beach in the foreground (Oct. 2023).

**Photo 3:** Symbolic fencing at Arroyo Grande Creek to protect western snowy plovers, riparian habitat, and sensitive aquatic species (March 2017).

**Photo 4:** Western snowy plover nest in the HCP area.


**Photo 5:** California least tern nesting within the 6 Exclosure.


**Photo 6:** Symbolic fencing at Post 6 northern shoreline boundary to protect nesting western snowy plovers and California least terns.

**Photo 7:** Southern Exclosure fence (looking north toward 7 Exclosure) protecting nesting western snowy plovers and California least terns, including closed shoreline and foredune (March 2021).

**Photo 8:** Close-up of Southern Exclosure west fence protecting nesting western snowy plovers and California least terns (7 Exclosure; Sept. 2017).


**Photo 9:** Mini exclosure to protect nesting western snowy plovers.



**Photo 10:** Close-up of exclosure fence with seasonal closure signs to protect nesting western snowy plovers and California least terns within the HCP area.


**Photo 11:** Western snowy plover and California least tern information and protection sign in the HCP area.


**Photo 12:** Typical dogs on leash sign in the HCP area.


**Photo 13:** Typical speed limit signage within the HCP area.


**Photo 14:** Symbolic fencing at the Nouth Oso Flaco northern shoreline boundary to protect nesting western snowy plovers (March 2023).

**Photo 15:** Symbolic fencing in South Oso Flaco (Sept. 2024).

**Photo 16:** Fenced vegetation island and surrounding area (Eucalyptus Tree vegetation island; Dec. 2024).

**Photo 17:** Aerial of several vegetation islands (BBQ Flats, Worm Valley, and Pavilion Hill; Feb. 2024).

**Photo 18:** 48-acre foredune, south to north (Feb. 2023).

**Photo 19:** Shoreline camping near the Post 3 with Dune Preserve on left side of image (Feb. 2023).

**Photo 20:** Southeast corner of the 48-acre foredune facing northwest with CXT-G in view. (Oct. 2023).

**Photo 21:** Oso Flaco Boardwalk over Oso Flaco Lake.

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# Appendix F. 2024 Nesting Season Management Plan

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# 2024 NESTING SEASON MANAGEMENT PLAN TO AVOID TAKE OF CALIFORNIA LEAST TERN AND WESTERN SNOWY PLOVER AT THE OCEANO DUNES STATE VEHICULAR RECREATION AREA

## FEBRUARY 2024

**Prepared for**
**California Department of Fish and Wildlife**
**United States Fish and Wildlife Service**

**Prepared by**
**California Department of Parks and Recreation**
**Oceano Dunes District**

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# INTRODUCTION

## Background and Purpose

On 21 March 2001 the California Department of Parks and Recreation (DPR), Oceano Dunes District (District) incidental take exemption pursuant to Section 7 of the Endangered Species Act expired. The incidental take exemption from the U.S. Fish and Wildlife Service's biological opinion with the U.S. Army Corps of Engineers (ACOE) lapsed. The ACOE determined that the activity being conducted at the District was no longer under ACOE jurisdiction. Therefore the District lost the federal nexus needed to continue take exemptions under a Section 7 consultation.

The biological opinion exempted incidental take of 2 federally listed species: the California least tern (*Sternula antillarum browni*) (CLTE) and the western snowy plover (*Anarhynchus nivosus nivosus*) (SNPL). Both birds have documented nesting and foraging habitat at the District. The biological opinion (dated 25 January 1996) provides a list of rules governing the recreational activities at the District; program elements of a CLTE and SNPL monitoring program; reasonable and prudent measures necessary and appropriate to minimize incidental take; and additional terms and conditions to implement the reasonable and prudent measures.

The District has been diligently implementing the terms and conditions of the biological opinion since its issuance. As anticipated by the biological opinion, some incidental take of CLTE and SNPL has taken place. However, measures undertaken at the District have resulted in the overall protection of the CLTE and SNPL populations within park boundaries, resulting in an increase in the breeding populations over time at the District, which has contributed to the recovery of both species.

The absence of ACOE jurisdiction has left the District without take authorization. The District/DPR has met with the U.S. Fish and Wildlife Service (USFWS) to address the situation and to determine the best course of action to resolve conflicts between listed species and ongoing vehicular recreation activities. In consultation with USFWS, the District/DPR released a Draft Habitat Conservation Plan (HCP) in November 2020 and is currently revising the document (see Attachment A for specific sections relating to CLTE and SNPL management).

The District/DPR also meets with California Department of Fish and Wildlife (CDFW) quarterly to fulfill the guidelines listed in the Biodiversity Management Plan (BMP), dated 13 January 2021. The plan recommends the completion of a state Natural Communities Conservation Plan (NCCP) within 5 years to ensure consistency with the California Endangered Species Act. At present DPR believes that it can continue to operate the off-highway vehicle use area Oceano Dunes State Vehicular Recreation Area (SVRA) and provide protection (attempting no take) of the listed species through the implementation of various protections, monitoring, and management measures as described in the sections below.

Until the District has an approved HCP and NCCP, operations continue under a "no-take" scenario, and District staff have been working closely with the USFWS and the CDFW to develop a yearly nesting season plan for CLTE and SNPL. District staff meets with USFWS and CDFW prior to the start of each nesting season to map out distinctive measures for this nesting season plan.

Specific protection measures and prescribed management protocols for implementation by DPR as contained within USFWS biological opinion (1-8-95- F/C-17) prepared under Section 7 consultation with the ACOE for the issuance of Regional General Permit No. 42 (Corps of Engineers File No. 95-50035-TAW), dated 25 January 1996; USFWS permit No. ES815214; California Department of Fish and Wildlife letter concerning DPR management protocols for the avoidance of take of CLTE within the District, dated

8 May 2001, and additional measures added in 2002, 2003, 2006, and 2016 are incorporated by reference and are components of this plan; and California Department of Fish and Wildlife in cooperation with DPR "Oceano Dunes Biodiversity Management Plan", dated 13 January 2021 (BMP). The following detail describes modifications, changes, or additions to the management protocols contained in the above referenced documents.

Additional measures listed are derived from the District monitoring of the prior nesting season. These measures are listed as recommendations in the annual DPR report written in consultation with Point Blue Conservation Science (Point Blue) (see Appendix B). The District/DPR oversees the CLTE and SNPL program using data collected by staff and consultants. Through these consultations and data collection, the District reviews all recommendations and implements what is reasonable and sound given all issues. The District continues to implement management actions that will ensure the highest extent of protection to both the CLTE and SNPL, and these actions overtime have resulted in breeding success and population growth of both species. The District is responsible for the management of these 2 species within its boundaries. All measures will be operational and in place by 1 March 2024, unless otherwise noted or discussed with appropriate wildlife agencies. A subset of these measures will also be used after the nesting season to assure that SNPL are afforded protection during the winter (see section titled "Monitoring of SNPL Winter Flocks" within this document).

## Adaptive Management

The management measures and protocols contained in this proposal represent the best management practices at this time. However, adaptive management practices may be employed in the protection efforts for CLTE and SNPL during the course of the 2024 nesting season. Adaptive management will be used to provide management flexibility to best afford protection for these species. Program adaptations causing initiation of changes of these proposed management actions could result from the following:

- Observations and data collected by District management and monitoring staff that may indicate CLTE or SNPL protocols proposed herein as ineffective.
- USFWS or CDFW may indicate more recent findings on species management.
- Recognition and response to currently unforeseen threats to the species, or other factors.

## Role of Other Departments and Agencies

District agreement with United States Fish and Wildlife Service and California Department of Fish and Wildlife:

- USFWS staff is available to provide quick and timely responses to informational requests by DPR/District on aspects of the plan that need immediate action.
- During the course of the 2024 nesting season, the USFWS or CDFW may recommend protocol alterations or modifications for the management and protection of CLTE and SNPL. DPR agrees to consult with USFWS and CDFW to coordinate and gain concurrence on any new management protocol changes that may affect CLTE and SNPL.
- USFWS has agreed to consult with CDFW on any modifications suggested or required by CDFW.

During the nesting season, the District will be in communication with USFWS and/or CDFW if there is an occurrence of CLTE and SNPL injury, mortality, or hazing events as described below. If the event is potentially related to vehicle impacts, DPR will consult with CDFW to determine if buffer sizes in place during the nesting season need to be adjusted, with a decision made within 48 hours of the notification.

- Injury or mortality, including all life stages of SNPL found outside buffer areas, adults or juveniles with wing injuries found inside fenced areas, mortality of adults or juveniles found near fencing, and other SNPL injuries or mortalities determined by District staff to possibly be related to recreational or management operations will be reported to USFWS and CDFW in email by the next business day. Does not include predation events.
- Hazing and disturbance events occurring outside buffer areas for all life stages of SNPL will be reported to CDFW by the next business day, with an email report sent to USFWS.
- SNPL chicks found in vehicle riding areas and outside buffer areas or protected shoreline areas (open riding area) will be reported to CDFW by the next business day, with an email report sent to USFWS.
- CLTE injury or mortality for all life stages will be reported to CDFW within 30 minutes by phone, with details of the event sent in email to both CDFW and USFWS by the next business day. Does not include predation events.
- Injury or mortality of CLTE and SNPL due to predation events will be reported in the breeding season annual summary document.

During the non-nesting season (October through February), the District will be in communication with USFWS and CDFW by the next business day for SNPL injuries or mortalities found in the area open to recreational vehicles when cause of injury or mortality is possibly related to vehicle impacts. A detailed report of the incident will be emailed to both agencies within 3 working days.

During the 2024 breeding season, DPR will continue working with CDFW to follow agreed upon guidelines outlined in the BMP:

- Provide site-specific data and information on nesting success, bird mortality and bird disturbance by vehicles relative to recent and current management practices.
- Study the experimental placement of SNPL nesting exclosures of varying sizes in the open riding area. Historical data was provided to CDFW in a detailed story map which analyzed SNPL nest buffer sizes to demonstrate buffers less than 150 meters have high hatch and fledgling success. In 2022-23, District began adding to this long-term data set by working with CDFW and scientific consultants to experimentally place protective fencing at varying distances from SNPL nests as a buffer from the riding and camping area and this effort will continue in 2024. Buffer distances for this experiment will be no smaller than 100 feet (30.5 meters) and no greater than 492 feet (150 meters).
- Design a study to analyze the impacts of night riding on SNPL. The study will be jointly prepared by DPR and CDFW and the District will also consult with outside peers during the study design process. Included in the design will be a control with night riding prohibited along the shoreline and foredunes south of marker post 4.5 during at least half of the study period, with exceptions for emergency vehicle access necessary for health and safety purposes. The study may be conducted over more than one year, if necessary to meet the goals of the study. The District intends to continue to plan and develop the study during the 2024 season (pending budgetary and

contracting restrictions), with the goal of beginning the study as soon as the 2024 nesting season, but no later than the beginning of the 2025 nesting season.

- The District intends to continue to plan and develop the study during the 2024 season (pending budgetary and contracting restrictions). With the goal of beginning the study as soon as the 2024 nesting season, but no later than the beginning of the 2025 nesting season.
- Continue to communicate and work with the CDFW raptor program to only selectively relocate raptors posing a significant threat to CLTE and SNPL.

## Site Protected Areas

The following exclosures and symbolically fenced areas will be in place, or installed as nests are initiated within these areas, and District staff will monitor, adjust, and repair fencing as necessary throughout the 2024 CLTE and SNPL nesting season (see maps in Figure 1 and 2).

Arroyo Grande creek / Post 1.5 area
Arroyo Grande creek and lagoon is symbolically fenced during the nesting season using posts, rope, and signs. If a SNPL nest is found in this area, buffer fencing will be constructed around the nest and provide a minimum of 100 feet between the nest and the area open to the public. There have been no nests found in this area since 2017. The rope is removed 1 October, but some posts and signs remain to prohibit vehicles driving into the upper Arroyo Grande Creek lagoon year-round.

Foredune closure shoreline
The Foredune closure is a restoration area within the open riding area that was closed with fencing in January 2020 to improve air quality conditions. There are 3 plots making up the Foredune closure, totaling 48 acres, approximately a quarter mile south of Post 4 to north of Post 6 (approximately 0.8 miles of shoreline). Although the plots were not originally closed for SNPL management, there is suitable nesting habitat in these early years of restoration, and SNPL nests have been found in all 3 plots each year from 2020-23. The fence surrounding each plot is intended to keep people and vehicles out of the restoration area, but the fence is not maintained as predator fencing and coyotes can easily move through the area. District staff working inside or nearby these plots on foot during the nesting season will coordinate with nest monitors to minimize disturbance to SNPL. The adjoining shoreline west of the area is closed to public use for the breeding season (1 March to 30 September) to protect SNPL broods. Rope fencing with posts and signs extend into the intertidal area to designate the closed shoreline and wire fencing closes off the western portion of the alleyways between the plots.

Southern Exclosure
Beginning October 2021, approximately 300 acres within the southern portion of the riding area has been closed to the public year-round. Prior to this, the Southern Exclosure was installed seasonally, with the fencing removed during the non-nesting season from 1 October to 29 February. For the 2024 nesting season, the Southern Exclosure will remain closed for the nesting season, and may be opened 1 October to once again be closed seasonally during the nesting season, depending on the outcome of litigation. As was done in prior nesting seasons to discourage coyotes from entering the exclosure, fencing will include 2-inch by 4-inch no-climb wire fencing buried 6-8 inches, a second layer of wire fencing to extend the height to 6 feet, and signage to form a single contiguous fenced area. In addition, 4-inch diameter, tall, steel posts were experimentally installed prior to the 2023 nesting season to better support the eastern fencing for year-round use. The taller fence is being monitored and evaluated for effectiveness while additional fencing options are being explored.

The integrity of the fence requires regular maintenance and upkeep using heavy equipment and manual labor, especially after high wind events moving sand around the fence. Jute netting, attached to the bottom of the fence at ground level and buried by sand, was tested in multiple locations of the exclosure fencing in 2022-23 and found to be effective to stabilize sand immediately adjacent to the fence, with the netting remaining completely buried for the nesting season. The jute netting will continue to be used on the exclosure fence in 2024 and inspected throughout the season to ensure the netting remains sufficiently covered by sand.

The adjoining shoreline is also part of the Southern Exclosure and is symbolically fenced using large posts, rope, and signs to deny public access year-round. During winter months outside the nesting season (October through February), the west fencing is removed to avoid being destroyed during storm-driven surf, but the shoreline area remains closed to the public year-round.

Oso Flaco Lake Natural Area (Oso Flaco): Approximately 1.7 miles of shoreline, narrow in width, and dunes that are typically heavily vegetated, relative to the riding area. Oso Flaco is divided into 2 areas:

*North Oso Flaco*: The approximately 68 acres and 0.5-mile stretch of shoreline area north of the Oso Flaco boardwalk and south of the Southern Exclosure. Foredunes are closed by 2-inch by 4-inch no-climb wire fence buried 6-8 inches and a second layer of wire fencing to extend height to 6 feet, and is connected to the Southern Exclosure. The adjacent shoreline is closed to the public using symbolic fencing with large posts, rope, and signs. North Oso Flaco has been closed to the public year-round since March 2022, including the shoreline component. For the 2024 nesting season, North Oso Flaco will remain closed for the nesting season, and may be opened to the public 1 October, depending on the outcome of litigation.

*South Oso Flaco*: The upper beach for the area south of the boardwalk to the southern boundary (1.2 miles) is closed with symbolic rope, posts, and signs during the nesting season. The symbolic fencing is installed at the beach end of the Oso Flaco boardwalk trail to direct visitors away from potential nesting areas. This fencing is removed at the end of the nesting season, on or close to 1 October, and the foredune areas are open to the public during the non-nesting season.

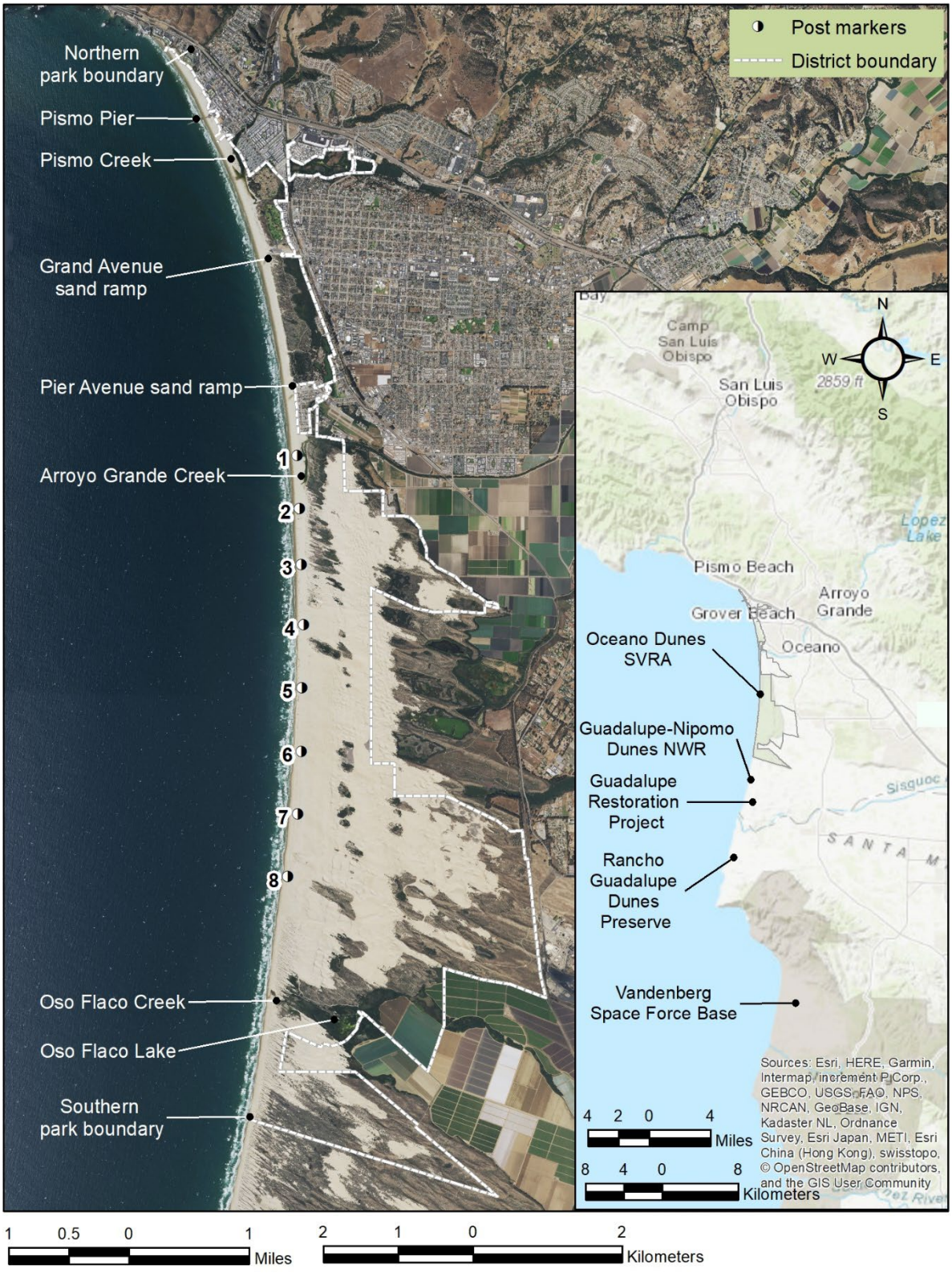


**Figure 1. Oceano Dunes District site map.**

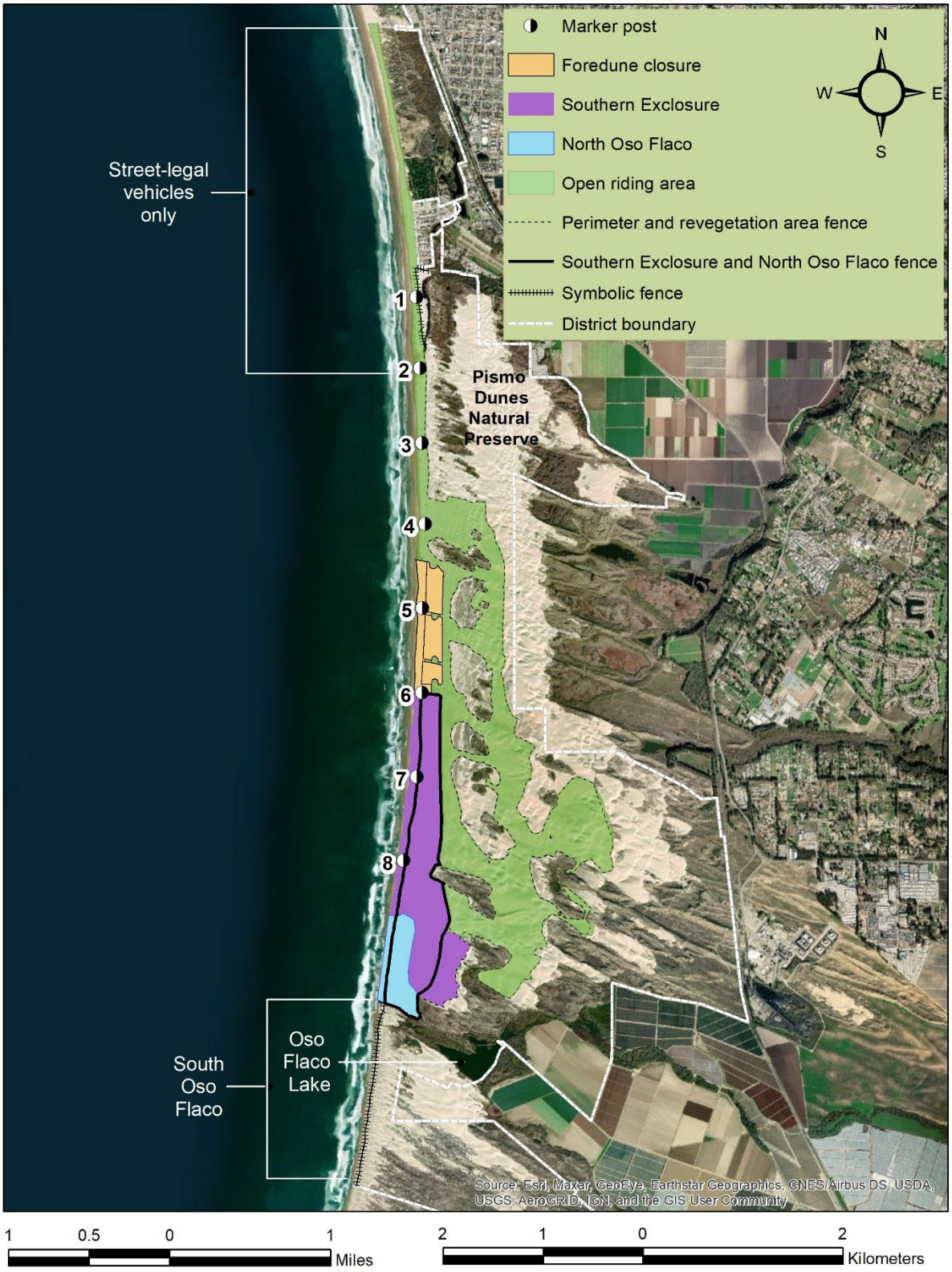


**Figure 2. Map of District Foredune closure, Southern Exclosure, and Oso Flaco protected areas.**

# MONITORING

Daily monitoring occurs from 1 March to 30 September to collect and record breeding season data. The District maintains 4 to 8 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 for 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. Nest cameras placed on a small number of nests provide additional monitoring information.

## General Breeding Season Monitoring Methods

District monitoring includes the following methods and procedures to protect CLTE and SNPL:

- Monitoring will take place daily during the nesting season, with staff in the field early in the morning (just after daylight), and for a minimum of 8 hours per day when nests and chicks are present, to enable a better identification of potential human use related threats to CLTE and SNPL and to summon law enforcement assistance if needed to prevent or eliminate any human use related threats to the species.
- If entering an area with nesting plovers or terns, monitors will be those individuals approved by USFWS for this function.
- During anticipated high visitor use periods as determined by historic visitor attendance records, e.g., Memorial Day Weekend, Fourth of July Weekend, Labor Day Weekend, additional staff will be scheduled to provide extended hours of monitoring within the Oceano Dunes SVRA.
- During holiday periods, field staff will focus specifically during daylight and evening hours on monitoring the northern boundary of the closed protected shoreline to address any trespass concerns.
- Point Blue has been contracted by DPR to provide a permitted bander for the 2024 nesting season. The Point Blue bander(s) will be responsible for the banding of CLTE and SNPL chicks for the full breeding season, and if determined necessary, to band SNPL adults. The Point Blue bander will be in consultation with and under the direction of the Senior Environmental Scientist assigned to the District. In addition, a District staff member has been trained by Point Blue since 2022 and will assist with banding SNPL chicks if state and federal permits for this activity are obtained this season. The banding of newly hatched chicks will follow protocols approved by USFWS and CDFW. The banders will report all banding data and records per guidelines established by USFWS and Point Blue.
- SNPL eggs will be “floated” to help estimate hatch rates when egg progression is unknown. Floating is performed by District and Point Blue staff that are approved by USFWS for this activity. CLTE eggs may be floated, if approved by the CDFW permit office, and will be done by a Point Blue contractor already approved by USFWS for this activity.
- Any breeding activity in the riding area (such as tracks, scrapes, or pairs observed) will be monitored closely. The areas will be marked and rechecked during the day and 1 person will be assigned each morning to recheck any potential breeding areas. All CLTE and SNPL tracks in the riding area will be walked to check for potential nests. Any nest found would be immediately protected with symbolic fencing as described in section below titled “Open Riding Area Nest Buffer Fencing.”

- Monitors will closely track chicks/broods hatched from any area within the riding area (buffer areas or revegetation areas). If determined necessary, staff may carefully direct a SNPL brood to the Southern Exclosure or other appropriate area with a closed shoreline component. Prior to a known nest hatching, monitors will oversee the erection of signs and/or temporary fencing to provide a safe passage until the brood reaches a non-vehicle use area of the SVRA. Fencing may remain in place for a longer period when SNPL broods are frequently seen in the open riding area and will be removed after chicks fledge or are no longer present. Refer to Attachment C for details on protecting SNPL broods in the open riding area and methods to direct SNPL broods to a protected area of the shoreline.
- SNPL chicks observed within a closed protected area, but close to the boundary of riding will be monitored closely until they move a safe distance away. The area outside of the closed protected area will be scanned thoroughly each morning for chicks that may have moved into the area open to riding. If chicks are found and it is appropriate, the brood will be directed back into the exclosure, as described above and in Attachment C.
- The District will continue to participate in the Region 5 working group for SNPL recovery and in the USFWS breeding window surveys.
- Predator management will be implemented in the 2024 nesting season as in previous seasons to address predation issues at the District. Predator management personnel have been contracted for the duration of the 2024 season. The District will continue to work with CDFW raptor program to limit the number of raptor relocations by only selectively relocating raptors posing a significant threat to nesting SNPL and CLTE.
- The District will limit UAV/drone use for restoration monitoring to the periods outside of the nesting season.

## Rare Plant Monitoring Activities

Rare plant surveys are performed every 1-3 years in the District. Populations of surf thistle (*Cirsium rhothophilum*) and beach spectaclepod (*Dithyrea maritima*) are known from North and South Oso Flaco within the nesting area. It is not possible to fully map the distribution of these plant species outside the nesting season. Beach spectaclepod in particular is an annual plant that is difficult to identify outside of the flowering period from April – May.

The District proposes the following protocols to allow these surveys to be conducted in the nesting area of Oso Flaco while eliminating or minimizing the potential for take to nesting CLTE and SNPL:

- The plant surveys will be performed by an experienced permitted monitor (listed on the USFWS Recovery Permit for the activity of independently conducting population surveys) or a permitted monitor will accompany the botanist at all times.
- Prior to conducting botanical surveys, the nesting sites in the survey area will be reviewed. No surveys will be conducted within 150 feet of known nest locations until the nest fates are determined (hatch or fail) and the brood and attending adult are known to have left the area. No surveys or walking within sight of nests will occur for nests that are close to hatch or newly hatched.
- Staff will follow existing nest search protocols to identify new nests, breeding behavior, and the presence of adults tending broods.

- If new nests, breeding behavior or adults tending broods are noted in an area, the team will leave the area as soon as possible and not return until the nest fates are determined or breeding/brooding activity is no longer detected in the area.
- Botanical surveys will take the minimum time necessary, no longer than 15 minutes at each site with a known population, to avoid disturbance to breeding birds in the area.
- Walking surveys of the entire foredune complex in the North and South Oso Flaco areas will take the minimum time necessary to identify new, previously unmapped populations of target species.
- All botanical surveys will be conducted under similar constraints as nest search surveys including during appropriate weather conditions, wind conditions, times when predator activity is not occurring, and other precautions as listed in the Federal Recovery Permit for the District.

## Monitoring of SNPL Winter Flocks

Measures to be implemented during the non-nesting season (1 October through 29 February) will consist of:

- Monitoring for location of SNPL weekly within beach areas of the District from the Pismo Pier to the southern boundary.
- Monitoring for location of SNPL daily within the Oceano Dunes SVRA (areas open to vehicular recreation), as staff levels and weather conditions allow.
- Participation in the USFWS winter window survey.
- 15 MPH and other signs placed on A-frame placards near winter plover flocks in the open riding area to advise the public to drive with caution.
- Continued public education programs with enhanced use of brochures, signage, and social media.
- Continued staff education programs.
- Continued enforcement of dog leash laws.
- Continued enforcement of the posted 15 MPH vehicle speed limits on the beach.
- Beach closures may occur in the event that conditions such as tides, storms, or creek flow cause the beach to be unsafe to the public.
- Arroyo Grande Creek is assessed daily during storm, wave, and high tide events and creek crossing by vehicles may close when on-duty State Park Peace Officers (SPPO's) determine it is too dangerous to cross or when water depth at the location where public is likely to cross exceeds 12 inches. CDPR may also close the park to camping if sustained storms or tidal conditions will result in extended creek crossing closures.

# MANAGEMENT ACTIONS

The District manages for CLTE and SNPL to optimize breeding success and reduce the potential for take. To reduce visitor disturbance to breeding birds, staff installs fence and posts signage to close areas to visitors. Staff may augment existing habitat with branches, woodchips, and wrack (surf-cast kelp). An active predator management program reduces disturbance and depredation by mammalian and avian predators. Under select circumstances, and in consultation with USFWS and CDFW, District staff may collect abandoned but potentially viable eggs or chicks for captive-rearing and may send carcasses to an approved facility for investigative necropsy.

## Open Riding Area Nest Buffer Fencing

Additional buffer fencing will be erected and maintained for CLTE and SNPL nests established in areas open to vehicle use during the nesting season (open riding area). For 2024, buffer fencing for CLTE nests will be a minimum 984 feet (300 meters) between nest and open riding area. As an experiment, as outlined in the BMP and in consultation with CDFW, buffer sizes for SNPL between the nest and the open riding area will vary in size. Buffer distances for this experiment will be no smaller than 100 feet and no greater than 492 feet. Buffer configuration and sizes will take into account the need for safe public and emergency access and sizes adjusted as necessary, and in consultation with CDFW. The fencing will remain in place during the period when nests are active or chicks are found within the buffer area. Once chicks move out of the area or reach fledge age and are flight capable, the fencing will be removed.

General guidelines for open riding area nest buffers

For a nest found in the open riding area, it will be protected with fencing to establish the minimum buffer distances described above and using the following guidelines:

- When the nest is found, it will immediately be protected with symbolic rope fencing and signs and may be slightly smaller than the full buffer, but no smaller than 50 feet. The larger buffer installation will be scheduled as soon as monitoring staff determine it is feasible, depending on the schedule and staff requirements, usually within 1-3 days of the nest being found. Symbolic fencing will be removed once fencing for the larger buffer area is in place.
- Material for buffer area will consist of wire “field” fencing (not predator proof) with t-posts and will not be buried.
- The large size of the CLTE buffer (984 feet) may take more than 1 day to install and the symbolic fence will remain in place until the wire fencing is in place.
- If determined necessary by the Senior Environmental Scientist and/or monitoring staff for predator protection, a circular exclosure or mini-nest exclosure will also be placed around the SNPL nest as described in the “Other Nest Exclosures and Fencing” section below. (These smaller exclosures are not used for CLTE.)
- Nest buffer fencing will be extended westerly to the surf line if evaluation by the Senior Environmental Scientist, monitoring staff, and/or USFWS / CDFW determine it is necessary to provide a secure travel corridor for SNPL brood foraging activity.
- Signs will be placed on the fence to designate a closed nesting area.

Open riding area nests adjacent to closed areas

When individual CLTE or SNPL nests are established within the open riding area, and are located within close proximity to an existing exclosure, the Foredune closure, buffer area, revegetation area, or other area

closed to recreational vehicle use, buffer fencing will be erected to enlarge the closed area so as to encompass the nest site, if topography allows and determined appropriate by the Senior Environmental Scientist/monitoring staff.

Open riding area nests close to each other
When 2 or more nests in the open riding area are located adjacent to each other and not close enough to be connected to a wire fenced area as described above, they will be encompassed into a new large closed fenced area, if topography allows and determined appropriate by the Senior Environmental Scientist/monitoring staff.

Open riding area nests near restrooms
If a CLTE or SNPL nest is established with a restroom facility within the minimum buffer zone, the following protocols will be implemented:

- Permanent Restroom Buildings will be closed to public use and buffer fencing will surround and isolate the restroom to prevent public use.
- Chemical toilets will be relocated to a minimum distance of 984 feet from nest sites of CLTE and 100 feet from nest sites for SNPL.

## Other Nest Exclosures and Fencing

Bumpout
If a CLTE or SNPL nest is initiated inside the Southern Exclosure, Foredune closure, or within the closed buffer area, but close to the fence that borders the open riding area, staff will install additional fencing to maintain a perimeter of a minimum distance of 984 feet from the public riding and camping area to CLTE nests and 100 feet from the riding and camping area for nests of SNPL. Nests with these "bumpouts" or buffer closure fencing will be monitored regularly. If an incubating bird is observed by monitors to be disturbed by recreational activity, the bumpout will be increased in size as needed. All nests are monitored for disturbance and any nest that is disturbed by regular recreational activity may receive a bumpout. This additional fencing will remain in place during the period when nests are active or chicks are found in this area. Once chicks move out of the area or reach fledge age, the bumpouts or buffer fencing will be removed.

Circular exclosure
District staff may build an approximate 3.5-foot radius circular exclosure (used since 2012) for SNPL nests in the Southern Exclosure, Oso Flaco, within other buffer fencing, or other areas approved by the Senior Environmental Scientist, as needed for additional predator protection. The exclosure is constructed using 2-inch by 4-inch wire no-climb fence, bottom 8 inches buried, and 1/2-inch by 1/2-inch mesh netting covers the top. Circular exclosures are typically erected at the 2-egg stage of the clutch, or after nest is consistently incubated, to help reduce abandonment threat.

Mini-exclosure
District staff may use a mini-exclosure measuring 3-foot by 3-foot by 3-foot (used since 2010) for SNPL nests in the Southern Exclosure, Oso Flaco, within other buffer fencing, or other areas approved by the Senior Environmental Scientist, as needed for additional predator protection. These are constructed with 2-inch by 4-inch wire non-climb fence (with a top of the same material) and are secured with stakes. When appropriate, they are buried 4 inches deep.

Symbolic fence in South Oso Flaco
District staff install symbolic fencing on 1 March to close off the upper beach and foredunes in South Oso Flaco. If a nest is established outside or within but close to the symbolic fencing boundary, the rope fencing will be moved further west to give the nest a greater buffer area while still providing a walkway for the public.

All of the exclosure sizes are approximate and can be adjusted based on topography, site conditions, operational needs (including the need to maintain a safe travel corridor for emergency response), and the level of threat to the nesting birds. Deviations from the exclosure sizes will be discussed with appropriate wildlife agencies.

## Nests Found in Revegetation Areas

Revegetation areas are within the off-highway vehicle use areas and are closed to riding year-round to protect sensitive dune vegetation. These are protected by wire fencing allowing passage of animals but are closed to all public entry. These areas do not have a protected adjacent shoreline and nearby SNPL food resources are limited. If a CLTE or SNPL nest is established in a revegetation area, the following protocols will be implemented:

- Staff will install buffer fencing to maintain a perimeter of a minimum distance of 984 feet from the riding and camping area for nests of CLTE. For SNPL, fencing for such nest buffer areas will be experimentally placed varying distances away from the nest site, in consultation with CDFW, with a minimum buffer distance of 100 feet and no greater than 492 feet.
- A Circular or mini-exclosure may be installed, in addition to the buffer fencing, if deemed necessary by the Senior Environmental Scientist and/or monitoring staff for SNPL protection. (Smaller exclosures are not used for CLTE.)
- District staff entering and working nearby revegetation areas on foot will coordinate with nest monitors and take appropriate steps to minimize disturbance to nests and birds. No surveys or walking within sight of nests will occur for nests that are close to hatch or newly hatched.

## Management Actions Specific to CLTE

The District, in consultation with CDFW, are confident the measures mentioned within this nesting season plan, if faithfully implemented at the District, will avoid take of CLTE, a State listed and fully protected species. The District proposes that these same measures will be adequate to assure USFWS that there will be no take of CLTE during the 2024 nesting season.

Orange fencing

The top of the Southern Exclosure fencing is lined with a strip of thicker plastic fencing (orange silt construction fencing cut into approximately 16-inch-wide sections) covering most of the western and northern fenced areas from Post 6 to approximately Post 8. This strip of "orange fencing" has been used on the Southern Exclosure fence since 2016 and is intended to increase the visibility of the exclosure fence for flying CLTE. The condition of the plastic fencing will be assessed each year prior to the nesting season and repaired or replaced as necessary.

Night roost

District staff identify the location of the CLTE night roost by searching for tracks and other signs during daily morning surveys and by monitoring tern activity at dusk as viewing conditions allow. Recreational vehicle activity is allowed at night for registered campers and up to 10 pm for day users. If the night roost is located in the riding area outside the closed buffer area, monitoring staff will install symbolic fencing to obtain a buffer minimum of 330 feet and park staff will avoid driving near the area. Fencing will be added as deemed necessary by the Senior Environmental Scientist or monitors, in consultation with CDFW, and fencing will be removed once the night roost is no longer present.

Buffer Bumpout

For CLTE nests, exclosure fencing will be maintained a minimum of 984 feet from active nesting areas and a large buffer bumpout will be installed east of the Southern Exclosure:

- As nests are initially established (within 7 days of first nest found) in the Southern Exclosure, the buffer bumpout configuration on the east side of the exclosure will be determined by District staff based on these early nest locations to obtain the required buffer distance. The buffer bumpout fencing will be installed as soon as possible, depending on the schedule and staff requirements, usually within 1-3 days of determining the buffer configuration. Fencing will be added as necessary to the Southern Exclosure or other closed areas to maintain this buffer distance. The tern buffer bumpout will be removed once CLTE nests have hatched, SNPL nests within the tern buffer and without other protective fencing have hatched, and CLTE and SNPL chicks have either moved into other protective areas or have reached fledge age.
- The buffer bumpout area will consist of wire "field" fencing (not predator proof) with t-posts and will be left unburied.
- Signs will be installed to prohibit public access within the buffer bumpout.
- If necessary, as determined by the Senior Environmental Scientist and/or monitoring staff, vehicle paths in the riding area between revegetation areas and adjacent to the large bumpout may be closed to public vehicular use.
- District monitoring staff may enter the buffer bumpout by vehicle to monitor CLTE and SNPL nests and broods within the Southern Exclosure. The area will be scanned thoroughly each morning and prior to driving through the area.
- District staff may also enter these areas for park maintenance activities, emergency response, or other necessary park surveys. Unless it is an emergency, staff will coordinate with monitors prior

to entering for updates on most recent nest activity in or near these areas. Appropriate steps will be taken to minimize disturbance to nests and avoid moving birds out of this area and into areas where they may be vulnerable to park activities.

Additional management and protections specific to CLTE chick or juveniles

- In the event that CLTE chicks are observed traveling outside a closed buffer area, small mesh fencing or silt fencing may be used to reduce CLTE travel outside the closed area. Buffer size may be altered based on operational need, public safety considerations, and to maintain adequate travel corridors within the open riding area. DPR will consult with CDFW for agreement and approval if the appropriate setback distances cannot be achieved as a result of operational needs.
- CLTE chicks within the Southern Exclosure or a closed buffer area will be monitored closely, and fencing may be adjusted, if chicks are found within 150 feet of the fence that borders public recreational activity areas. If chick movement is a result of monitoring activity (such as walking inside the exclosure to band), the chicks will be monitored until they are a safe distance from the fence and the chicks are no longer subject to disturbance.
- Banding of CLTE chicks will continue at the District for 2024. Permitted banders from Point Blue have been contracted to perform this duty.
- Driftwood has been placed throughout the Southern Exclosure in past years to serve as natural shelter for CLTE chicks and, as necessary, additional driftwood may be placed on the shoreline in 2024.
- In recent years, Oso Flaco Lake has rarely been used by CLTE for foraging and the footbridge hand railing has not been used since 2018 for perching fledglings and adults. If CLTE are present at Oso Flaco Lake and observed using the railing as a perch, the visiting public will be provided with information and guidelines to avoid disturbance of the activities of CLTE. If, in the opinion of the Senior Environmental Scientist or monitors, visitor activities are significantly disrupting CLTE behavior, the footbridge may be closed to public use, or types of public use on the boardwalk may be temporarily prohibited until the CLTE have left the lake area.

## Public Information and Interpretation

- All first time visitors will be provided with a flyer or pamphlet describing the natural history of the species, their status under endangered species acts, recovery efforts in place within the SVRA and a list or description of activities either prohibited or desired by the public that serve to protect both CLTE and SNPL. This information will be regularly updated as needed.
- Interpretive programs will be updated to reflect new information and emerging trends, including through social media.
- All first-time visitors entering the District by vehicle will be provided with a copy of the park brochure that contains information on the federally and state listed status of the CLTE and SNPL, and management actions in place to aid in the recovery effort of these species.
- All visitors entering the District by vehicle to camp will be offered plastic garbage bags and will be informed they are to haul their trash out of the park at the end of their visit. Visitor participation in reducing or eliminating trash within the SVRA will discourage predators from frequenting the visitor use area and thus reduce the likelihood of predation on CLTE and SNPL.

- Trash dumpsters will be provided for the deposit of trash bags near the OHV staging area, near Post 2. The location of the trash dumpsters will be changed as necessary to avoid disturbance to any nearby active SNPL or CLTE nests.
- Interpretive signs describing park law, policies, and guidelines for the protection of SNPL and shorebirds are posted at multiple bathroom locations throughout camping areas in the open riding area.
- Seven days a week, 24-hours a day the District AM radio station broadcasts information on visitor safety and park rules and regulations.
- Visitors entering the District by vehicle with a dog will be provided with an informational handout about the negative effects of unleashed dogs on wildlife.

## Maintenance Activities

- All protocols for maintenance activities and maintenance vehicle movement and routing contained in the biological opinion remain in effect. Since 2014, the District has ceased conducting surveys for plover nests specifically prior to maintenance activities on the sand ramps because there is too much visitor use activity in these areas to be considered viable nesting or roosting areas. These areas will be regularly inspected a minimum of once per day associated with the regular monitoring activities within the open riding area. During these daily morning surveys, the park is surveyed from south of the Pismo Pier, near Pismo Creek, to the Foredune closure shoreline to identify snowy plover individuals and nests. The sand ramps will be covered in this daily survey.
- All tools, materials, and equipment necessary to construct a single nest exclosure, buffer closure, or bumpout will be available throughout the 2024 nesting season and will be installed as soon as possible as requested by monitoring staff.
- Resource monitoring staff, as well as Maintenance staff and Peace Officers, will carry trash bags in each vehicle and provide trash bags to visitors for the removal of trash and litter from visitor use areas.
- The Southern Exclosure fence will be maintained throughout the season and on a regular basis with the assistance of heavy equipment. This is necessary to maintain its intended use to deter coyotes from entering the nesting colony and to keep the public out of the nesting area. Please refer to Attachment A for specific information on maintenance of the exclosure fence using hand labor and/or heavy equipment.

- Mechanical trash removal will occur in the open riding area and outside areas closed for CLTE and SNPL nesting. A District Environmental Scientist shall survey areas immediately prior to planned mechanical trash removal and the activities shall maintain a safe buffer from CLTE, SNPL, and other wildlife. Activities will avoid wet sand on the shoreline and shall occur above the high tide and wrack line. An operational handbook for mechanical trash removal has been developed by the District and is attached.

# RULES, REGULATIONS, AND ENFORCEMENT

## Prohibited Recreational Activities

The District Superintendent has issued orders to prohibit:

- Public or pet access, entry, occupation in posted closure areas, or operation of vehicles or E-bikes in designated closure areas.
- Camping, parking, or stopping a motor vehicle within 100 feet of a nest closure area (Southern Exclosure, Foredune closure, closed buffer area, and bumpouts) or hanging personal materials on closure fencing.
- Kite flying south of the Pier Avenue ramp during the nesting season.
- Kite surfing south of Post 6 and launching/landing south of Pier Avenue.
- Entry into any signed or closed area, including people and animals.
- Dogs in the Pismo Dunes Natural Preserve and Oso Flaco (dogs are permitted in other areas of the District, but must be on a leash and under control of the owner at all times).
- Public Drone/UAV south of Pier Avenue ramp during the nesting season.

## Enforcement Activities

State Park Peace Officers (SPPO's) will provide focused law enforcement of trespass into the nesting exclosures and other nest closures, the dog leash laws, the posted 15 MPH beach speed limit, firework violations, kite flying violations, public use of drones/unmanned aerial vehicles (UAV), and litter violations throughout the 2024 nesting season.

- SPPO’s will respond to requests by monitors for assistance with CLTE and SNPL protection and security. The enforcement of laws affecting the safety of CLTE and SNPL will be the highest non-emergency priority for law enforcement focus and action within the District.
- During anticipated high visitor attendance periods (major holiday weekends including Memorial Day, Fourth of July, and Labor Day), SPPO staffing levels will be increased (as needed and as staffing levels allow) to provide additional enforcement of all park regulations, including focused enforcement of protections outlined below.
- Every day, a minimum of 2 SPPO’s will be on duty and available from 0630 through 2400 HRS to respond to:
    1. Requests for assistance by monitors for the protection of CLTE and SNPL
    2. Exclosure/closed buffer area trespass violations
    3. Leash law violations
    4. Posted 15 MPH beach speed limit violations
    5. Firework violations
    6. Kite flying violations

7. Drones/UAV violations
8. Litter violations

- During the Fourth of July holiday period, SPPO's, volunteers and other department staff will educate and contact the public and enforce CCR 4314 firework violations, focusing on areas near the Southern Exclosure and other nesting areas. Additional resources may be brought in to enforce firework restrictions including CAL Fire Law Enforcement staff.

# ATTACHMENT A
## Relevant Sections of Draft Habitat Conservation Plan - Installation and Maintenance of Protection Fencing and Avoidance and Minimization Measures

The HCP includes Section 4.3.1.2.1 on Pages 4/17-18 discussing the activities and management practices implemented to avoid and minimize impacts to covered species. Additionally, there are four Snowy Plover avoidance and minimization measures (AMMs) that are specific to exclosure fence maintenance. AMMs 70-73 on page 5-29.

**Covered Species Management**

***Installation and Maintenance of Western Snowy Plover and California Least Tern Protection Fences (CA-12a)***

Exclosure (in place year-round) and symbolic fencing (installed each breeding season 1 March to 30 September) are maintained in the HCP area as part of the ongoing SNPL and CLTE management program.

**Nesting and Brooding Disturbance.** Both heavy equipment and hand maintenance of the fence and bumpout installation can disturb nesting SNPL by temporarily flushing brooding adults away from nests or chicks or by flushing chicks. Once the adults leave the nests or chicks, eggs can be buried by sand, depredated, or inadequately incubated and chicks can be depredated, inadequately fed, or flushed into the open riding area.

Maintenance using heavy equipment is typically shorter in duration than maintenance by hand and thus likely results in less impact to nesting SNPL than hand maintenance. In addition, effects from exclosure and symbolic fence maintenance have been minimal in the past due to the implementation of established protocols in the SNPL and CLTE management program. Specifically, fence maintenance and bumpout installation are timed to avoid extremely windy periods or other inclement weather. In addition, monitors conduct a survey prior to conducting fence maintenance activities. If a nesting SNPL could be impacted by activities, monitors postpone maintenance, if appropriate, or remain on site during fence maintenance/installation to minimize disruption to SNPL. Furthermore, if chicks are flushed out of the exclosure during fence maintenance and/or bumpout installation, monitors attempt to follow and protect the chicks until they move back inside the exclosure. Overall, fenced protected areas have been shown to increase SNPL and other shorebird reproductive success in other locations. In the HCP area, reproductive success has increased since the implementation of the SNPL and CLTE management program, including the use of the exclosure and symbolic fencing; therefore, the exclosure and symbolic fencing areas have provided a considerable benefit to SNPL.

**Snowy Plover Avoidance and Minimization Measures**

**AMM 70** Fence maintenance and bumpout installation will continue to be timed to avoid high wind periods and other periods deemed critical for chick or nest survival, like extreme temperatures.

**AMM 71** Monitors will continue to escort maintenance vehicles driving through the closed shoreline, as necessary. All DPR staff driving within the closed shoreline area will continue to be trained on how to operate a vehicle on the shoreline when SNPL broods are present to avoid collision or other harm, e.g., scanning in front of vehicle, driving where chicks are less likely to occur, avoiding wrack, and keeping speeds at or below 5 mph.

**AMM 72** Monitors will continue to conduct surveys prior to conducting fence maintenance activities. If nesting SNPL could be impacted by activities, monitors will postpone maintenance, if appropriate. Monitors will remain on site during fence maintenance/ installation conducted by hand to monitor nearby nests and minimize disruption to SNPL.

**AMM 73** If any chicks are flushed out of the exclosure, monitors will continue to follow and protect chicks until they move back inside the exclosure as described in section 2.2.2.1.2.

# ATTACHMENT B
# Recommendation section from Oceano Dunes State Vehicular Area (ODSVRA) 2023 nesting season annual report (November 2023)

**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 the effectiveness of those actions. 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.

**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. Banding a large portion of the tern and plover chicks hatching from ODSVRA is necessary to determine the seasonal productivity and for assessing the management effectiveness. Additionally, bands provide an opportunity to gain insight into predator impacts on chicks and fledglings. Banding of tern and plover chicks also provides information on natal site fidelity of terns and plovers fledged at ODSVRA, as well as migration to other sites.

Every year, ODSVRA bands as many tern and plover chicks as possible, but there are situations when park staff will determine the banding effort is not suitable or could be detrimental to the birds. Chicks are not banded at ODSVRA when it will cause a disturbance to nearby young tern and plover broods. A variety of other factors will prohibit banding including, but not limited to, very young unbanded chicks lost prior to any banding opportunity, weather conditions (and other conditions defined in the USFWS permit) that would make banding unsafe, topography and vegetation in area of chicks making them difficult to locate, and chicks from nests with unknown locations found when too old and mobile to capture for banding. In 2023, there were the highest percentages of unbanded tern chicks (42%, 28/66) and plover chicks (57.3%, 224/391) compared to any other season since banding began. In 2022, there were 27.5% (19/69) unbanded tern chicks and 32.6% (169/515) unbanded plover chicks, and compares to 19.2% (range=9.4-35.9%) for tern and 34.5% (range=12.3-52.4%) for plover during the previous 10-year period 2012-21. The increase in unbanded chicks of both tern and plover in 2023 is likely a result of the highest number of plover nests hatching during a period that occurred simultaneously with tern nests hatching. This caused increased densities of young chicks in many areas, and banding is not possible in these dense brood situations since it would cause a high amount of detrimental disturbance to the broods. In addition, there has been an increase in density of vegetation and size of hummocks in the Southern Exclosure and Foredune closure, making chicks more difficult to view and locate for banding.

Even though the number of unbanded chicks was high in 2023, all of the unbanded plover chicks were successfully tracked and fates for them were determined with intensive brood monitoring. Tern broods do not tend to remain in one area compared to plovers and may leave the site very quickly after fledgling, which makes unbanded tern chicks more difficult to track and determine fate.

Since 2022, Point Blue has been training ODSVRA staff to band plover chicks and it is recommended to continue to train additional staff in 2024 with the goal to apply for additional permits to band. For 2024, Point Blue will continue banding efforts at ODSVRA and have agreed to provide more than one banding contractor if needed during the busier part of the season as an option to attempt to band additional chicks if conditions allow.

**Continue banding least tern chicks to individual**

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

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

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

**Continue option to band adult snowy plovers**

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

**Continue to provide bumpouts and buffer fencing to protect least tern and snowy plover nests and chicks in or close to the open riding area**

Least tern and snowy plover nests inside fenced areas of the Southern Exclosure, Foredune closure, and revegetation areas, may receive temporary additional fencing if a buffer is needed to increase the nest distance from recreational activities in the open riding area. These bumpouts connect to the fence adjacent to nests and extend into the open riding area. Buffer fencing for nests and the tern night roost, when found in the open riding area, is connected to the closest adjacent closure fencing, if appropriate. The bumpout and buffer sizes, determined in consultation with USFWS and CDFW, differs for plover and tern.

It is recommended for 2024 to provide the buffer distances listed below to comply with the January 2021 Biodiversity Management Plan (BMP) using a bumpout or nonpredator fencing (CDFW 2021):

Least tern nests: Provide a tern nest buffer distance of 984 feet (300 meters).

Least tern night roost in the open riding area: Install a bumpout or nonpredator fencing to maintain a minimum of 330 feet (100 meters) from the tern night roost location.

Snowy plover nests in the Southern Exclosure and Foredune closure: Continue to install bumpouts to provide a minimum 100-foot buffer distance between the plover nest and the open riding area for plover nests found inside the Southern Exclosure or Foredune closure, and located close to the fence that borders the open riding area.

Snowy plover nests outside the Southern Exclosure and Foredune closure: Continue to experiment with various plover nest buffer sizes for nests found outside the Southern Exclosure and Foredune closure (such as the open riding area or revegetation areas), in consultation with CDFW, with buffer distances no smaller than 100 feet and no greater than 492 feet (150 meters). Hatch rates for the various buffer sizes will be compared over time. Chicks hatching from these plover nests are monitored closely as they move from nest

to determine the daily location of brood for the week after hatch, survival of chicks, and ultimate fledge rates.

Nest bumpouts and buffers may be smaller in size for cases where topography will not allow the minimum size or as necessary to maintain a safe vehicle corridor adjacent to the north and east fence of any bumpout or buffer. Additionally, to immediately protect the nest when it is first found, and because the buffer requirements are so large, a smaller size buffer consisting of symbolic rope fencing with signs or a smaller single nest wire exclosure may be installed until a larger buffer installation can be scheduled when staff time, material availability, and weather conditions permit. The bumpout and buffer material consists of nonpredator fencing. Access to enter bumpouts or closed buffer areas will not be allowed by the public, but ODSVRA staff vehicles and equipment are allowed within these areas for tasks related to daily tern and plover monitoring, periodic vegetation monitoring, and regular fence maintenance. Other vehicles and personnel will also be allowed to access these areas as necessary to respond to public emergency situations. The bumpout or buffer fencing is removed once nesting activity ceases or there are no longer broods inside the fenced area.

Nests will be monitored closely to assess the adequacy of protective fencing in reducing disturbance. If necessary, bumpouts or buffers may increase in size if disturbance to incubating birds is observed as a result of recreational activity. The buffer size may also be adjusted if tern chicks or nocturnal roosting terns are observed to remain close to the closed buffer area fence.

For plover nests in the open riding area or any area outside of the Southern Exclosure and Foredune closure, a fence corridor that can be closed to the public may be provided as appropriate once nest is close to hatch. This may be done by extending fencing westerly to the surf line to provide a secure chick travel corridor to a protected area of shoreline for foraging habitat.

**Continue to protect snowy plover broods in the open riding area**
The shoreline is important as foraging habitat and for raising snowy plover chicks. After a nest hatches, broods typically move toward the closest shoreline and establish a territory. Portions of the open riding area are temporarily closed, using symbolic fence or nonpredator fencing and signs, to provide a corridor of safe passage for broods moving in the open riding area between nests and foraging areas (see section titled Snowy plover chicks in the open riding area and closed buffer areas on page 39).

In 2024, it is recommended to provide protection to plover broods in the open riding area in consultation with USFWS and CDFW, including methods to allow staff to guide broods to a protected area when necessary (see section titled Broods in the open riding area on page 19). For broods found in the open riding area that are in critical danger from recreational activities, and when it is not practical for a chick closure or travel corridor to be installed, it is recommended that chicks be captured and relocated to an approved rehabilitation facility. Examples of circumstances where chick capture would be needed include: broods that are found far away from any closed shoreline and surrounded by campers where a chick corridor or closed area is not feasible; chicks become separated or appear weak while moving on their own within the riding area to a closed area; or no adult is present and chicks are unattended in the open riding area for an extended period. If possible, USFWS and CDFW will be consulted prior to any capture of chicks, however immediate action may be taken as necessary to avoid loss of chicks due to recreational activities.

**Continue to use predator proof fencing and allow staff and heavy equipment access throughout the season to maintain the effectiveness of the exclosure perimeter fence protecting terns and plovers breeding in the Southern Exclosure and North Oso Flaco**
The contiguous area enclosed by predator fencing within the Southern Exclosure and North Oso Flaco is important in discouraging coyotes during the nesting season from entering nesting and chick-rearing habitat, as well as to limit vehicle and human trespass year-round. The Exclosure predator fencing was

installed seasonally 2006-21 and the area has been closed to the public year-round since October 2021 based on operational needs and for consistency with other agency requirements. The fence during the nesting season is composed of two layers of wire fencing six feet above the surface, with the bottom layer of two-inch by four-inch mesh buried a minimum of eight inches to discourage coyote entry. High winds at ODSVRA can cause gaps or blowouts at the bottom of the fence, and the fence is prone to falling if not repaired in a timely manner. Other areas may become buried by sand which creates low sections in the fence. Coyotes can take advantage of the gaps and low spots to enter the exclosure, making nests and chicks vulnerable to predation. Additionally, gaps and downed fence can cause trespass issues. In 2023, and in past years, heavy equipment was used to repair and maintain the fence for the nesting season by pushing or pulling sand away from the fence, usually once per week (or more as needed) on the eastern fence line that borders the open riding area to maintain the fence for predator control. Staff also access closed buffer areas to repair fencing by hand and add fence material to close gaps and keep the fence at an optimal height.

During the 2023-24 winter months (October to February), it is recommended to continue to repair damaged fence to prevent public trespass, but it will not be necessary to maintain the fence to the same level as during the breeding season since it will not be intended for predator protection. The western fence will be removed during the winter to avoid damage by winter storms and high surf events. Although the predator fencing is effective for the nesting season, it requires almost daily maintenance, multiple hours of staff time, and is not intended to be used as a permanent fence. Prior to the 2023 season, taller and more sturdy posts were used for approximately one mile of the fencing for Boneyard exclosure and the southern portion of 8 exclosure as an experiment and we are evaluating the durability and longevity of this new fence. For 2024, if the Southern Exclosure and North Oso Flaco is expected to remain in place year-round, it is recommended that additional fencing options be explored, with the goal of finding materials that can last more than a single season, in order to maintain the integrity of the predator exclosure fencing. Incorporating new fence materials into the management program at ODSVRA, determined in consultation with USFWS and CDFW, will depend on year-round closure plans, available materials, and staff time.

Prior to the 2024 nesting season, it is recommended to replace the western exclosure predator fencing and repair the fence using heavy equipment and hand crews, to remove any gaps or low spots that may have developed over the winter. Throughout the 2024 nesting season, it is also recommended to maintain the predator fence and continue to allow staff and heavy equipment access to the fence for repairs within closed buffer areas if necessary. The heavy equipment is necessary to cover gaps or pull sand away from heavily buried areas, usually on a weekly basis to maintain the fence. Prior to equipment use, staff would scan the area within and outside the exclosure fence line to determine if there is nesting activity near the fence and any sensitive areas would be avoided by the equipment operator.

**Continue to assess habitat in the Southern Exclosure and, as necessary, distribute natural materials and increase efficiency in distributing woodchips with the help of maintenance staff and heavy equipment**

Natural materials such as driftwood, woodchips, and wrack (surf-cast kelp) have been distributed since 2002 within the Southern Exclosure (including the shoreline) to enhance habitat features to benefit nests and chicks. Tern shelters have not been used since 2014 because the natural habitat enhancement material, such as driftwood, are preferred as a source of cover for chicks. In 2023, woodchips and wrack were not distributed because the exclosure had sufficient materials remaining from previous years. Driftwood was collected on the shoreline at the end of the season, since it would have otherwise washed out during winter high tide and storm events, but was left in other upland areas of the Southern Exclosure. Driftwood was redistributed in bare areas of the Southern Exclosure shoreline and, in lesser amounts on the Foredune closure shoreline, at the beginning of the 2023 nesting season. Driftwood and wrack is gathered into trucks or trailers and unloaded into the Southern Exclosure by hand. From 2008 to 2022, woodchips were loaded into dump trucks, truck beds, or trailers using ODSVRA heavy equipment operators and distributed by hand into the Southern Exclosure.

In 2024, it is recommended to assess the habitat and substrate present in the Southern Exclosure and Foredune closure shoreline prior to the nesting season and, if determined necessary, distribute driftwood, woodchips, and wrack to bare areas. It is also recommended to continue using available heavy equipment and dump trucks for woodchip dispersal. The equipment increases staff efficiency, allows larger amounts of woodchips to be dispersed, and a broader distribution of material to provide shelter from wind and cover from predators. The use of heavy equipment needs to be balanced with other operational needs in the park.

**Continue to monitor wrack levels on the Southern Exclosure shoreline and, if necessary, implement distribution of wrack and inoculate with wrack-associated invertebrates (these invertebrates are an important part of the prey base for snowy plover chicks, juveniles, and adults)**

A five-year study (2007-11) by Drs. Jenifer Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara (UCSB), examined the responses of invertebrate numbers and diversity in areas where wrack was added to the Southern Exclosure shoreline throughout the breeding season. The unpublished results indicated that, prior to 2021, when the exclosure was seasonally closed only for the breeding season (March-September), there was not a sufficient period of time for invertebrates to effectively and naturally recover species diversity and abundance on the Southern Exclosure shoreline following five months of recreational use. In 2012-22, park staff inoculated wrack added to the Southern Exclosure shoreline with invertebrates, but this was not done in 2023 because the year-round closure allowed for sufficient natural wrack to accumulate. Staff continued the UCSB method of invertebrate surveys used since 2012 (see paragraph titled Wrack and talitrids in the Management Actions section on page 18 for more detail) and recommend continuing these surveys in 2024. The surveys would help to document trends over time and determine if the invertebrate population is recovering on the Foredune closure and Southern Exclosure shorelines to assist management decisions for the future. Wrack addition and inoculation using UCSB methods may occur on the shoreline in 2024 if abundance of talitrids or wrack amounts appears low, depending on available materials, accessibility of beach areas, equipment, and staff time.

**Experiment with vegetation and topography management in the Southern Exclosure to improve nesting habitat**

Over the last several years, areas developed dense vegetation within 6, 7, and 8 exclosures, resulting in increasingly tall vegetated hummocks and severe topography. This is especially evident in 8 exclosure. Concurrently, nesting by terns and plovers in these areas shows a marked decrease. Although nests in dense vegetation are more difficult to locate, the lower nest numbers are likely due to the combination of substrate and viewshed not being appropriate for nesting, the large dune hummocks attracting avian predators as perch locations, and the amount of area closed for nest buffers or revegetation elsewhere in the park has increased over time in areas with better quality nesting habitat.

Least terns and snowy plovers typically select open habitats with low dunes and limited vegetation cover (less than 10%), to allow the birds to have a larger viewshed for earlier detection of predators (Swaisgood et al. 2018) (Muir and Colwell 2010) (Page et al. 1995). Approximately 25% of the acreage in 6, 7, and 8 exclosures (roughly 40 acres mostly on the west side) has become less productive for tern and plover, with nest numbers in this area having 16.5% of the total nests during the 2016-20 period compared to only 5.8% since the year-round closure from 2021-23. There were a total of 53 tern and plover nests in an approximate 20 acre area on the west side of 8 exclosure where topography is highest from 2016-20, and only 3 nests from 2021-23 in the same area. Since 2021, possibly in response to increased vegetation and topography on the west side of the Southern Exclosure, there has been a substantial increase of nesting closer to the east fence of the exclosure, placing more nests closer to recreational activities and requiring additional buffer fencing to protect these nests (see maps showing topography and nest abundance changes in Figures C.12 to C.14 in Appendix C).

The foredune plants that have persisted in the exclosure include mainly sea rocket (*Cakile maritima*), beach bur (*Ambrosia chamissonis*), and Coastal sand verbena (*Abronia latifolia*). It is recommended to design an experimental habitat manipulation plan in 2024 to improve nesting habitat to be distributed for review and approval by outside agencies. The plan would focus on removal during the nonbreeding season of the nonnative sea rocket and larger dune hummocks in heavily vegetated areas where nesting has reduced in the Southern Exclosure. The intent of the vegetation removal would be to mimic the natural action of creek and river mouths, which can clear out acres of vegetation in one storm event to create "blow-out" areas within the foredune habitat, extremes for which foredune habitats are adapted. Vegetation at the very western edge of the exclosure would be avoided since these hummocks are beneficial to plover broods as a place to take cover from predators and shelter from wind. Only large hummocks would be targeted, small hummocks left in place, with a goal of creating a mosaic of plants and open sand areas attractive to snowy plovers for nesting. Prior to any habitat manipulation, trained park staff would verify sensitive listed plant species and small mammal burrows are absent. A trained monitor would also be present during mechanical removal to ensure all wildlife remains safe and any sensitive plants are avoided. Changes in tern and plover nesting numbers and nest fates in the experimental vegetation removal areas would be documented and evaluated as part of the plan.

**Continue to evaluate physical features of the nesting and chick-rearing habitat in the Southern Exclosure using drone/Uncrewed Aircraft Systems (UAS) equipment during the nonbreeding season**
Beginning in 2018, and each year afterward, drone equipment was used to photograph the Southern Exclosure habitat using protocols created in consultation with USFWS or CDFW. Flights were performed prior to any nests being established or after nests hatched and chicks fledged from the flight area. All areas with drone flights were continuously monitored for snowy plovers and their behavior. Snowy plovers generally showed no signs of disturbance. The information collected during flights recorded placement of enhancement materials distributed by staff and can be used to assess nesting habitat. It is recommended for 2024 to continue scheduling drone flights in February, prior to the initiation of nests, and flights at the end of September or early October, after all plover chicks have fledged and are flight-capable.

**Continue to use the trash dumpster design at marker post 2 that has been used since the fall 2020**
The predator management strategy at ODSVRA includes methods to discourage attracting predators to the site, including to the trash dumpsters at marker post 2. In the past, experiments with trash dumpster covers of different configurations presented logistical and operational challenges and were discontinued. ODSVRA worked with the local trash company and they provided a new trash cover design that was installed on the beach near marker post 2 beginning in the fall of 2020. Prior to this, four to six large trash dumpsters (22 feet long, eight feet wide, and four feet high with 20 cubic yards capacity and open on top) were used and attracted a large number of gulls landing on and foraging in the dumpsters. The new dumpster design has the same dimensions, but with a closed top and a side door that is left open. This design meets the park requirements and may have helped lower the number of gulls attracted to our park. Reduction in gull numbers at the park may also be partly a result of lower camper and visitor numbers since 2020 and less waste produced. The maximum number of gulls present at one time at the dumpster area during 2021-23 nesting seasons ranged from 59-170. This is much lower than the max of 297 and 445 recorded in 2019 and 2018, respectively, years when the park was at full capacity and dumpsters uncovered on the top were used. It is recommended for 2024 to continue using the newer design of covered trash dumpsters in the marker post 2 area, as it is effective in lowering the number of gulls attracted to the area. Gull surveys are not recommended to continue, as there is ample data previously collected, but the twice per week surveys may recommence using previous methods if there are changes in the dumpster design used at marker post 2 (see Monitoring and Management section for survey details).

**Ongoing management actions that will continue in 2024**

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, symbolic rope, and signs, as practiced since 2006 (Site Description).
- A thermal scope (Trijicon REAP-IR) acquired in 2019, will continue to be used for monitoring the least tern night roost and additional equipment options will continue to be explored.
- Continue monitoring least tern juveniles and the night roost. Continue monitoring foraging activity at nearby freshwater lakes if time allows.
- Continue use of motion detection cameras for nest monitoring and train and permit additional monitoring staff as needed.
- Continue to use an anemometer with data logger from a wind monitoring tower to record daily wind speeds and direction.
- Continue option to use least tern chick fencing on the east side of the exclosure if a method to maintain the tern chick fencing is found.
- Predator monitoring and management actions that have been in place since 2002 will continue.
- The Foredune closure, Southern Exclosure, and North Oso Flaco shoreline will continue to be protected during the breeding season; this includes maintaining the posts and rope at marker post 4.5 and Oso Flaco boardwalk intertidal zones to minimize trespass. The Southern Exclosure and North Oso Flaco are closed year-round (since October 2021), and the shoreline of the Foredune closure is open 1 October to 29 February.
- Continue use of circular exclosures with net tops and mini-exclosures as needed to protect nests from mammalian and avian predators. These small exclosures are not without risks to incubating adults and will continue to be closely monitored and evaluated for their use.
- Surveys for plovers will continue during the nonbreeding season. These weekly surveys have been conducted since the winter of 2009-10.
- Continue to maintain option to salvage and rescue eggs, chicks, juveniles, and adults under very limited circumstances.
- Continue to document impacts and, when possible, reduce disturbance caused by low-flying aircraft over the Southern Exclosure and Oso Flaco.
- Continue to work to address water quality issues at Oso Flaco Lake.
- Continue to work on outreach methods and informational signage at ODSVRA to increase public awareness of threats to nesting and roosting terns and plovers.
- Efforts to hire and retain skilled monitors throughout the year will continue at ODSVRA.

# ATTACHMENT C
# Protocol for SNPL Broods located in open riding areas of Oceano Dunes District

The following is the Oceano Dunes District (District) protocol for snowy plover (SNPL) broods located in the area open to vehicles, off-road use, and camping (open riding area, ORA) of the park. This activity is designed to monitor or safely guide chicks to an area closed to the public with an attached closed shoreline where they are protected from public activity and to reduce conflicts from recreation and public activities at the beach. For broods that are observed frequently moving in the open riding area between protected areas (such as between the Southern Exclosure and revegetation islands to the east), staff may install temporary symbolic or wire fencing to create a travel corridor for the chicks. The fencing will be removed once chicks have fledged or monitors determine broods are no longer using travel corridors. The location coordinates for each instance of SNPL chicks found in the open riding area will be recorded by monitoring staff using Survey123 phone application and the data will be provided to CDFW and USFWS upon request. If possible, District Staff will consult with CDFW and USFWS prior to known nests located in the open riding area hatching or once a brood is found greater than 200 feet away from a protected area prior to any guided movement of broods, however immediate action may be taken as necessary to avoid loss of chicks due to recreational activity. If movement to a protected area is approved to occur or deemed necessary, the protocols below will be applied.

The protected shoreline is monitored closely, and when SNPL broods are being raised near the boundary of the open riding area, staff will be assigned to monitor broods at the boundary periodically or during all daylight hours, as necessary to protect broods. If broods move slightly out of the boundary and there is not an immediate threat detected, they are monitored closely until they return. If the brood does not return in a quick manner, or continues to move further away from the boundary, monitors will guide the brood back to the protected shoreline using methods to those described in "Relocation process" section below. Broods at the boundary will continue to be monitored after they safely make their way to the protected shoreline.

<u>Nests within the ORA</u>
For nests within the ORA without a protected adjacent shoreline, the following protocols apply. Note: This includes nests within revegetation areas or any other area outside the Southern Exclosure, the Foredune closure, and Oso Flaco (see Figure 2).

- The nest is monitored on a daily basis, and checked more frequently upon becoming close to hatch.
- Temporary chick fencing (small mesh fencing) may be installed around the nest to prevent chick movement into the ORA during the night when District monitoring staff is not available.
- Once the nest hatches, the chicks may be banded if the bander determines it is safe and appropriate. Alternately, chicks can be banded on another day after the brood establishes a territory on the protected shoreline.
- While remaining at or near the nest, the brood is checked by monitoring staff throughout the day, giving updates to other field staff on brood status and location. SNPL broods often stay at or near the nest site until the chicks become more mobile. It can take ~1 day for this to occur. Once mobile, the adult will lead the chicks towards the shoreline to forage.
- Once the brood is mobile or moving to the shoreline, District staff will monitor the brood as they are guided to the protected shoreline to establish a territory.

  - District staff will conduct a thorough assessment of the area the brood will be moving through to identify any risks posed by predators, public activity, or other potential disturbance factors.
  - Staff will monitor brood to keep track of their location and to redirect any vehicle traffic or pedestrian foot traffic away from the brood, adding or modifying fencing and/or signage if necessary.
  - Predators will be monitored and hazed from the brood area.
- Note that broods found in the ORA, either from one that moved outside the exclosure on its own or one from an unknown nest location, will be guided by staff to a protected closed area following the process outlined below. CDFW and USFWS will be notified of these events by the next business day, with an email report sent to USFWS.

Preparations and planning for guided brood movement will include the following:

- The location to where the brood will be guided to is chosen ahead of time. The location recommended is usually the closest protected shoreline area, or other closed nesting area, but other factors will be considered such as location and density of other broods and nests. This is to prevent territorial disputes amongst the SNPL broods and/or nesting adults in the area which may cause harm to the chicks.
- Fencing and/or signage may be installed ahead of time to allow the brood to have a protected passage to a safe area. For example, nests in the open riding area or revegetation areas east of the Southern Exclosure will be provided an appropriately sized fenced corridor, that can be closed to the pubic once the nest is showing signs of hatch, for the brood to move west through the corridor into the protected closed area. The corridor fencing will be removed from the ORA once monitors determine the brood is no longer using the travel corridor and has safely moved to a protected closed area.
- If conditions are appropriate, District monitoring staff will begin the process of encouraging the brood towards a safe location to establish a territory to raise the chicks in.

Relocation process:
District staff will monitor broods that may leave the protected area, identify threats to brood movement or safety, guide the brood to a protected shoreline, and monitor the brood once it returns to a protected closed area. The relocation process includes the following steps:

- Trained staff will be involved with this process, with District Environmental Scientists that are listed on the Federal Recovery Permit (permitted ES) leading the team. The experienced Point Blue bander may also assist with monitoring the brood.
- As the brood begins to move westward on its own to the shoreline, staff will establish a vehicle perimeter to be able to keep track of the brood as well as to redirect any pedestrian or vehicle traffic. District State Park Peace Officers may assist if available.
- The adult(s) and chicks will be allowed time to brood and forage while staff monitor from inside vehicles, using spotting scopes and binoculars. The vehicles act as a blind, allowing the brood to behave normally without disturbance.
- Once sufficient brooding/foraging time has passed, the permitted ES will carefully exit their vehicle and slowly start walking towards the brood, encouraging them towards the target location. Staff within vehicles will monitor the moving brood, noting all behaviors and communicating the information with others involved in the process via radio/phones.

- Periodically, the permitted ES guiding the brood on foot will retreat and crouch down, or get back into a vehicle if close and available. This is to give the chicks time to rest, be brooded, and forage with limited disturbance.
- The vehicle perimeter created by District staff will slowly readjust as the brood moves, maintaining their ability to help monitor the brood, scan for nearby predators, and redirect pedestrian/vehicle traffic.
- Portable brooders and hand warmers will be available if one or more chicks appears to be sluggish or cold anytime during this process as a rescue measure.[1]
- Once the brood is at the planned location on the closed shoreline or within protected nesting habitat, staff will monitor the brood from a distance from inside vehicles. Staff will avoid driving or walking in the location near the brood for the rest of the day to limit disturbance and to allow the brood to establish their territory.
- The scheduled night shift staff will check on the brood from a distance after day shift leaves. The brood will also be searched for first thing the next morning.

The process takes approximately 1-3 hours, or may take longer depending on weather conditions, public activity nearby, distance of travel, and other factors.

[1] District staff have successfully used hand warmers and brooders in other instances that are not related to chick relocation to warm chicks that have become separated from attending adults. It is our experience that the chicks can be reunited after a short period of warming to avoid a chick from becoming separated or left behind.

# Appendix G. 2023 SNPL and CLTE Breeding Season Report

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# NESTING OF THE CALIFORNIA LEAST TERN AND WESTERN SNOWY PLOVER AT OCEANO DUNES STATE VEHICULAR RECREATION AREA, SAN LUIS OBISPO COUNTY, CALIFORNIA 2023 SEASON


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**Prepared by**
**Joanna Iwanicha, Amber Clark, Ryan Slack, Sarah Robinson, Mattie Reddell, Mariela Martinez, Daniel Johnson, and Paul Phelps**
**of Oceano Dunes District**
**and**
**Douglas George of Point Blue Conservation Science**

**November 2023**

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Cover photograph from nest camera of common raven depredating the SP30 nest (circled in red) at ODSVRA on 7 exclosure shoreline 7 May 2023. Raven shown with one egg in its bill and the two other eggs were carried off by raven, one at a time, within a short time period.

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# SUMMARY

Staff of Oceano Dunes State Vehicular Recreation Area (Oceano Dunes SVRA, ODSVRA) and Point Blue Conservation Science (Point Blue) monitored breeding California least terns (*Sternula antillarum browni*) (least tern, tern) and western snowy plovers (*Charadrius nivosus nivosus*) (snowy plover, plover) at ODSVRA, San Luis Obispo County, California, in 2023. This is the 22nd consecutive year of both intensive banding of snowy plover chicks and predator management that includes options for selective relocation or removal of predators. Banding of least tern chicks began in 2003.

**Least tern**
There were an estimated 41-42 least tern breeding pairs in 2023, slightly fewer than the 43-44 breeding pairs in 2022, and similar to the average of 40-43 pairs (range=23-60) in the 17-year period 2005-21. During the 2023 season a minimum of 15 banded birds with known origins were documented breeding at the park, with 14 banded as chicks and fledged from ODSVRA, and one banded as a chick and fledged from Vandenberg Space Force Base (VSFB).

There were 42 known nesting attempts, all from known locations within predator fencing of the Southern Exclosure. Of these, two had an unknown fate (not known if hatched or failed) and three were abandoned. The hatching rate for known location and fate nests was 92.5% (37/40), compared to the average of 85.0% during the previous 18-year period 2005-22.

Sixty-six chicks hatched and of these 38 were color-banded to individual. Thirty-five chicks (30 banded, five unbanded) are known to have fledged (seen when 21 days old or older), for a fledging rate of 53.0% and an estimated 0.83-0.85 chicks fledged per pair. This is below the average for the previous 17-year period 2006-22 (banding chicks to individual began in 2006) of 46 juveniles produced per year, a 71.2% chick fledging rate, and 1.08-1.15 chicks fledged per pair.

**Snowy plover**
There was a minimum of 232 breeding snowy plovers (128 males and 104 females) in 2023, an increase of 12.6% from the previous year. Eighty-nine banded birds with known origins were documented as breeding with 86.5% (77/89) banded as chicks and fledged from ODSVRA.

There were 260 known nesting attempts, including 43 identified only by detection of brood (unknown nest location). Of the 217 nests from known locations, 118 (54.4%) were in the Southern Exclosure, 18 (8.5%) in Oso Flaco, 64 (29.5%) in the Foredune closure, eight (3.7%) in the open riding area, two (0.9%) in the closed buffer area, three (1.4%) in Eucalyptus Tree North revegetation area east of 6 exclosure, and four (1.8%) in Eucalyptus Tree revegetation area east of 7 exclosure. Of the 208 nests with known location and fate, 118 hatched for a nest hatching rate of 56.7%. This is below the average of 73.8% for the previous 21-year period 2002-22. Ninety nests failed, attributed to the following causes: abandoned pre-term (7); abandoned unknown pre- or post-term (2); vandalism (1); wind (3); overwashed by tide (5); cause unknown (3); eggs removed by staff (2); unidentified predator (7); unidentified avian predator (10); common raven (36); crow (2); harrier (10) and coyote (2).

Of the 391 hatching chicks, 167 were color-banded to brood with 62.3% (104/167) fledging, and the fate of the 224 unbanded chicks is believed known with 56.7% (127/224) fledging. A total of 231 chicks fledged (seen when 28 days old or older) for a fledging rate of 59.1% and is well above the average fledge rate of 37.7% (range=7.4-66.0%) for the 21-year period 2002-22. One chick fledged per breeding male is the estimated number needed to prevent the population of snowy plovers from declining and productivity of 1.2 chicks fledged per male should provide for moderate population growth (assuming approximately 75% annual adult survival and 50% juvenile survival) (U.S. Fish and Wildlife Service 2007). In 2023, an

estimated 1.80 chicks fledged per breeding male at ODSVRA. For the previous 21-year period, average productivity was 1.43 chicks fledged per breeding male.

# INTRODUCTION

Oceano Dunes SVRA, located in southern coastal San Luis Obispo County, California, is a popular park with high attendance, visited for a variety of recreational opportunities, including driving vehicles and camping on the beach. ODSVRA allowed 1,000 off-highway vehicles per day, 1,000 street-legal vehicles per day, and 300 beach camping units during the 2023 nesting season. Approximately 1,057,900 people visited ODSVRA in 2022 and an estimated 183,900 street-legal vehicles and 73,300 off-highway vehicles were driven on the beach and dunes in the designated riding areas of the park.[1] ODSVRA was closed during the 2020 season due to COVID concerns, was open since 2021, but with limited allowable vehicle and camping use. Prior to 2020, larger portions of the park were open to vehicle use and allowable limits were higher (1,720 off-highway vehicles, 2,580 street-legal vehicles, and 1,000 campers). The 10-year estimated average from 2010-19 was higher than in 2022 with nearly 1.5 million visitors, 315,377 street-legal vehicles, and 121,786 off-highway vehicles (CDPR 2011-22).

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 2023 nesting season for least terns and snowy plovers at ODSVRA. A limited amount of data from previous years' reports has been updated in this report to reflect information that is more accurate and conforms to current analysis practices. Maps in figures and appendices use aerial imagery taken 2019-21 by the National Agriculture Imagery Program (NAIP), unless otherwise noted.

State Park staff conducts monitoring activities at ODSVRA under U.S. Fish and Wildlife Service (USFWS) permit 10(a)(1)(A) ES-815214-10 and California Department of Fish and Wildlife (CDFW) Wildlife Branch Entity Scientific Collecting Permit (S-190250002-19028-001). Predator removal activities are conducted under USFWS Depredation Permit MB25976A-0. Point Blue conducts monitoring and banding activities under USFWS permit 10(a)(1)(A) ES-807078-20, Federal U.S. Geological Survey Bird Banding Laboratory Banding Permit 09316, CDFW Scientific Collecting Permit SC-9591, and a CDFW Memorandum of Understanding.

[1] ODSVRA 2022 Annual attendance figures (source ODSVRA)

# SITE DESCRIPTION

The Oceano Dunes District, California Department of Parks and Recreation, manages approximately 4,900 acres with 9.1 miles of ocean shoreline on the western edge, and is part of the larger Guadalupe-Nipomo Dunes complex that extends south to Point Sal. On the northern border of the park is the city of Pismo Beach. Located to the east of the park are Phillips 66 Refinery, the cities of Grover Beach and Oceano, and private lands that consist of dunes, coastal scrub, and agricultural fields. The southern border of the park abuts the Guadalupe-Nipomo Dunes National Wildlife Refuge (Guadalupe-Nipomo Dunes NWR). Inside the park, dunes open to vehicles extend inland approximately 0.6 to 1.3 miles. Eight numbered marker posts, located approximately 0.5 miles apart along the coastal strand, 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 1.0 mile south of Pier Avenue). ODSVRA was closed to camping in 2023 from 1-20 January, and for the early part of the nesting season 9 March - 25 April, and vehicle access was limited during these periods because of storms and periodic closure of Arroyo Grande Creek crossing. Vehicle access and use is prohibited one hour after sunset to 7 am year-round, with exceptions for emergency vehicles and visitors camping and traveling to or from their campsites and the park entrance. In the southern portion of ODSVRA is the Oso Flaco Lake area, which is closed to the public year-round on the northern end (approximately 0.5 miles of shoreline) and open to pedestrians on the southern end (approximately 1.2 miles of shoreline), 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 (Figures 1 and 2, Appendix C).

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. The Pismo Lake property was acquired in 2007 and is closed to the public.

Riding area: The area within ODSVRA open to street-legal and off-highway vehicles during the non-nesting season from 1 October to 28 February. The northern boundary for street-legal vehicles is the Grand Avenue park entrance and is marker post 2 (approximately one mile south of the Pier Avenue park entrance) for off-highway vehicles. The shoreline is open south to marker post 6, with a large area of back dunes also open to vehicles. Due to winter storms, there were many days during the non-nesting season prior to 1 March when all or portions of the riding area were closed. When the park is fully open, the riding area is approximately 900 acres on 4.2 miles of beach.

Open riding area: The area within ODSVRA open to vehicle use during the nesting season (approximately 874 acres when the park is fully open). Due to storms in the early part of the nesting season, Arroyo Grande Creek near marker post 1 was not crossable and ODSVRA did not fully open until 25 April. The installation of buffer fencing decreases the open riding area acreage. (see Closed buffer area description below). Fencing designates the eastern perimeter of the open riding area, however this fence is not maintained as predator fencing and coyotes (*Canis latrans*) and other mammals can easily move through this fencing. The majority of the open riding area is not optimal nesting habitat, with mostly bare sand, limited areas of artificial debris patches, little to no vegetation, and regions with steep topography.

Foredune closure: Vegetation restoration area within the open riding area closed in January 2020 to improve air quality conditions. Fencing was installed approximately a quarter mile south of marker post 4 to north of marker post 6 (approximately 0.8 miles of shoreline). The closure, totaling 48 acres, is broken into three plots: Foredune North, Foredune Central, and Foredune South. The plots were given different experimental treatments using straw, native seed, and native plants. One control section was not treated. During the nesting season the treated plots had moderate amounts of plant cover, low topography, and areas

of scattered straw. The plots were not intended as a snowy plover nesting area, but in these initial years of restoration, suitable habitat is available for nesting. The fence surrounding each plot is intended to keep people and vehicles out of the restoration area, but the fence is not maintained as predator fencing and coyotes and other mammals can easily move through the area. The adjoining shoreline west of the area and the western portions of the alleyways between these three plots are closed to public use during the breeding season (1 March to 30 September) and nests found in these areas are included within the Foredune closure. The total acreage of plots, shoreline component, and alleyway area closed during the nesting season is approximately 77 acres. The eastern portions of the alleyways between these three plots were initially open for public access to restrooms and nests found here in these circumstances are considered located in the open riding area. On 18 and 27 April, the eastern portions of the two alleyways south of Foredune North and Foredune Central were closed to create buffer areas for plover nests, and nests found in these areas are considered located in a closed buffer area (see description below). The two alleyways were reopened to the public 7 and 13 September, when nests were no longer active and chicks were no longer present.

Closed buffer area: Portions of the open riding area are closed to the public to provide a buffer for tern and plover nests, chicks, and for the tern night roost. As staff finds nests or chicks outside of protected areas, management closes those areas of the open riding area to the public to provide this buffer. Additional areas of the open riding area are closed as staff finds tern nests within closed areas to provide larger buffers for these nests (see section titled Nonpredator fencing on page 17 for details on buffer sizes). The closed buffer area varies in size during the nesting season, as well as from year to year, depending on locations of nests or chicks found. On 1 June 2023, after the first tern nests were found, a large closed buffer area (53 acres) was installed east of the Southern Exclosure and Foredune closure. This closed buffer area was expanded over time to close more areas as the tern night roost and additional tern nests were established, as well as for plover chick protection (maximum of 89 acres on 24 July, see maps in in Appendix C). The fencing east of the Southern Exclosure and Foredune closure was removed on 21 August, when nests were no longer present in the area and the eastern alleyways of the Foredune closure were opened 13 September, when plover broods had fledged from the area. Because the closed buffer area can be large in size, it is often adjacent and connected to the Foredune closure, revegetation areas, or the Southern Exclosure fence using symbolic or hard fencing to keep people and vehicles out of the area, but the fence is not maintained as predator fencing and coyotes and other mammals can easily move through the area. Staff assigns the "closed buffer area" location to nests initiated and found within already existing enclosed buffer areas. Nests found outside the closed buffer area and other protected areas are assigned to the "open riding area" location.

Southern Exclosure: A single contiguous area within the southern portion of the riding area that is fenced and closed to public entry to protect nesting terns and plovers. The adjoining shoreline is also part of the Southern Exclosure. 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. Although the basic configuration of the Southern Exclosure has remained consistent since 2004, changes in dune topography and public safety issues affect the placement of the east fence, resulting in small variations in acreage from year to year. In 2023, the area of the Southern Exclosure (including the area above the high tide line on the closed shoreline) was approximately 298 acres and compares to an average of 294 acres (range=271-307 acres) for the 19-year period 2004 to 2022. From 2001 to 2021, the Southern exclosure and adjacent shoreline were seasonally closed to public entry during the nesting season from 1 March to 30 September, and were closed to public entry year-round beginning 9 October 2021. Individually identified areas within the Southern Exclosure include the following:

> *6 exclosure*: The area from marker post 6 to marker post 7, (approximately 0.5 miles of shoreline and approximately 62 acres), first incorporated into the Southern Exclosure for a full season in 2004. Habitat includes areas of bare sand, small to medium sized hummocks, limited areas of organic surface debris (shells, driftwood, dried algal wrack), and while the area was once sparsely vegetated it is more heavily vegetated in recent years.

*7 exclosure*: The area from marker post 7 to the south side of 7.5 revegetation area (approximately 0.4 miles of shoreline and approximately 63 acres). Habitat includes areas of bare sand, extensive areas of small to medium sized hummocks, limited areas of organic surface debris (shells, driftwood, dried algal wrack), areas of sparse to heavily vegetated dunes, and dense vegetation in the 7.5 revegetation area (4.8 acres, included in the 63 total acres) located within the 7 exclosure.

*8 exclosure*: 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 82 acres). Habitat includes areas of tall dunes with bare sand in the eastern portion, areas of moderate to tall foredune hummocks with mostly dense vegetation in the western portion, and limited areas of organic surface debris (shells, driftwood, and dried algal wrack).

*Boneyard exclosure*: The area east of the North Oso Flaco dunes. Habitat is primarily bare sand, includes tall sand dunes, especially on the eastern portion, with areas of densely vegetated moderate dunes in the western portion. This inland area does not have a shoreline component and is approximately 92 acres. A portion of the west side (approximately 16 acres) has been closed year-round since 2005 and the entire area was closed year-round in 2021 (with the rest of the Southern Exclosure). The eastern boundary of the Boneyard exclosure is not maintained with 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 exclosure during the nesting season, resulting in 44 acres in the western portion (contiguous with 6, 7, and 8 exclosures and North Oso Flaco) and 47 acres in the eastern portion in 2023.

Oso Flaco: The shoreline and dunes in ODSVRA located approximately 0.4 miles south of marker post 8. The approximately 1.7 miles of shoreline 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, with some areas partially open to pedestrian use but closed to vehicles. For purposes of discussion in this report, Oso Flaco is divided into North Oso Flaco and South Oso Flaco.

*North Oso Flaco*: The area extending south of 8 exclosure to the Oso Flaco boardwalk (a pedestrian 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 east of the shoreline is part of the Exclosure predator fence (see description in Management Actions section on page 16) and managed in a similar manner with predator fencing. Additionally, the shoreline has been closed to the public during the nesting season since 2005 and was closed year-round beginning October 2021.

*South Oso Flaco*: Extends from the Oso Flaco boardwalk to the ODSVRA southern boundary (approximately 1.2 miles of shoreline). 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 often receive single nest exclosures. No areas are closed year-round in South Oso Flaco.

Dunes Preserve: Located south of Arroyo Grande Creek and 0.4 miles north of the Foredune closure (1.3 miles in length). The area includes tall sand dunes with densely vegetated foredunes in the western portion and primarily bare sand dunes in the eastern portion. The area was established as a preserve in 1974, vehicles and dogs are not allowed, and fencing designates the boundary adjacent to the open riding area, however there are openings in the fence for pedestrian and equestrian access. Management of the Dunes

Preserve was transferred to the Oceano Dunes District in December 2004. ODSVRA provided tern and plover monitoring for the Dunes Preserve prior to 2004 and continues to do so.

Pipeline revegetation area: Located adjacent to the east side of 8 exclosure. The area is heavily vegetated. Fencing designates the perimeter of the revegetation area adjacent to the open riding area, however this fence is not maintained as predator fencing. Since 2021, the revegetation area is closed to public entry.

Other revegetation areas mentioned in this report: Several named revegetation areas are in the open riding area near nesting areas including Bigfoot (222 feet east of the Foredune closure), Eucalyptus North (319 feet east of 6 exclosure), and Eucalyptus Tree (328 feet east of 6 and 7 exclosure). Maidenform revegetation area is located adjacent to the east side of Boneyard exclosure and the open riding area. Pavilion Hill revegetation area is 180 feet northeast of the Foredune closure between marker posts 4 and 5. The areas are mostly heavily vegetated, but some small portions of the areas more recently expanded for restoration are lightly scattered with dry straw and widely scattered small plants. Fencing designates the perimeter of revegetation areas in the open riding area; however, this fence is not maintained as predator fencing. Since 2021, all these revegetation areas are closed to public entry.

Arroyo Grande Creek: Seasonally flows into the Pacific Ocean approximately 1 mile south of Pier Avenue and 1.5 miles north of the Foredune closure. The associated lagoon is variably located east of the area near marker post 1 and north of 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. During the nesting season, staff installs symbolic fence in such a way to allow equestrian access to Dunes Preserve.

Carpenter Creek: Seasonally flows into the Pacific Ocean approximately 0.4 miles north of Grand Avenue and 3.5 miles north of the Foredune closure. No public vehicles are allowed in the area and the area receives a high level of pedestrian use.

Pismo Creek lagoon: Seasonally flows into the Pacific Ocean approximately 0.6 miles north of Grand Avenue and 3.7 miles north of the Foredune closure. Standing water persists all year, with low vegetated hummocks west of the lagoon; tall vegetated dunes and developed RV campground to the east. No public vehicles are allowed in the area and the area receives a high level of pedestrian use. Only a small portion of the lagoon is part of State Park property.

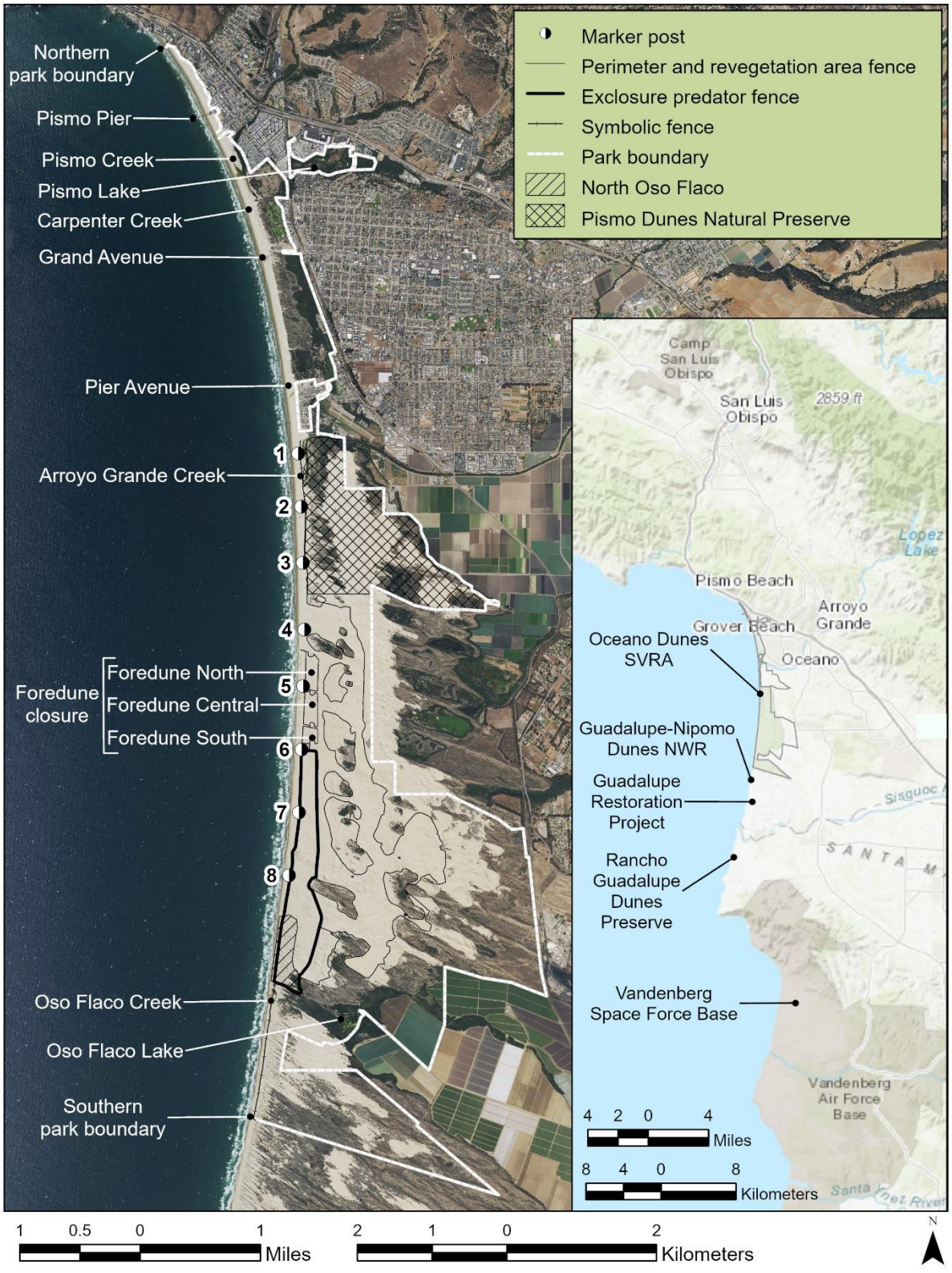


**Figure 1. ODSVRA site map.**

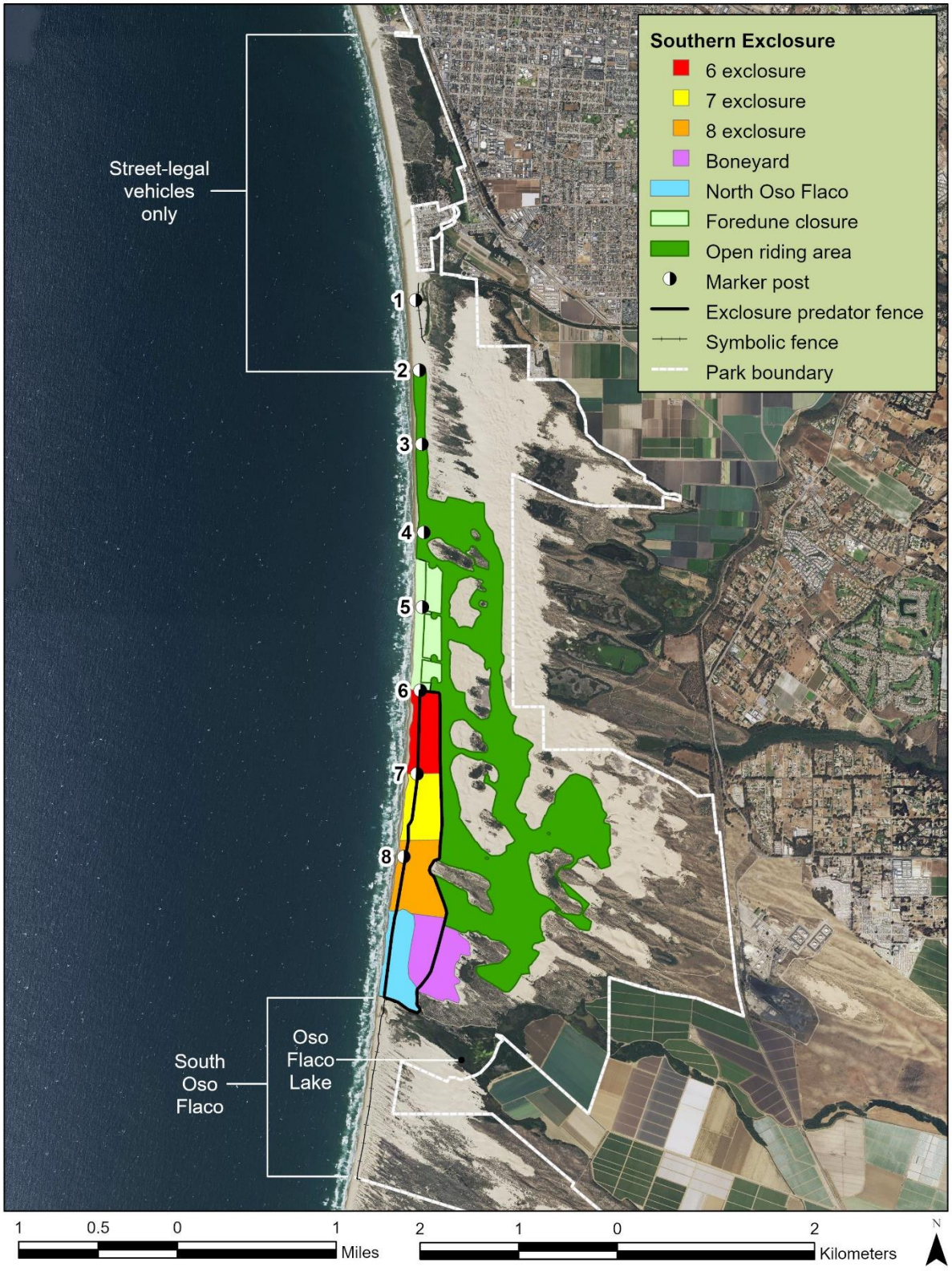


**Figure 2. ODSVRA Southern Exclosure and Oso Flaco protected areas for breeding California least terns and snowy plovers in 2023.**

# MONITORING AND MANAGEMENT ACTIONS

## MONITORING

Daily monitoring occurs from 1 March to 30 September. ODSVRA maintains four to eight or more monitors during morning and early afternoon hours. As the season progresses, monitoring increases to include the late afternoon and early evening hours, typically with two staff members. Monitoring involves walking to assess or find new nests as well as scanning for 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.

Monitors collect and record data such as: nest status; brood location and count of chicks; fledgling identification; band combinations of chicks, juveniles, and adults; tern night roost location and number of birds; injuries or mortalities; predator sightings or tracks; and visitor infractions. Nest cameras placed at a small number of tern and plover nests may provide additional monitoring information such as adult bands, adult behavior, nest attendance, predators, nest fates, nest fate dates, and chick numbers, especially in areas otherwise difficult to access. Monitors enter data from field notes, nest cameras, and ESRI ArcGIS Online Survey123 and Field Maps into a comprehensive Microsoft Access database and ESRI ArcMap.

### Open riding area

Monitoring of the open riding area by vehicle occurs daily along defined transects, as any nests or chicks located in this area require immediate protection from recreational activities and may require additional monitoring. These daily transects include portions of the revegetation areas closest to the open riding area. Staff looks for nesting bird sign, predator presence or sign, and nonpermitted visitor activity (such as off-leash dogs or kites near the exclosure). Staff also rescues sick or injured wildlife and collects deceased wildlife. Areas along transects with tern or plover activity indicating potential nesting interest (scraping or copulating) receive more thorough checks on foot and with increased frequency using binoculars or spotting scopes. Monitors pay particular attention to the boundaries of the Southern Exclosure, Foredune closure, and revegetation areas, looking for indications of nesting close to the open riding area and for tracks or other signs of tern or plover movement into the open riding area. Close brood monitoring occurs daily, including any time staff walk within the exclosure, and is prioritized for any brood movement toward or into the open riding area (see more detail in section titled Broods in the open riding area in the Management Actions section on page 19).

### Breeding least terns and snowy plovers

Finding and monitoring nests: The least tern and snowy plover management program documents size of breeding populations and attempts to find, monitor, and determine all tern and plover nest and chick fates. Staff checks most nests daily and conducts regular nest searches using binoculars and spotting scopes from parked vehicles outside of the Southern Exclosure and Foredune closure, and from vehicles on the adjoining shoreline, to minimize disturbance to nesting birds and broods. Additional nest searches conducted on foot confirm egg number and document activity at the nest bowl. Staff maps nest locations using a Global Positioning System (GPS) receiver connected by Bluetooth to a phone.

Estimating nest initiation date: Initiation date estimates arise from multiple methods that include: timing of egg-laying sequence; floating eggs for plover nests; or when hatch date is known using average length of time for nests to hatch (32 days) and backdating to nest initiation. When none of this information is available, staff cannot estimate nest initiation dates.

Nest fates

The following are categories of nest fates used in this report. Staff examines contents of nonhatching eggs post season to look for evidence of fertilization, which may help determine if eggs were abandoned pre- or post-term.

*Hatch*: Nest hatched at least one egg. Nesting attempts known only by detection of brood constitute "unknown location nests" and egg numbers from such nests represent minimums derived from the number of chicks first observed (see paragraph titled Assignment of broods to nests within this Monitoring section for more detail). When all chicks in a plover brood are known to hatch over more than one day, this is referred to as a "split hatch." It is common for two- or three-egg tern nests to hatch over more than one day and the term "split hatch" is not applied.

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

*Abandoned post-term*: Nest abandoned after the expected hatch date; 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, Overwashed by tide*: Nest overwashed by tide, or flooded by a shifting creek or expanding lagoon.

*Wind*: Nest buried during periods of high winds, with eggs typically found almost or completely buried.

*Failed, eggs removed by staff*: Nonviable eggs from nest removed by staff after incubated well past estimated hatch date. Egg removal is done in consultation with USFWS.

*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, or nests with insufficient information to estimate an initiation date. To decrease disturbance to chicks, monitors limit access to nests with nearby young tern and plover broods present, which may result in nests with unknown fate.

Banding chicks: In 2023, least tern chicks received a size 1A numbered aluminum federal band (covered with red over aqua vinyl tape) on the left leg and a size 1A blank aluminum band on the right leg. Color tape placed on the right band creates color band combinations unique to each individual chick for the season. Weighing chicks occurs immediately prior to banding, typically at two to five days old.

Staff inconsistently banded plover chicks prior to 2001. ODSVRA aims to band as many chicks as possible, with all chicks within one plover brood given the same color band combination since 2002. ODSVRA has a limited number of designated combinations and will reuse combinations when birds with the combination are dead or after a period of at least three years with no sightings in the Pacific coast population's range. Even with this method, reuse of combinations on birds known alive became necessary and occurred from 2010-18, resulting in indeterminate ages of some adult banded plovers. Since 2019, broods have received

a combination no longer believed in use on a living bird because ODSVRA obtained additional band combination options.

To reduce disturbance to chicks, monitors may choose to leave chicks unbanded when broods remain in areas with nearby young tern and plover broods. In addition, loss of a number of very young unbanded chicks occurs prior to any banding opportunity. Staff tracks the fates of unbanded chicks with intense brood monitoring; in many instances, the associated adult or sibling chicks may have color bands.

Assignment of broods to nests: Point Blue and park staff trained by Point Blue typically bands chicks at the nest. For unbanded broods found outside of the immediate nest area, staff evaluates brood location, age of chicks, and adult bands and assigns the brood to a nest as either: 1) a preexisting known location hatched nest or, 2) a new hatched nest with unknown location and known only from brood. Prior to 2023, staff used a third category of "unassigned nest" when unsure how to assign broods to a specific nest, in circumstances where several nearby nests hatch at the same time and unbanded broods with chicks of similar age appear on the same section of shoreline. The unassigned category was not used in 2023 and assumptions were made to determine the most likely nest source for the broods.

Chick monitoring: Staff records chick observation data during daily monitoring activities. In addition, focused searching for broods occurs multiple times each week from vehicle surveys on the Foredune closure, Southern Exclosure, and Oso Flaco shorelines. Staff records band combinations, chick numbers, adults present, and location.

Fledging success: At ODSVRA, juvenile terns can disperse widely over a large area. Specifically monitoring terns allows estimation of number of juveniles produced as well as identifying potential threats to survival. ODSVRA considers tern chicks surviving to 21 days or older as fledged (21 days after the hatch date, which counts as day zero). Tracking of juvenile terns occurs at the Southern Exclosure and any temporary daytime roosting areas that may become established in the park or off-site. To collect additional information on banded tern juveniles dispersing off-site, staff reviews photographic records from off-site birder visits (eBird.org 2023). Staff also communicates with off-site tern managers to supplement site data and may visit nearby locations where terns fledging from ODSVRA may be present.

The fledgling least 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 counts conducted from 2002-04 (chicks banded to site 2003-04). In 2005, ODSVRA color-banded chicks to brood and since 2006 color-banded most chicks 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. Staff counts unbanded fledglings and adds the single day high count to banded fledgling numbers to obtain total fledgling numbers.

ODSVRA considers plover chicks surviving to 28 days or older from the time of hatch as fledged (28 days after the hatch date, which counts as day zero). Staff identifies and records fledglings during chick monitoring as described above. Prior to 2001, staff monitored Oso Flaco and Pismo Dunes Natural Preserve intermittently, resulting in a lack of fledgling information.

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

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

*Percentage chicks fledging*: Total number of chicks fledging divided by total number of chicks.

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

*Productivity*: Number of least tern fledglings per breeding pair (consistent with the annual statewide California least tern report produced by CDFW). Number of snowy plover fledglings per breeding male (consistent with USFWS Pacific coast western snowy plover recovery plan). For snowy plover in 2023, the number of plover fledglings produced per eggs laid, called breeding coefficient, is also reported as an alternate assessment of productivity.

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

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

Max. no. pairs = min. no. pairs + [(total no. nests - min. no. pairs) / 2]

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

Banded snowy plover adults provide the most accurate means to identify breeding population size but currently too few individually banded adults breed at ODSVRA to rely solely on this method. A minimum number of breeding females derives 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. The minimum estimated number of breeding males equals the highest same day count of active nests and broods (males typically raise the chicks; not including males with broods three weeks of age or older since they could be associated with a new nest) and number of nests initiated the day after the high count. From 2009 to 2017, staff compiled numbers of color-banded adults confirmed breeding; staff added any number of this group not accounted for on the same day high count, including nests or broods with unknown adults, to the same day high count for the appropriate sex. Beginning in 2018, using a database query, staff created a more accurate method to determine high counts of unbanded males and females actively associated with a nest on any given day and a total number of uniquely banded males and females associated with a nest at any point in the season.

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. Staff searches for evidence (tracks, roosting scrapes, fecal matter) in the open riding area during daily morning transects and periodically within the Southern Exclosure to identify night roost locations. Monitors search for the night roost at least once per week, weather permitting, as the terns arrive at dusk or later using a thermal infrared scope (Trijicon REAP-IR) and record the location and number of individuals present. ODSVRA considers counts a minimum due to the inherent limited visibility of the night roost. Light conditions after dusk make adults and juveniles indistinguishable.

Least tern use of freshwater lakes: Freshwater lakes can provide a source of prey fish in addition to the near-shore ocean. Though not always feasible, surveying nearby small freshwater lakes documents tern use and gives a better understanding of local food resources; importantly, determining if lakes provide additional appropriately sized fish to feed chicks (chicks require fish small enough to be swallowed whole). Staff monitors the tern colony in the Southern Exclosure daily and observations of adults in flight provide information about the direction of foraging sources. Monitors conduct occasional surveys during the season at Oso Flaco Lake, located on park property approximately 1.5 miles south of the tern colony and at Monarch Dunes Golf Club ponds (4.3 miles southeast of the park) in response to non-staff reports of tern presence 2021-23.

**Wind speed monitoring**

Since 2011, ODSVRA monitors wind speed from a tower (S1 wind tower) located approximately 360 feet east of 6 exclosure with a recording anemometer at a height of 10 meters.

**Predator activity**

Monitoring predator activities: Park staff and contractors (Wildlife Innovations, U.S. Department of Agriculture [USDA] Wildlife Services, and Point Blue) collect information on predator presence at ODSVRA from March to September. From direct observation of avian and mammalian predators or their sign (e.g., tracks, scat, regurgitated pellets, prey remains, depredated nests) monitors record, when possible, species, type of sign, characteristics that may identify an individual, behavior, duration of observation, direction of travel, locations, bands found in pellet/scat contents, and any hazing or trapping details.

Measures describing predator activity

Monitors record predator presence from 1 March to 10 September (a 194-day period) under the following three categories to estimate the extent of predator activity, both temporally and spatially, in the protected areas:

> *Number of days detected*: Total number of days different avian and mammalian predators occur in the nesting area of the Southern Exclosure and Oso Flaco during the nesting season.
>
> *Sightings*: Record of avian predator activities, with most detections made by direct observation (with the notable exception of nocturnal owls). In addition, observations of an individual remaining in one area longer than one hour count as multiple sightings (one sighting per hour or portion thereof) in order to account for possible additional impacts.
>
> *Occurrences*: Record of mammalian predator activities, with most detections occurring by tracks and sign. Because direct observation of mammalian predators is very limited, information typically does not include details such as number of individuals, behavior, or duration of presence.

For both sightings and occurrences, this report separates single day detections for the different areas of the Southern Exclosure (6, 7, 8, and Boneyard exclosures) and Oso Flaco (North and South). Monitors record predator activity in the Foredune closure using the same methods, however these recordings are not included in sighting and occurrences totals in this report to keep comparisons between years consistent. Note that the number of recorded sightings or occurrences for the first two weeks of March and the last few weeks of the season (end of August and beginning of September) may be biased lower, with less predator contractor presence in the field, and less staff time during these periods spent on predator surveys and more time spent on habitat enhancement and fencing projects.

Gull monitoring: Gulls may depredate snowy plover and least tern eggs and chicks, as well as young plover juveniles, and occasionally adults. Human activity and associated food resources attracts gulls, making them a subsidized predator. Staff performs general monitoring of gulls around the Foredune closure, Southern Exclosure, and Oso Flaco to identify potential problem individuals. In addition, monitors count gull numbers at the trash dumpster area near marker post 2 two times per week on Sunday and Monday mornings when the trash dumpsters are usually full.

**Nonbreeding season monitoring of snowy plovers**

Beginning in October 2009 and continuing through the 2022-23 winter, more consistent weekly surveys for snowy plovers occurred 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;
2) Grand Avenue to marker post 2;
3) marker post 2 to marker post 6;
4) marker post 6 to the North Oso Flaco northern boundary; and
5) Oso Flaco (shoreline from North Oso Flaco to ODSVRA's southern boundary).

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

## 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 fencing and posts signage to close areas to visitors. Staff may augment existing habitat with branches, woodchips, and wrack (surf-cast kelp), but distributed less of these materials in 2022-23 because the Southern Exclosure was closed to the public year-round, which allowed for materials to stay in place without disturbance. An active predator management program reduces disturbance and depredation by mammalian and avian predators. Under select circumstances, and in consultation with USFWS and CDFW, ODSVRA staff may collect abandoned but potentially viable eggs or chicks for captive-rearing and may send carcasses to an approved facility for investigative necropsy. For 2023, ODSVRA selectively took eggs to the Santa Barbara Zoo and sent carcasses appropriate for necropsy to CDFW, Office of Spill Prevention and Response, Marine Wildlife Veterinary Care and Research Center, Santa Cruz, California (MWVCRC). In addition, staff processes nonhatching eggs post season to analyze contents and takes eggshell specimens to the Santa Barbara Museum of Natural History.

### Informational signage and enforcement of regulations

Staff places interpretive panels and signs at public access points, near restroom facilities, and on A-frame placards near winter plover flocks to increase public awareness of threats to terns and plovers. Staff also uses signs to identify closed areas during the breeding season. The public can access a low wattage radio station (1690 AM) with a repeated recording of park information, including information about protection of sensitive species. Least tern and snowy plover information and updates are also posted on ODSVRA websites and social media pages, such as Facebook. Park ranger staff enforces park regulations enacted to protect terns and plovers.

### Closures and fencing

ODSVRA closes portions of the park to vehicle and/or pedestrian use with wire mesh or symbolic fencing. The wire fencing of the Exclosure predator fence (see details below), provides a higher level of protection compared to nonpredator fencing and symbolic fencing to keep visitors and coyotes from entering sensitive areas. When nesting occurs outside of the Exclosure predator fencing, staff may choose an alternative exclosure or other fence type with consideration for the species, topography, proximity to recreational activities, predator threats, and duration of disturbance to the area during exclosure construction.

ODSVRA uses the following fencing and exclosure types:

Exclosure predator fence (within Southern Exclosure and North Oso Flaco): ODSVRA enclosed with wire mesh fencing this approximately 270-acre area 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. For the purposes of this report, this type of buried wire fence is referred to as “predator fence” or “predator fencing.” Beginning in 2006, an additional layer of fence material attached to overlap the top of the fence increased 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. Beginning in 2016, for the purpose of making the fence more visible to flying least terns, orange plastic fencing overlays the top portion of the fence (in swaths approximately 16 inches wide) on the north and west fence of the Southern Exclosure from approximately marker post 6 to post 8. Heavy equipment operators assist regularly, usually weekly during high wind periods, in the maintenance of the predator fence. In 2023, staff began installing jute netting more regularly along the base of the fence to help to stabilize sand and lessen the need for heavy equipment.

Symbolic fencing

Rope fencing in several areas of the park seasonally or temporarily is used to protect nesting or shoreline brooding habitat, but varies in configuration and length of time used depending on the location and protection needs. Nests with symbolic fencing may also receive protection from a single nest wire exclosure.

*Foredune closure, Southern Exclosure, and North Oso Flaco shoreline*: Symbolic rope fencing, with the addition of tall posts with large stop signs extending into the intertidal area at the northern end of the Foredune closure shoreline and the southern end of North Oso Flaco to clearly designate a closed shoreline of the Foredune closure, Southern Exclosure, and North Oso Flaco to visitors for the nesting season from 1 March to 30 September. On 1 October, the symbolic fence is installed at marker post 6 extending into the intertidal zone to close the Southern Exclosure and North Oso Flaco shorelines for the winter months (the Foredune closure shoreline opens to the public 1 October).

*South Oso Flaco*: Symbolic rope fencing and signs close approximately 1.2 miles of nesting and brood-rearing habitat in South Oso Flaco (lower shore remains open to public). Staff moves the fencing in this area westward for nests found west of or very near the symbolic fence to provide an additional buffer between nests and pedestrians.

*Arroyo Grande Creek and lagoon area*: Symbolic rope fencing and signs close a small area around Arroyo Grande Creek and lagoon from 1 March to the end of September for the nesting season. ODSVRA removes the symbolic fence, opening it to pedestrian use during the nonbreeding season from 1 October through 28 February, but posts and signs remain in place to restrict vehicle use year-round.

*Open riding area*: Nest or chick protection consists of symbolic rope fencing and signs initially when monitors discover a nest or brood in the open riding area. The symbolic fence is replaced with temporary wire fencing (nonpredator fencing) in most cases and when necessary. Staff removes fencing once nesting activity ceases or when broods are no longer present in the temporarily fenced area.

Nonpredator fencing: Wire "field" fencing has a larger mesh size and is four feet tall, unburied, not predator proof and used to identify some areas as closed to the public. Nonpredator fencing closes the western portion of the Foredune closure alleyways for the breeding season 1 March to 30 September. Staff installs nonpredator fencing to provide a closed buffer area around any least tern or snowy plover nest found in the open riding area (see Site Description for details on closed buffer area). Staff may also install the wire fencing to protect snowy plover broods in the open riding area. Tern nests receive a minimum nest buffer from the open riding area of 984 feet (300 meters). For plover nests in 2023, nest buffers were a minimum of 100 feet (30 meters). Because of the large size of the tern buffer, staff often attaches the nonpredator fencing to adjacent fenced closed areas (such as the Southern Exclosure, Foredune closure, or revegetation areas), making an irregular shape (not circular). The nonpredator fencing makes up the closed buffer area that expands or contracts in size over time, often with overlapping fencing. ODSVRA may use nonpredator fencing to create closed buffer areas of smaller sizes in cases where topography or safety conditions preclude a full-sized exclosure. Park staff vehicles are allowed in the closed buffer areas for daily monitoring tasks, fence maintenance, and to respond to emergency situations.

Circular exclosure and mini-exclosure: Staff selectively uses small exclosures (made of two-inch by four-inch wire predator fencing) around individual snowy plover nests inside or outside of predator fencing for protection from predators, including roosting gull flocks. Permitted monitors use different exclosures based on a variety of factors including, but not limited to, weather, topography, predator threats, and proximity of

young broods. Staff closely monitors nests within smaller exclosures since there may be an increase in abandonment due to predation on adult plovers attending the nests or a higher risk that sand accumulating inside the fencing during high wind events buries eggs.

Staff builds a seven-foot-diameter circular exclosure (used since 2012) with five-foot-high sides and the bottom eight inches buried when located outside of the Southern Exclosure. Plastic netting, with 1/2-inch by 1/2-inch mesh, covers the top and protects against avian and climbing mammalian predators. Staff may also selectively use a three-feet by three-feet by three-feet mini-exclosure (used since 2010), with a wire mesh top, staked into the ground, and buried four to eight inches when appropriate. The mini-exclosure takes the least amount of time and staff to install but the circular exclosure is currently preferred because the larger size may give more protection from predators, accommodates more nest movement, and may cause less sand deposition and egg burial at this very windy site.

Bumpout: A nest in the Southern Exclosure, Foredune closure, or revegetation areas and located close to the boundary of the open riding area requires temporary additional fencing extending into the open riding area to allow an adequate buffer from recreational activities. Least tern nests within 984 feet (300 meters) and snowy plover nests within 100 feet (30 meters) of the open riding area receive a bumpout. Rarely, a slight reduction in bumpout size occurs, in consultation with USFWS and CDFW, to maintain a safe vehicle corridor adjacent to the east fence. Staff creates these bumpouts using wire fence (unburied) or symbolic rope, thus they are not predator proof. Sometimes staff excloses nests on the shoreline close to the west fence with two-inch by four-inch mesh buried predator fencing extending as a bumpout from the Southern Exclosure fence.

**Habitat enhancement**

Staff evaluates the nesting habitat of the Southern Exclosure and the Foredune closure shoreline and places materials to offer more areas of disruptive cover, provide shelter from wind and blowing sand, reduce exposure to predators, and augment potential nesting substrate for terns and plovers. Following the nesting seasons of 2021 and 2022, and for the five-month period October through February, the Foredune closure shoreline was open to camping and vehicles resulting in barren sand with little to no natural debris and vegetation compared to the Southern Exclosure and Oso Flaco. Beginning in February or March, and prior to nest initiation, staff may add natural materials such as driftwood, wrack, or woodchips to the Foredune closure shoreline or the Southern Exclosure, as deemed necessary to enhance habitat features. On the Southern Exclosure shoreline, staff may inoculate wrack with talitrids (commonly called beach hoppers) to help establish a breeding population, thus increasing the food resources available for plover chicks and juveniles during the breeding months.

Wrack and talitrids: Results from a five-year study conducted from 2007-11 by Drs. Jenny Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara (UCSB), showed greatly depressed invertebrate populations on the Southern Exclosure shoreline when the area was seasonally open during five months (October through February) to recreational vehicle use. The studies also showed that invertebrates cannot effectively recover species diversity and abundance on the Southern Exclosure shoreline in the following seven-month seasonal closure (March through September). In 2012, UCSB sampled invertebrates on the ODSVRA shoreline and from 2013-23, park staff continued the surveys using the UCSB protocols. The beginning and end of season surveys are comprised of 15 transects in defined areas along the Foredune closure (3 transects, began surveying in 2021), Southern Exclosure (9 transects), and North Oso Flaco (3 transects as a control) and the samples are sent to Dr. Dugan for analysis. The Southern Exclosure has been closed year-round since October 2021, and invertebrate populations appear to be improving (talitrid survey results are pending). Since the Foredune closure shoreline is open to camping and vehicles seasonally, it is likely to have depressed numbers of invertebrate populations on the shoreline compared to the Southern Exclosure and Oso Flaco.

ODSVRA may collect wrack in the open riding area and disperses it on the Foredune closure and Southern Exclosure shorelines to improve habitat conditions. Collection and distribution occur by hand and relocation by truck and trailer. Staff may collect talitrids from outside the vehicle use area north of Grand Avenue and from South Oso Flaco, taking care not to deplete talitrid numbers from collection sites, and inoculates talitrids into the dispersed wrack on the Southern Exclosure shoreline. Wrack is dispersed mainly in the months of February to April but may be distributed later in the season. Amount of wrack and talitrids collected and dispersed, and timing of distribution, varies from year to year depending on availability of materials and amount of invertebrates found, as well as allowable staff time. Wrack and talitrids were not distributed on the closed shorelines in 2023 because of accessibility issues due to early season storm events causing beach closures, limited staff time, lack of available wrack/talitrid resources, and less bare areas present on the closed shorelines.

Wood pieces and woodchips: Staff distributes wood pieces (cut branches and driftwood) in patches from the mid-portion of 6 and 7 exclosures toward the west fence, the upper portion of the Southern Exclosure shoreline west of the fence, and the Foredune closure shoreline. Staff collects the wood pieces at the end of each season from the shoreline areas where they may be washed out and stores them for use in the following season.

From 2008-2022, staff added woodchips to the Southern Exclosure to supplement the existing assorted debris that least terns and snowy plovers often choose as nesting substrate. Crews spread woodchips in patches, usually less than a quarter-acre in size, in the Southern Exclosure in areas of barren sand and over thinning woodchip patches remaining from previous years. ODSVRA heavy equipment assists in loading woodchips to be distributed. In recent years, staff dispersed smaller amounts of woodchips and none were distributed in 2023 because less bare areas were present. Woodchips remained in place from previous years and the year-round closure of the Southern Exclosure since October 2021 protected the substrate. Moving sand dunes in other bare areas of the Southern Exclosure would cover any materials, making placement of wood pieces and woodchips impractical.

**Predator management**

In addition to preventative measures such as fencing, single nest wire exclosures, and cover provided by habitat enhancement, park staff removes animal carcasses (which attract scavengers) in or adjacent to nesting and brood-rearing habitat and may haze predators to flush them from sensitive areas. Hazing techniques used include approaching an avian predator on foot or by vehicle, waving arms and making noise, or firing a bird whistler. A handheld launcher, the bird whistler fires a projectile up to 300 feet with a loud whistling sound, hazing predatory birds without harming them. In some situations, firing the bird whistler may cause less disruption to plovers and terns compared to approaching an avian predator on foot in the breeding habitat. When ODSVRA requires additional options for managing predators, Wildlife Innovations performs selective live-trapping and relocation of raptors and USDA Wildlife Services conducts lethal removal of mammalian and avian predators (see section titled Predators and predator management on page 48 for additional information).

**Broods in the open riding area**

When staff observes tern or plover chicks within a closed protected area, but close to the boundary of the riding area, staff continues monitoring closely until the broods move a safe distance away. If broods move slightly out of the boundary without an immediate threat detected, monitors watch them closely until they return. If the brood fails to return quickly or continues to move further away from the boundary into the open riding area, monitors divert vehicle traffic and pedestrian foot traffic out of the area using fencing and/or signage if necessary. If determined necessary, monitors carefully direct the brood to a protected non-vehicle use area such as the Southern Exclosure or the Foredune closure. For nests expected to hatch outside a protected area, monitors oversee the erection of temporary fencing prior to the nest hatching to provide a safe passage until the brood reaches a protected area. Corridors may vary in size, shape, and type of

materials depending on location and other factors but are typically 100 to 200 feet in width. Additional potential protection measures allowing the brood's safe movement include flushing threats such as gulls or other predators within the travel corridor and obtaining assistance as necessary from ODSVRA patrol staff. ODSVRA consults with CDFW and USFWS before known nests located in the open riding area hatch or once a brood is found greater than 200 feet away from a protected area prior to guiding brood movement.

**Selective collection and transfer of abandoned chicks and potentially viable eggs**

Under select circumstances, ODSVRA staff may collect abandoned but potentially viable eggs or chicks. Monitors consider if disturbance factors from visitors or park management efforts contributed to abandonment. Some examples include: abandoned eggs or chicks from a nest in the open riding area; abandoned eggs or chicks from a nest within a single nest exclosure such as a circular exclosure, with suspected adult mortality; or abandoned eggs or chicks from a nest near the park's two-inch by four-inch exclosure fencing which can increase windblown sand deposition on the nest. For eggs, monitors first assess if any nests with active incubation but nonviable eggs (well past estimated hatch date) are available to receive the collected potentially viable eggs. Without an available nonviable active nest, and in consultation with USFWS and CDFW, staff transports the eggs to Santa Barbara Zoo, an approved facility for captive-rearing. There may be very limited circumstances where staff collects an abandoned chick, such as when a chick is observed on the closed shoreline with limited mobility and unattended by an adult for an extended period of time, as the chick would otherwise succumb to the elements. Staff places an abandoned chick in a portable brooder, warms the chick until mobile, and first attempts to reunite the chick with the associated adults on the closed shoreline; if not possible, staff transports the chick to the Santa Barbara Zoo for captive-rearing. Staff uses a portable brooder during transport to maintain an appropriate temperature for the collected eggs or chicks, as directed by the rehabilitation trained staff. When possible, chicks raised in captivity and reaching fledgling status are color-banded to individual prior to release, allowing for collection of information on movements, survival, and future reproductive success.

**Investigation of least tern and snowy plover carcasses**

ODSVRA, with USFWS and CDFW consultation and direction, freezes fresh carcasses of least terns and snowy plovers and sends them to MWVCRC for necropsy. Monitors may record wing length measurement of chicks or young fledglings to help determine age of individual.

# RESULTS AND DISCUSSION

## CALIFORNIA LEAST TERN

### Number of breeding pairs

In 2023, least terns were first seen at ODSVRA on 5 May, with three flying over the exclosure, and from 9 May onward terns were seen or heard daily. The last sighting was of two juveniles over Arroyo Grande Creek on 18 August. During the previous 21 years, first sightings occurred between 8 April and 15 May (median=4 May) and last sightings occurred between 10 August and 28 September (median=29 August). To determine the minimum number of breeding pairs ODSVRA uses the single day high count of concurrent nests and broods (see Monitoring and Management Actions section for additional information on determining number of breeding adults). In 2023, there was a known minimum of 41 breeding pairs and an estimated maximum of 42 pairs, with 41 nests and broods active at the same time on 20 June–22 June. This is similar to both the 43-44 pairs in 2022 and the average of 40-43 pairs (range=23-60) for the 18-year period 2005-22 (Table 1, Figure 3).

### Number, clutch size, and distribution of nests

There was a total of 42 nests, with the first nest initiated approximately 27 May and the last 28 June (Appendix A). During the 21-year period 2002-22, there was an average of 47 nests per year (range=22-79) with initiation dates for first nests ranging from 16 May–8 June (median=28 May) (Table 1). Of the 42 nests (all with known complete clutch size) five had one egg, 36 had two eggs, and one had three eggs, with an average clutch size of 1.90 eggs. This compares to an average of 1.87 for 2005-22 (range=1.57-2.05) and the most recent reported statewide average of 1.68 from 2007–17 (range=1.37-1.82) (Marschalek 2008-12; Frost 2013-17; Sin 2021). Of the 42 nests, 30 (71.4%) were in 6 exclosure and 12 (28.6%) were in 7 exclosure. In 2022, 32 (71.1.3%) and 13 (28.9%) were in 6 and 7 exclosure, respectively (Figure 4).

### Clutch hatching rate

Fates of the 42 nests were 37 hatch, three fail (abandonment), and two with unknown fate. The clutch hatching rate for known location and fate nests was 92.5% (37/40) (Table 2). This compares to an average hatching rate of 83.6% (range=64.7-97.8%) for known location and fate nests for the 20-year period 2003-22 (Table 1). In 2023, the hatching rate was 93.1% (27/29) in 6 exclosure and 90.9% (10/11) in 7 exclosure. Forty-nine chicks hatched from a minimum of 56 eggs in 6 exclosure and 17 chicks hatched from a minimum of 24 eggs in 7 exclosure.

**Table 1. Nesting success of California least terns at ODSVRA from 1991-2023.**

Percent nests hatched calculated using number of nests with known location and fate. Percent chicks fledged and juveniles fledged per nest may include fledglings from unknown nest locations detected only by brood presence, but these are few. Chicks were banded to site in 2003 and 2004, banded to brood in 2005, and banded to individual from 2006-23.

| Year | Estimated no. breeding pairs | No. nests (no. known location and fate) | No. hatched nests (no. known location) | Percent known location and fate nests hatched | No. chicks | Percent chicks fledged | No. juveniles | Juveniles fledged per nest | Estimated no. juveniles fledged per pair |
|---|---|---|---|---|---|---|---|---|---|
| **1991** | 4-5 | 6 (6) | 2 | 33 | 4 | 100 | 4 | 0.67 | 0.80-1.00 |
| **1992** | 3-4 | 4 (4) | 1 | 25 | 2 | 50 | 1 | 0.25 | 0.25-0.33 |
| **1993** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1994** | 2 | 2 (2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1995** | 1 | 1 (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1996** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1997** | 16-19 | 21 (16) | 3 (3) | 19 | 6 | 0 | 0 | 0 | 0 |
| **1998** | 33-37 | 40 (32) | 26 (26) | 81 | 40 | 60 | 24 | 0.6 | 0.65-0.73 |
| **1999** | 28-31 | 34 (31) | 22 (22) | 71 | 42 | 40 | 17 | 0.5 | 0.55-0.61 |
| **2000** | 4-5 | 5 (5) | 4 (4) | 80 | 8 | 50 | 4 | 0.8 | 0.80-1.00 |
| **2001** | 12-15 | 18 (18) | 13 (13) | 72 | 22 | 55 | 12 | 0.67 | 0.80-1.00 |
| **2002** | 20-21 | 22 (19) | 15 (15) | 79 | 27 | 37 | 10 | 0.45 | 0.48-0.50 |
| **2003** | 53-66 | 79 (77) | 60 (60) | 78 | 101 | 37 | 37 | 0.47 | 0.56-0.70 |
| **2004** | 47-55 | 63 (60) | 44 (43) | 72 | 69 | 36 | 25 | 0.4 | 0.45-0.53 |
| **2005** | 47-53 | 59 (59) | 39 (39) | 66 | 66 | 30 | 20 | 0.34 | 0.38-0.43 |
| **2006** | 31-35 | 38 (38) | 28 (28) | 74 | 45 | 80 | 36 | 0.95 | 1.03-1.16 |
| **2007** | 54-60 | 66 (65) | 51 (50) | 77 | 90 | 78 | 70 | 1.06 | 1.17-1.30 |
| **2008** | 55-56 | 56 (55) | 50 (49) | 89 | 99 | 72 | 71 | 1.27 | 1.27-1.29 |
| **2009** | 25-26 | 26 (26) | 23 (23) | 88 | 43 | 77 | 33 | 1.27 | 1.27-1.32 |
| **2010** | 23-23 | 23 (23) | 20 (20) | 87 | 35 | 83 | 29 | 1.26 | 1.26-1.26 |
| **2011** | 33-34 | 35 (35) | 31 (31) | 89 | 55 | 91 | 50 | 1.43 | 1.47-1.52 |
| **2012** | 41-44 | 46 (39) | 32 (32) | 82 | 51 | 82 | 42 | 0.91 | 0.95-1.02 |
| **2013** | 48-53 | 57 (52) | 45 (45) | 87 | 85 | 66 | 56 | 0.98 | 1.06-1.17 |
| **2014** | 47-48 | 49 (46) | 42 (42) | 91 | 76 | 76 | 58 | 1.18 | 1.21-1.23 |
| **2015** | 44-49 | 54 (54) | 48 (48) | 89 | 84 | 82 | 69 | 1.28 | 1.41-1.57 |
| **2016** | 47-48 | 49 (46) | 46 (45) | 98 | 78 | 76 | 59 | 1.2 | 1.23-1.26 |
| **2017** | 42-47 | 52 (34) | 22 (22) | 65 | 39 | 18 | 7 | 0.13 | 0.15-0.17 |
| **2018** | 30-33 | 35 (34) | 28 (27) | 79 | 42 | 83 | 35 | 1 | 1.06-1.17 |
| **2019** | 31-33 | 34 (33) | 31 (31) | 94 | 52 | 73 | 38 | 1.12 | 1.15-1.23 |
| **2020** | 35-42 | 48 (46) | 36 (36) | 78 | 63 | 60 | 38 | 0.79 | 0.90-1.09 |
| **2021** | 50-52 | 53 (51) | 49 (48) | 94 | 81 | 59 | 48 | 0.91 | 0.92-0.96 |
| **2022** | 43-44 | 45 (44) | 42 (42) | 95 | 69 | 54 | 37 | 0.82 | 0.84-0.86 |
| **2023** | 41-42 | 42 (40) | 37 (37) | 93 | 66 | 53 | 35 | 0.83 | 0.83-0.85 |

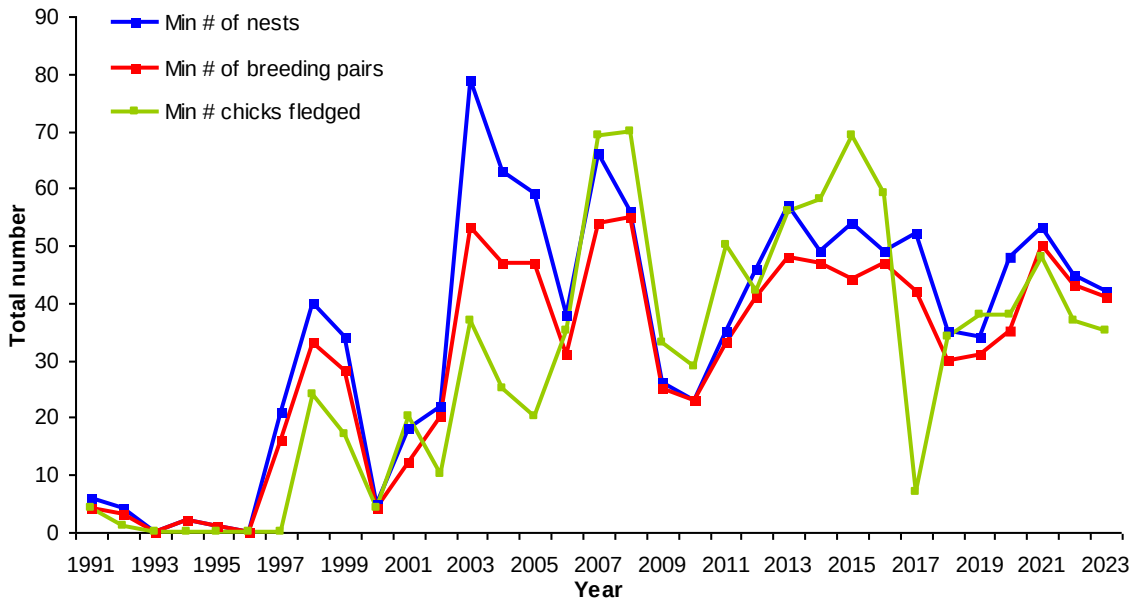


**Figure 3. Number of California least tern nests, pairs, and fledglings at ODSVRA from 1991-2023.**

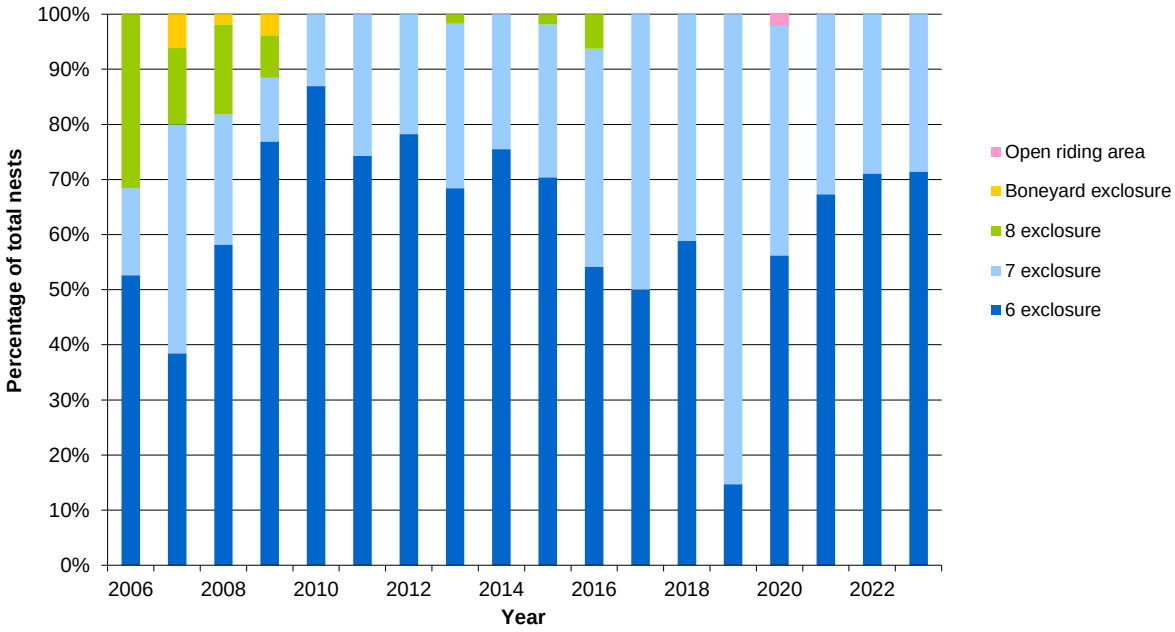


**Figure 4. Distribution of known location California least tern nests as a percentage of total nests at ODSVRA from 2006-23.**

**Table 2. Causes of California least tern nest loss at ODSVRA from 2002-23.**
Ab. = Abandoned, Unid. = Unidentified

| Season | Ab. pre-term | Ab. post-term | Ab., unknown if pre- or post-term | Wind | Failed, unknown cause | Unid. Predator | Gull | Coyote | Opossum | Raccoon | Skunk | Chick dies in egg at hatch | Total no. failed nests |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2002** | 1 | 1 | | | | | | 2 | | | | | 4 |
| **2003** | 6 | 3 | | | 5 | 2 | | 1 | | | | | 17 |
| **2004** | 9 | 1 | | | 3 | 1 | | 2 | | | | | 16 |
| **2005** | 7 | 3 | 4 | | 4 | 1 | | | | | | 1 | 20 |
| **2006** | 4 | 3 | 2 | | | 1 | | | | | | | 10 |
| **2007** | 2 | 4 | | 4 | 5 | | | | | | | | 15 |
| **2008** | 3 | 2 | | | | | 1 | | | | | | 6 |
| **2009** | 1 | 1 | 1 | | | | | | | | | | 3 |
| **2010** | | 1 | | | 1 | | | | 1 | | | | 3 |
| **2011** | 2 | 2 | | | | | | | | | | | 4 |
| **2012** | 1 | 2 | 3 | | 1 | | | | | | | | 7 |
| **2013** | 2 | | 2 | | 1 | | | 1 | 1 | | | | 7 |
| **2014** | 1 | 1 | 1 | | 1 | | | | | | | | 4 |
| **2015** | 1 | 1 | 1 | | 2 | | | | | 1 | | | 6 |
| **2016** | | | 1 | | | | | | | | | | 1 |
| **2017** | 5 | | 1 | | 1 | | | | | | 5 | | 12 |
| **2018** | 4 | 2 | | | 1 | | | | | | | | 7 |
| **2019** | 1 | | 1 | | | | | | | | | | 2 |
| **2020** | | 1 | 3 | 1 | 4 | 1 | | | | | | | 10 |
| **2021** | | 1 | 2 | | | | | | | | | | 3 |
| **2022** | 2 | | | | | | | | | | | | 2 |
| **2023** | | 1 | 2 | | | | | | | | | | 3 |
| **Total** | **52** | **30** | **24** | **5** | **29** | **6** | **1** | **6** | **2** | **1** | **5** | **1** | **162** |
| **2002-23** | 32.1% | 18.5% | 14.8% | 3.1% | 17.9% | 3.7% | 0.6% | 3.7% | 1.2% | 0.6% | 3.1% | 0.6% | |

**Chick fledging rate, juveniles produced per pair, and juvenile length of stay on-site**
In 2023, 38 of 66 hatching chicks were banded with an individual color combination unique for the year. Thirty-five of the 66 chicks were seen when 21 days old or older for a fledging rate of 53.0%, the second lowest rate since 2006 when banding chicks to individual first began. The fledging rate for banded chicks was 78.9% (30/38) and 17.9% (5/28) for unbanded chicks (Appendix A). The estimated number of fledglings produced per pair ranged from 0.83-0.85 in 2023 compared to an average of 1.08-1.15 from 2006-22 (range=0.15-1.57) (Table 1). Estimated annual fledging rates for all of California are reported by CDFW as a range and averaged 0.27-0.39 fledglings per pair for the 13-year period 2005-17 (highest estimate in 2014 with range=0.37-0.68), more recent California data is not available at the time of this report writing (Marschalek 2006-12; Frost 2013-17; Sin 2021).

From 2010-15, there were six known occurrences of a least tern chick moving east of the Southern Exclosure into the open riding area (two in 2010, by the same chick on the same day; one in 2011; two in 2013; and one in 2015). These chicks were monitored and directed back into the exclosure. For the period 2016-23, excluding 2020 when the park was closed to vehicle use and camping due to COVID for the nesting season, there were no occurrences of chicks moving into the open riding area. In 2020, due to the decrease in recreational activities with the park being closed, up to 20 terns were seen roosting in areas outside of the Southern Exclosure daily for the period of 2-24 July. Beginning in 2021, least tern nests were provided a 984-foot (300-meter) buffer closed from any public use (closed buffer area). There were three occasions of chicks seen entering the closed buffer area from the Southern Exclosure in 2021, no such occurrences in 2022, and one occasion in 2023.

Of the current or recent breeding sites in San Luis Obispo and Santa Barbara counties, banding tern chicks occurs at ODSVRA (since 2003) and VSFB (beginning 2018 with banding to site and year). Banding least tern chicks at ODSVRA, especially with individual color band combinations, has increased the ability to detect juveniles at ODSVRA and provides greater accuracy in documenting fledging rate than the three-week count method[1]. For the six-year period 2006-11, the three-week count method at ODSVRA consistently underestimated the minimum known number of juveniles produced each year, identifying an average of 49.0% (range=38.0-66.7%) of the known minimum number (see CDPR 2011 for greater details). Since 2012, ODSVRA has relied primarily on color band resighting data to derive fledging rates of tern chicks.

Color banding chicks to brood in 2005 and to individual since 2006 has also provided information on juvenile length of stay at ODSVRA. In 2023, only 10.0% (3/30) of color-banded juveniles were confirmed remaining at ODSVRA for 21 days or longer post-fledging. This compares to 3.3% (1/30) during 2022, and 27.9% (173/620) during the 15-year period 2006-20 (Table 3, Figure 5).

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

**Table 3. Number of days that color-banded California least tern juveniles hatched at ODSVRA continued to be seen on-site after reaching fledge age (21 days old) during the 18-year period 2006-23.**

During this period, 721 color-banded fledglings (21 days old or older) were tracked at ODSVRA (sightings outside the park are not included). Numbers in parentheses are percentages of all banded fledglings observed at ODSVRA 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 | ≥35 days post-fledge |
|---|---|---|---|---|---|---|
| **2006** | 3 (9%) | 9 (26%) | 7 (20%) | 12 (34%) | 4 (11%) | 0 (0%) |
| **2007** | 9 (14%) | 13 (20%) | 15 (23%) | 18 (28%) | 9 (14%) | 1 (2%) |
| **2008** | 12 (18%) | 29 (43%) | 16 (24%) | 11 (16%) | 0 (0%) | 0 (0%) |
| **2009** | 3 (10%) | 14 (48%) | 8 (28%) | 3 (10%) | 1 (3%) | 0 (0%) |
| **2010** | 3 (11%) | 4 (14%) | 14 (50%) | 7 (25%) | 0 (0%) | 0 (0%) |
| **2011** | 2 (4%) | 5 (10%) | 9 (18%) | 31 (63%) | 2 (4%) | 0 (0%) |
| **2012** | 3 (9%) | 7 (20%) | 11 (31%) | 12 (34%) | 2 (6%) | 0 (0%) |
| **2013** | 5 (10%) | 12 (23%) | 25 (48%) | 10 (19%) | 0 (0%) | 0 (0%) |
| **2014** | 2 (5%) | 7 (17%) | 18 (43%) | 14 (33%) | 1 (2%) | 0 (0%) |
| **2015** | 12 (21%) | 10 (18%) | 21 (38%) | 10 (18%) | 1 (2%) | 2 (4%) |
| **2016** | 22 (39%) | 9 (16%) | 19 (34%) | 5 (9%) | 1 (2%) | 0 (0%) |
| **2017** | 0 (0%) | 3 (60%) | 1 (20%) | 1 (20%) | 0 (0%) | 0 (0%) |
| **2018** | 3 (9%) | 5 (15%) | 13 (39%) | 4 (12%) | 8 (24%) | 0 (0%) |
| **2019** | 3 (10%) | 16 (52%) | 10 (32%) | 2 (6%) | 0 (0%) | 0 (0%) |
| **2020** | 21 (60%) | 12 (34%) | 1 (3%) | 1 (3%) | 0 (0%) | 0 (0%) |
| **2021** | 11 (26%) | 16 (38%) | 14 (33%) | 1 (2%) | 0 (0%) | 0 (0%) |
| **2022** | 14 (47%) | 8 (27%) | 7 (23%) | 1 (3%) | 0 (0%) | 0 (0%) |
| **2023** | 6 (20%) | 9 (30%) | 12 (40%) | 3 (10%) | 0 (0%) | 0 (0%) |
| **Total 2006-23** | 134 (19%) | 188 (26%) | 221 (31%) | 146 (20%) | 29 (4%) | 3 (0%) |

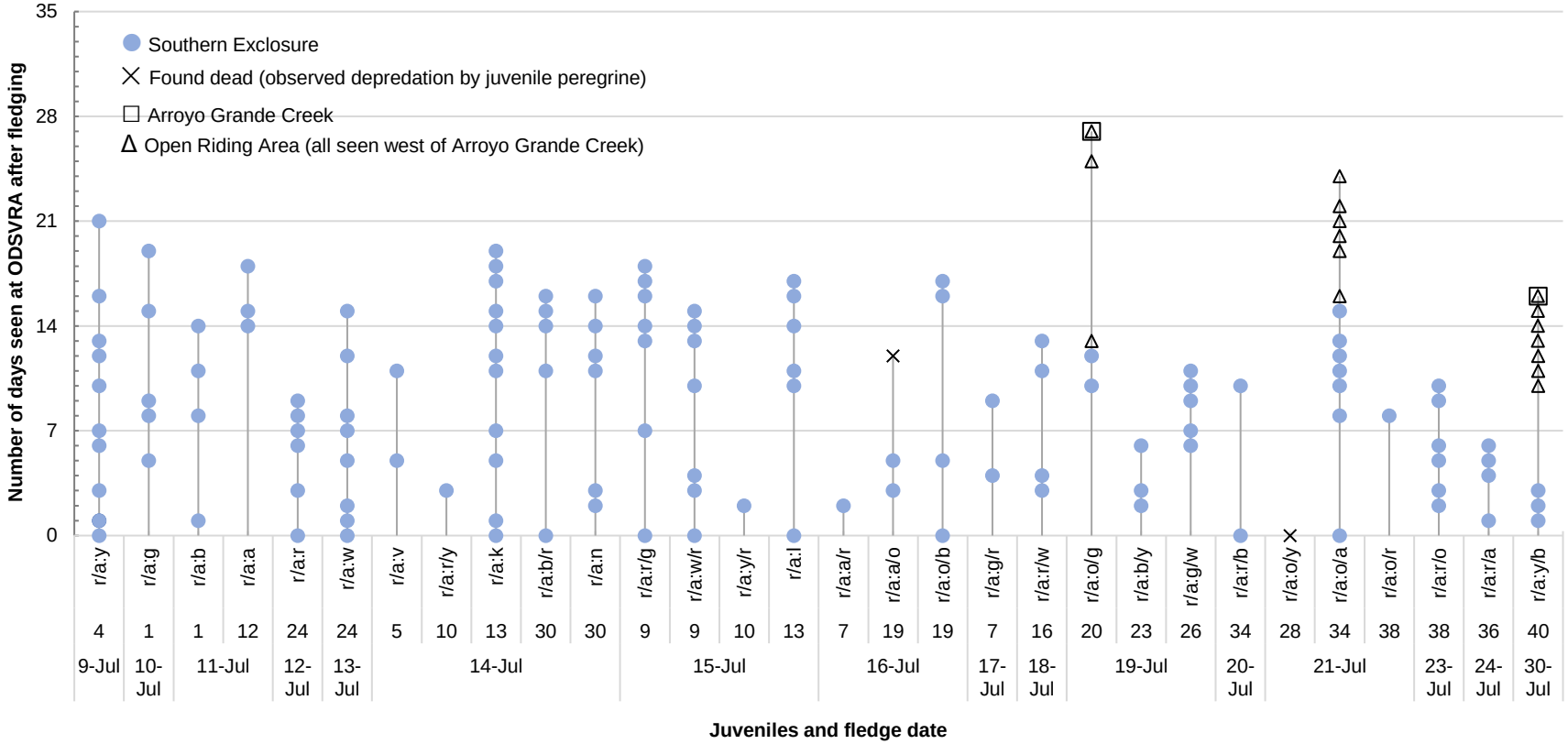


**Figure 5. Number of days individually color-banded California least tern juveniles that hatched at ODSVRA in 2023 continued to be seen on-site after reaching fledge age (21 days old).**

The horizontal axis provides the nest number from which each fledgling hatched and the date it fledged.

**Collection and transfer of abandoned least tern chick to a nest with nonviable eggs**
For the first time at ODSVRA, with approval from CDFW, an abandoned least tern chick was transferred to a nest actively being incubated but determined to have nonviable eggs (well past estimated hatch date) in 2023.

The LT36 nest was found with one egg on 12 June in 6 exclosure, the nest stayed at one egg, and incubation became inconsistent after 29 June. On 3 July at 12:15 pm, one small chick and the entire eggshell remains of a hatched egg were present at the nest that was not attended by an adult tern. At 12:54 pm, an unbanded adult snowy plover was observed brooding the tern chick and attempts to move the plover away from the chick were unsuccessful. The nest was monitored all afternoon from a distance, the plover continued to brood the tern chick near the nest, and terns were not seen in the area.

The LT2 nest was found with two eggs on 30 May in 7 exclosure and continued to be consistently incubated past the estimated hatch date of approximately 20 June with no signs of hatch observed. On 3 July, the nest was assessed as a potential surrogate for the abandoned LT36 chick, an adult was observed at the LT2 nest, one egg was at the nest with no sign of hatch, and the second egg was missing (unknown if missing pre- or post-term). After determining the adult at the LT2 nest was an acceptable option to act as a potential surrogate, the abandoned LT36 chick was transferred to the LT2 nest at 5:14 pm on 3 July. That evening, an adult was not observed returning to the LT2 nest, but an adult was at the nest brooding the chick and incubating the one egg the following morning. The adult was seen consistently brooding the chick after this date. The egg at LT2 was last seen incubated on 7 July (17 days past its estimated hatch date) and was missing post-term on 18 August. The LT36 chick continued to be attended by the LT2 adult, was banded r/a:r/a on 11 July, and subsequently fledged.

**Injuries, mortality (other than eggs), and carcasses collected or observed**
In 2023, there was one tern chick observed with an injury. Details of the injury are provided in Table H.1 in Appendix H. There were 5 documented least tern mortalities (other than eggs) at ODSVRA in 2023: two chicks and three juveniles. The three juvenile mortalities were the result of peregrine falcon (*Falco peregrinus*) (peregrine) predation. Documented mortality other than predation was two chicks. Both carcasses were too decomposed for necropsy. Details of the mortalities are provided in Table H.3 and H.4 in Appendix H.

**Least tern use of nearby small freshwater lakes**
At ODSVRA nearshore ocean waters are the primary source of prey fish for the tern colony, and in 2023 foraging activity over the ocean was observed throughout the season. During the chick-rearing period small fish may also be taken from freshwater sources. Over the past 17 years, nearby small freshwater lakes observed with more than incidental tern activity in one or more years include Oso Flaco Lake (located on park property approximately 1.5 miles south of the middle of tern colony), the Dune Lakes (1.5 miles northeast), and Cypress Ridge Lake (3.2 miles northeast). Since 2019, unlike many previous years, late season daytime use of Oso Flaco Lake by ODSVRA banded adult and juvenile terns has been very low. Conditions at Oso Flaco Lake appeared poor the last five years, with an increased amount of algae growth on the lake's surface, and the few adults seen fishing had poor success. Monitoring of sites east of the park is typically done in response to observations of terns from the colony flying toward or returning from the east or from tern sighting reports by individuals other than park staff. From 2021-23, terns were observed at the ponds of Monarch Dunes Golf Club (4.3 miles southeast) by staff or reported by non-staff. Surveys were limited due to difficulty accessing ponds.

**Banded adult least terns at ODSVRA**
Recording color combinations is more difficult for adult least terns than snowy plovers as the behavior of the terns provides fewer opportunities for observations. In 2023, there was a minimum of 33 banded adults with known origin documented at ODSVRA. Thirty-two of these birds were identified as banded at

ODSVRA as chicks (banding began in 2003) and one was from a bird banded as a chick in 2018 from VSFB. Breeding was documented for a minimum of 25 banded adults and this is likely an underestimate. At least 14 of the 25 breeding adults were banded as chicks at ODSVRA, one was banded as a chick from VSFB, and the complete color combinations of the other 10 breeding adults could not be confirmed (Appendix A, Table D.1 in Appendix D).

Least terns typically first breed at three years old, with some breeding documented by two-year-old birds (Massey and Atwood 1981). A total of nine two-year-old banded terns have been documented as breeding at ODSVRA from 2012-23 (two in 2012, three in 2013, two in 2014, one in 2016, and one in 2018, all banded as chicks at ODSVRA). In 2005, a two-year-old tern banded as a chick at ODSVRA was documented breeding at VSFB. Ages of known year origin banded terns originating from ODSVRA and seen on-site this season ranged from two to 15 years old. In 2023, the oldest confirmed breeding adult at ODSVRA was a 15-year-old tern (g/y:g banded as a chick at ODSVRA in 2008).

**Least terns banded at other sites and seen at ODSVRA**

From 2011 to 2023, there have been limited observations of banded terns from other sites at ODSVRA. One was an adult (s:a/o) seen 28 July–11 August 2011, that was banded at the U.S. Navy North Island Maintenance and Training Facility in San Diego Bay, San Diego County, California. In 2018, all VSFB chicks were banded s:b and at least one juvenile with this combination was seen 16-18 August 2018 at ODSVRA. In 2020, a two-year-old tern banded s:b was seen on 9 July, and at least one adult banded s:b was documented breeding at ODSVRA from 2021 to 2023. In 2019, all VSFB chicks were banded s:r and at least one two-year-old tern banded s:r was seen 17 July and 3 August in 2021. One adult banded s:r was documented breeding at ODSVRA in 2022, seen from 18 May to 4 June. The only documented sighting at ODSVRA of a tern banded outside of California was an adult on 16 May 2022, that was banded in 2019 in San Quintin, Baja California, Mexico, with silver on the left and a red VID band vertically labeled in white letters with “B04” on the right (Table D.1 in Appendix D).

**Least terns banded at ODSVRA seen at other sites**

In 2023, there were 10 least terns (seven adults and three juveniles) banded as chicks at ODSVRA, documented at sites other than ODSVRA. The majority were seen in Santa Barbara and San Luis Obispo counties at Santa Ynez River Mouth near VSFB (one juvenile), VSFB (five adults), and Coal Oil Point Reserve (one adult). Further south one adult and two juveniles were seen in San Diego County at Camp Pendleton (one adult and one juvenile) and Tijuana River Mouth (one juvenile) (Table D.2 in Appendix D).

**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. From 2006-19, the night roost was only detected in 6 and 7 exclosures. A night roost was first established outside of the Southern Exclosure in 2020 when the park was closed to vehicles. In 2021, the area east of 6 and 7 exclosures was closed to visitor activity, as a closed buffer area for nests. The roost persisted outside of the Southern Exclosure within this closed buffer area during the 2021 and 2022 seasons. In 2023, surveys for a night roost were conducted on 16 days between 27 May to 16 August, and the roost was in two locations east of 6 exclosure in the closed buffer area, except on three occasions when the roost was seen within 6 exclosure (location also verified during early morning surveys by locating night roost tracks and signs) (see 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 2023, there was a high count of 53 birds at the night roost on 10 June and 24 June. This compares to an average night roost high count of 62 (range=35-95) from 2007-22. Only adults were noted but it was typically too dark to distinguish plumage and age class (CDPR 2006-22).

**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, 2020). 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, and all sites have management providing protective measures and monitoring. ODSVRA is the only site in San Luis Obispo County. RGDP, VSFB, and COPR are in Santa Barbara County and approximately six, 22, and 85 miles south of the ODSVRA colony, respectively. For this regional population, ODSVRA has become an important source of productivity. During the 20-year period 2004-23, ODSVRA produced a minimum of 856 juvenile terns while RGDP, VSFB, and COPR combined reported a range of 342-347 juveniles. In 2023, ODSVRA produced 35 juveniles compared to RGDP (no breeding), VSFB (17 juveniles), and COPR (no breeding) (Appendix E, Table 4).

**Table 4. Number of reported breeding least tern pairs and juveniles produced at ODSVRA and the combined sites of Rancho Guadalupe Dunes Preserve (RGDP), Vandenberg Space Force Base (VSFB), and Coal Oil Point Reserve (COPR) from 2004-23.**

During this period, most tern chicks were banded at ODSVRA and observation of color-banded individuals was an important means to document juvenile production. Beginning in 2018, VSFB banded tern chicks to site and year. Sources: RGDP (pers. comm. Tom Applegate), VSFB (pers. comm. Emily Rice), and COPR (pers. comm. Jessica Nielson).

| | ODSVRA | | | RGDP, VSFB, and COPR combined | |
|---|---|---|---|---|---|
| Year | Est. no. breeding pairs | No. juveniles | | Est. no. breeding pairs | No. juveniles |
| **2004** | 47-55 | 25 | | 15 | 0 |
| **2005** | 47-53 | 20 | | 48 | 1 |
| **2006** | 31-35 | 36 | | 7 | 7 |
| **2007** | 54-60 | 70 | | 23 | 17 |
| **2008** | 55-56 | 71 | | 19 | 19 |
| **2009** | 25-26 | 33 | | 32-33 | 40 |
| **2010** | 23 | 29 | | 34 | 31 |
| **2011** | 33-34 | 50 | | 33 | 4 |
| **2012** | 41-44 | 42 | | 18 | 10 |
| **2013** | 48-53 | 56 | | 15 | 19 |
| **2014** | 47-48 | 58 | | 17 | 20 |
| **2015** | 44-49 | 69 | | 22 | 29 |
| **2016** | 47-48 | 59 | | 25 | 18 |
| **2017** | 42-47 | 7 | | 27 | 8 |
| **2018** | 30-33 | 35 | | 70-71 | 39 |
| **2019** | 31-33 | 38 | | 59 | 21[1] |
| **2020** | 35-42 | 38 | | 60 | 11-16 |
| **2021** | 50-52 | 48 | | 27 | 8 |
| **2022** | 43-44 | 37 | | 43 | 23 |
| **2023** | 41-42 | 35 | | 39 | 17 |
| **Total juveniles produced** | | **856** | | | **342-347[1]** |

[1]In 2019, RGDP had at least 17 nests hatch a minimum of 15 chicks and the number of juveniles produced is unknown.

## WESTERN SNOWY PLOVER

### Minimum number of breeding adults

In 2023, the minimum number of breeding adults was the highest recorded in the 22-year period 2002-23, with a total of 232 birds (128 males and 104 females). This is an increase of 12.6% from 206 breeding adults in the previous year and compares to a range of 32-226 adults (average=154) for the 21-year period 2002-22. The average number of breeding adults for the last five years is 207, increasing slightly to 211 for the last three years (Table 5, Figure 6).

Beginning in 2005, the USFWS has coordinated a rangewide window survey count of the U.S. Pacific coast breeding population of the snowy plover between the second half of May and first week of June. In 2023, the survey at ODSVRA counted 124 adult plovers (51 males, 56 females, and 17 of unknown sex), 53% of the minimum number documented for the entire season by known breeding activity. In 18 of the 19 years from 2005-23, the window survey count at ODSVRA was lower than the minimum number of breeding birds (53-95% of minimum number). It was higher (107%) in 2008. For the entire 19-year period the window survey count averaged 77% of the known minimum number of breeding adults for the season (Table 6).

**Table 5. Number of snowy plover breeding adults, breeding males, fledglings, and chicks fledging per breeding male for the 22-year period 2002-23.**

| Year | Min. no. breeding adults | Min. no. breeding males | No. fledglings | No. fledglings per breeding male[1] |
|---|---|---|---|---|
| **2002** | 32 | 18 | 35 | 1.94 |
| **2003** | 84 | 52 | 107 | 2.06 |
| **2004** | 121 | 67 | 66 | 0.99 |
| **2005** | 116 | 65 | 82 | 1.26 |
| **2006** | 107 | 58 | 17 | 0.29 |
| **2007** | 79 | 47 | 66 | 1.40 |
| **2008** | 95 | 54 | 72 | 1.33 |
| **2009** | 114 | 66 | 81 | 1.23 |
| **2010** | 137 | 78 | 107 | 1.37 |
| **2011** | 160 | 94 | 152 | 1.62 |
| **2012** | 190 | 105 | 96 | 0.91 |
| **2013** | 163 | 92 | 187 | 2.03 |
| **2014** | 226 | 120 | 196 | 1.63 |
| **2015** | 205 | 113 | 277 | 2.45 |
| **2016** | 209 | 110 | 157 | 1.43 |
| **2017** | 183 | 93 | 174 | 1.87 |
| **2018** | 201 | 115 | 200 | 1.74 |
| **2019** | 214 | 120 | 108 | 0.90 |
| **2020** | 190 | 110 | 117 | 1.06 |
| **2021** | 195 | 107 | 119 | 1.11 |
| **2022** | 206 | 119 | 179 | 1.50 |
| **2023** | 232 | 128 | 231 | 1.80 |
| **Average for 22-year period 2002-23** | 157 | 88 | 128 | 1.45 |
| **Average for 5-year period 2019-23** | 207 | 117 | 151 | 1.27 |
| **Average for 3-year period 2021-23** | 211 | 118 | 176 | 1.47 |

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

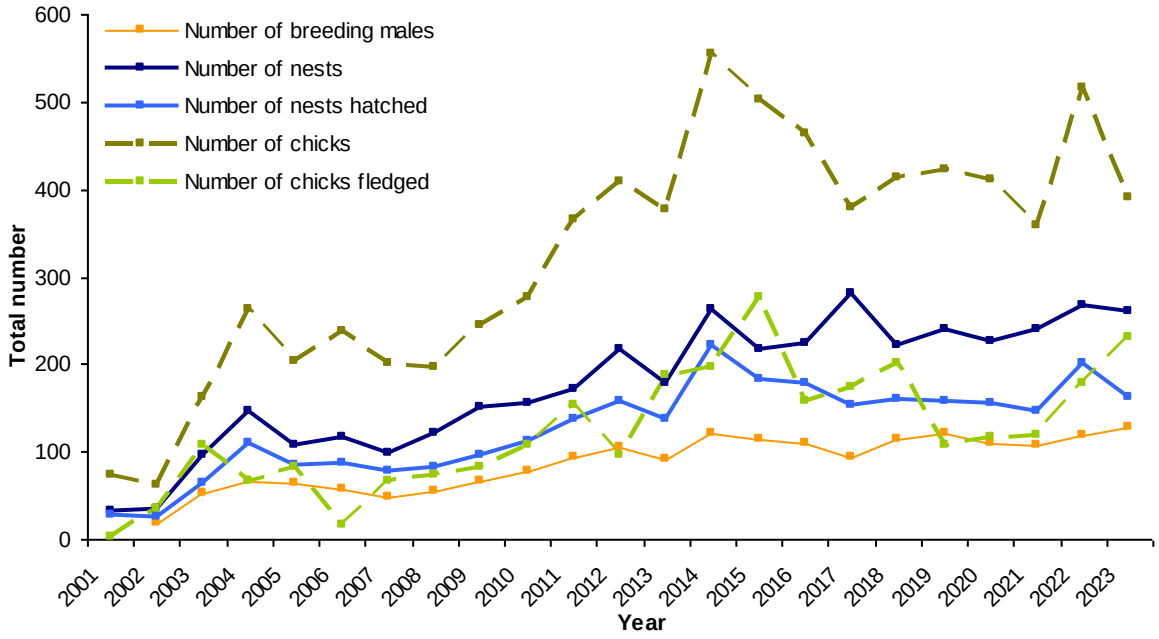


**Figure 6. Number of snowy plover breeding males, nests, nests hatched, chicks, and chicks fledged at ODSVRA from 2001-23.**

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

**Table 6. Number of adult snowy plovers counted on USFWS breeding season window surveys versus calculated minimum number of breeding adults at ODSVRA from 2005-23.**

| Year | Calculated minimum number of breeding adults | Summer breeding window survey numbers | Breeding window numbers/ calculated minimum numbers |
|---|---|---|---|
| **2005** | 116 | 92 | 79% |
| **2006** | 107 | 87 | 81% |
| **2007** | 79 | 60 | 76% |
| **2008** | 95 | 102 | 107% |
| **2009** | 114 | 98 | 86% |
| **2010** | 137 | 74 | 54% |
| **2011** | 160 | 112 | 70% |
| **2012** | 190 | 145 | 76% |
| **2013** | 163 | 94 | 58% |
| **2014** | 226 | 180 | 80% |
| **2015** | 205 | 180 | 88% |
| **2016** | 209 | 160 | 77% |
| **2017** | 183 | 174 | 95% |
| **2018** | 201 | 155 | 77% |
| **2019** | 214 | 154 | 72% |
| **2020** | 190 | 155 | 82% |
| **2021** | 195 | 116 | 59% |
| **2022** | 206 | 190 | 92% |
| **2023** | 232 | 124 | 53% |

**Number and distribution of nests**

In 2023, there were 260 known nesting attempts identified, including 43 with unknown nest location, initiated between 15 March to 15 July (Figure 7, Appendix B, see section titled Assignment of broods to nests in the Monitoring and Management Action section for unknown nest location description). Of the 217 nests from known locations, 118 (54.4%) were in the Southern Exclosure, six (2.8%) in North Oso Flaco, 12 (5.5%) in South Oso Flaco, 64 (29.5%) in the Foredune closure, eight (3.7%) in the open riding area, two (0.9%) in the closed buffer area, four (1.8%) in Eucalyptus Tree revegetation area east of 7 exclosure, and three (1.4%) in Eucalyptus North revegetation area east of 6 exclosure. More specifically for the Southern Exclosure, there were 52 nests in 6 exclosure, 38 in 7 exclosure, 19 in 8 exclosure, and nine in Boneyard exclosure. The Southern Exclosure and Foredune closure combined supported 83.9% of known location nests in 2023. The eight nests in the open riding area in 2023 were the most found in a single year since 2001 (excluding 2020 when the park was closed to public vehicle access most of the season). Two nests were found in the open riding area in 2022, four in 2021, and during the 19-year period 2001-19, the average was less than 1 (range=0-3). The maximum number of known location nests active at one time was 71 on 13 June, with the highest number in 6 exclosure (21 nests) (Table 7, Table 8, Figure 8, Appendix C, Table F.1 in Appendix F).

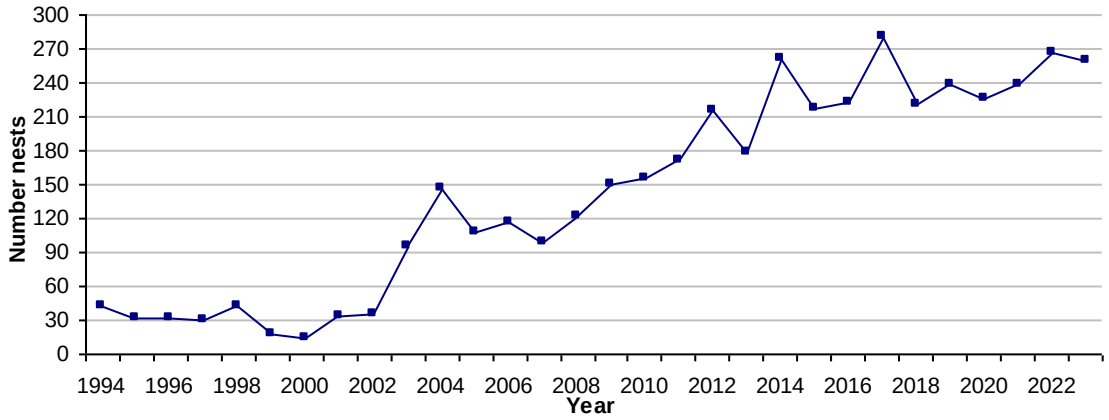


**Figure 7. Number of snowy plover nesting attempts at ODSVRA from 1994-2023.**
Includes nests known only from detection of broods.

**Table 7. Snowy plover nest distribution and success at ODSVRA in 2023.**
Excludes 43 nests known only from detection of broods.
Euc. = Eucalyptus, reveg. = revegetation

| Location | No. nests (no. known location and fate) | Min. no. eggs laid | No. known location and fate nests hatching | Percent known location and fate nests hatching |
|---|---|---|---|---|
| **Southern Exclosure** | | | | |
| 6 exclosure | 52 (50) | 144 | 35 | 70.0 |
| 7 exclosure | 38 (34) | 96 | 17 | 50.0 |
| 8 exclosure | 19 (19) | 50 | 7 | 36.8 |
| Boneyard exclosure | 9 (9) | 24 | 6 | 66.7 |
| **TOTAL SOUTHERN EXCLOSURE** | **118 (112)** | **314** | **65** | **58.0** |
| **Oso Flaco** | | | | |
| North Oso Flaco | 6 (6) | 15 | 4 | 66.7 |
| South Oso Flaco | 12 (11) | 31 | 6 | 54.5 |
| **TOTAL OSO FLACO** | **18 (17)** | **46** | **10** | **58.8** |
| **Other** | | | | |
| Foredune closure | 64 (62) | 173 | 36 | 58.1 |
| Closed buffer area | 2 (2) | 5 | 2 | 100.0 |
| Open riding area | 8 (8) | 22 | 2 | 25.0 |
| Euc. North reveg. area | 3 (3) | 9 | 2 | 66.7 |
| Euc. Tree reveg. area | 4 (4) | 11 | 1 | 25.0 |
| **TOTAL OTHER** | **81 (79)** | **220** | **43** | **54.4** |
| **GRAND TOTAL** | **217 (208)** | **580** | **118** | **56.7** |

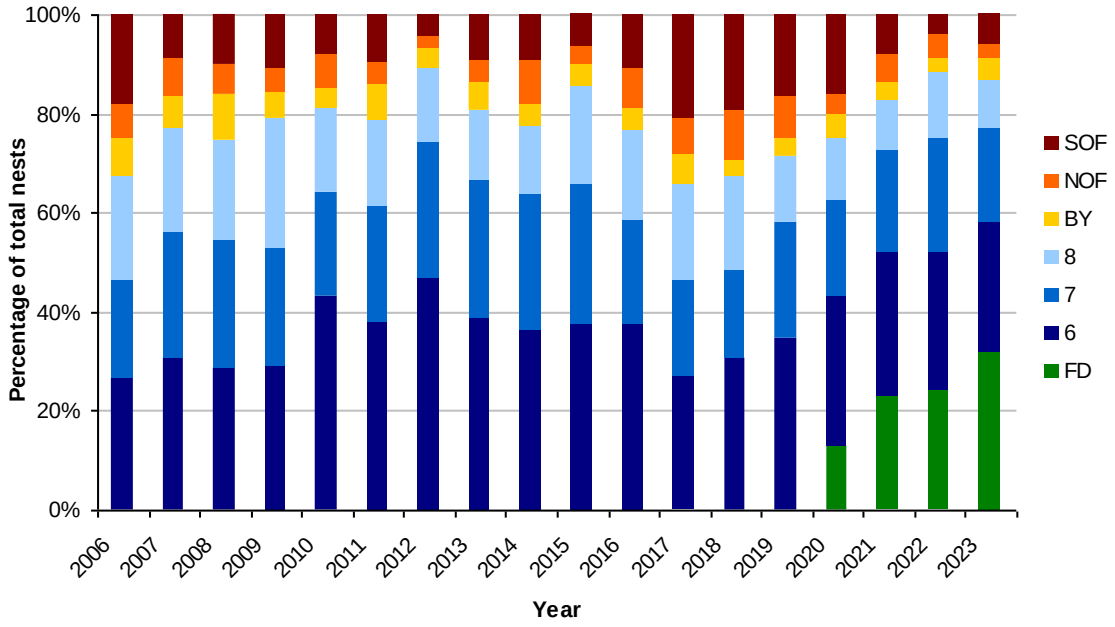


**Figure 8. Distribution of snowy plover nests as a percent of total nests in the Southern Exclosure, Oso Flaco, and Foredune closure from 2006-23.**

Includes all nests with known location in the Southern Exclosure, Oso Flaco, and Foredune closure (restoration area within the open riding area closed since January 2020).

6 = 6 exclosure, 7 = 7 exclosure, 8 = 8 exclosure, BY = Boneyard exclosure, FD = Foredune closure, NOF = North Oso Flaco, SOF = South Oso Flaco

**Table 8. Nesting success of snowy plovers at ODSVRA from 2001-23.**

Number of eggs from nests with unknown location is a minimum number derived from number of chicks seen. A more detailed table of nesting success for 2001-23 is included as Table F.1 in Appendix F.

na = not available

| Year | No. nests (no. known location and fate) | Min. no. eggs | Ave. clutch size (no. nests known location and complete clutch size) | No. nests hatching (no. known location) | Percent hatching | No. chicks | No. chicks fledged (percent fledged) | No. fledglings per nest | No. fledglings per egg |
|---|---|---|---|---|---|---|---|---|---|
| **2001** | 33 (30) | na | na | 27 (26) | 86.7 | 72 | 3 (4.2) | 0.09 | na |
| **2002** | 35 (35) | 99 | na | 25 (25) | 71.4 | 62 | 35 (56.5) | 1.00 | 0.35 |
| **2003** | 95 (93) | 255 | na | 63 (62) | 66.7 | 162 | 107 (66.0) | 1.13 | 0.42 |
| **2004** | 147 (140) | 415 | 2.88 (138) | 110 (105) | 75.0 | 263 | 66 (25.1) | 0.45 | 0.16 |
| **2005** | 107 (103) | 290 | 2.86 (96) | 84 (80) | 77.7 | 204 | 82 (40.2) | 0.77 | 0.28 |
| **2006** | 117 (114) | 336 | 2.90 (115) | 87 (89) | 78.1 | 230 | 17 (7.4) | 0.15 | 0.05 |
| **2007** | 99 (91) | 288 | 2.96 (89) | 78 (70) | 76.9 | 200 | 66 (33.0) | 0.67 | 0.23 |
| **2008** | 121 (119) | 341 | 2.88 (113) | 83 (81) | 68.1 | 197 | 72 (36.5) | 0.60 | 0.21 |
| **2009** | 150 (147) | 418 | 2.88 (140) | 95 (94) | 63.9 | 244 | 81 (33.2) | 0.54 | 0.19 |
| **2010** | 155 (150) | 431 | 2.87 (144) | 111 (109) | 72.7 | 275 | 107 (38.9) | 0.69 | 0.25 |
| **2011** | 172 (160) | 487 | 2.90 (157) | 138 (131) | 81.9 | 365 | 152 (41.6) | 0.88 | 0.31 |
| **2012** | 216 (203) | 603 | 2.88 (199) | 157 (152) | 74.9 | 405 | 96 (23.7) | 0.44 | 0.16 |
| **2013** | 178 (167) | 502 | 2.94 (162) | 138 (130) | 77.8 | 377 | 187 (49.6) | 1.05 | 0.37 |
| **2014** | 262 (239) | 726 | 2.88 (234) | 222 (206) | 86.2 | 555 | 196 (35.3) | 0.75 | 0.27 |
| **2015** | 217 (195) | 613 | 2.93 (188) | 182 (167) | 85.6 | 503 | 277 (55.1) | 1.28 | 0.45 |
| **2016** | 223 (193) | 613 | 2.89 (188) | 179 (165) | 85.5 | 462 | 157 (34.0) | 0.70 | 0.26 |
| **2017** | 281 (238) | 738 | 2.88 (228) | 153 (145) | 60.9 | 378 | 174 (46.0) | 0.62 | 0.24 |
| **2018** | 221 (200) | 615 | 2.95 (184) | 159 (144) | 72.0 | 412 | 200 (48.5) | 0.90 | 0.33 |
| **2019** | 239 (220) | 649 | 2.92 (202) | 158 (149) | 67.7 | 421 | 108 (25.7) | 0.45 | 0.17 |
| **2020** | 226 (197) | 627 | 2.92 (194) | 154 (142) | 72.1 | 410 | 117 (28.5) | 0.52 | 0.19 |
| **2021** | 239 (219) | 660 | 2.89 (206) | 145 (129) | 58.9 | 359 | 119 (33.1) | 0.50 | 0.18 |
| **2022** | 266 (225) | 725 | 2.81 (227) | 200 (169) | 75.1 | 515 | 179 (34.8) | 0.67 | 0.25 |
| **2023** | 260 (208) | 690 | 2.81 (195) | 161 (118) | 56.7 | 391 | 231 (59.1) | 0.89 | 0.33 |

**Average clutch size, clutch loss, and nest hatching rate**

There were 260 identified nesting attempts, including 43 known only by brood, and of these 161 hatched. For 195 nests with known complete clutch size (and excluding nesting attempts known only by brood) the average number of eggs was 2.81. This compares to an average of 2.90 eggs per clutch (range=2.81-2.96) for the 19-year period 2004-22. Excluding 52 nests (nine with unknown fate and 43 detected by brood only), the nest hatching rate in 2023 was 56.7% (118/208). This is lower than the average of 73.8% (range=60.9-86.2%) from 2002-22. The hatching rate in 2023 was slightly lower in the Southern Exclosure (58.0%) than in Oso Flaco (58.8%) (Table 7, Table 8). During the 23-year period 2001-23, Oso Flaco has had a higher hatch rate than the Southern Exclosure in only two years (2023 and 2001) (Table F.1 in Appendix F). The nest hatching rate for nests found outside the Southern Exclosure and Oso Flaco was 54.4% (43/79) (Table 7). In 2023, of the 208 nests with both known location and fate, 90 failed with 74.4% (67/90) of nest loss due to predation (Table 9).

**Table 9. Attributed causes of snowy plover nest loss at specific locations at ODSVRA in 2023.**
A total of 90 nests failed of 208 nests with known location and fate. Excludes the closed buffer area as no nests failed in this area.
Aband. = abandoned, Euc. North reveg = Eucalyptus North revegetation area, Euc. Tree reveg = Eucalyptus Tree revegetation area, Unid. = unidentified, unk. = unknown, pred. = predator, Tide = overwashed by tide

| Area | Aband. pre-term | Aband. unk. pre- or post-term | Failed eggs removed by staff | Wind | Tide | Failed, cause unk. | Unid. pred. | Unid. avian pred. | Harrier | Crow | Raven | Coyote | Vandalism | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Exclosure** | | | | | | | | | | | | | | |
| 6 exclosure | 2 | | | | | | 1 | 4 | 1 | | 7 | | | 15 |
| 7 exclosure | | 1 | | | 1 | | 3 | 2 | 2 | | 8 | | | 17 |
| 8 exclosure | 1 | | | | 1 | | 1 | | | | 8 | 1 | | 12 |
| Boneyard exclosure | 1 | | | | | | | | | | 1 | 1 | | 3 |
| **TOTAL SOUTHERN EXCLOSURE** | 4 | 1 | | | 2 | | 5 | 6 | 3 | | 24 | 2 | | 47 |
| **Oso Flaco** | | | | | | | | | | | | | | |
| North Oso Flaco | | | | | | | 1 | | | | 1 | | | 2 |
| South Oso Flaco | | | | 1 | 1 | 1 | | | | | 1 | | 1 | 5 |
| **TOTAL OSO FLACO** | | | | 1 | 1 | 1 | 1 | | | | 2 | | 1 | 7 |
| **Other** | | | | | | | | | | | | | | |
| Foredune closure | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 6 | | 5 | | | 26 |
| Open riding area | 1 | | | | | | | | 1 | 2 | 2 | | | 6 |
| Euc. North reveg | | | | | | | | | | | 1 | | | 1 |
| Euc. Tree reveg | | | | | | | | 1 | | | 2 | | | 3 |
| **TOTAL OTHER** | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 4 | 7 | 2 | 10 | | | 36 |
| **TOTAL ODSVRA** | 7 | 2 | 2 | 3 | 5 | 3 | 7 | 10 | 10 | 2 | 36 | 2 | 1 | 90 |

**Snowy plover chicks in the open riding area and closed buffer areas**
Between 21 and 22 July, a total of three chicks from two broods were seen in the open riding area between the Foredune closure and Bigfoot revegetation area: one chick from the SP166 nest on 21 July (26 days old) and two chicks from the SP199 nest on 22 July (three days old). The SP166 nest hatched from inside Foredune Central and the SP199 nest hatched from Foredune North shoreline. On 23 July, the closed buffer area in place for least tern nests was expanded with symbolic fence to include additional area between the Foredune closure and Bigfoot revegetation area to protect these plover broods. This was replaced with wire fencing 24 July. From 23-29 July, the SP199 brood was seen in the closed buffer area on one occasion and in Bigfoot revegetation area east of the closed buffer area on three occasions. The closed buffer fencing was removed 21 August, after all chicks in the area had fledged.

Two nests, SP18 and SP40, were found in the open riding area and nonpredator fencing was installed to provide a minimum buffer from the nest to the open riding area of 135 feet for SP18 and 132 feet for SP40. As nests neared hatch, symbolic fence corridors were installed to temporarily close public access west of the nest sites. Chick fencing, with a large open gap on the west side, was also installed around the SP40 nest to guide chicks away from the open riding area, located approximately 170 feet east of the nest. The SP18 nest, located 500 feet east of 7 exclosure, hatched two chicks on 23 May, the brood moved through a 900 foot wide closed buffer area corridor to 7 exclosure on 24 May, and both chicks were seen on the 7 exclosure shoreline by the following morning. The brood continued to be raised on the 7 exclosure shoreline, two chicks were last seen 30 May, at 7 days old, one chick was last seen 3 June, at 11 days old, and no chicks fledged. The SP40 nest, located approximately 360 feet east of 8 exclosure, hatched two chicks on 24-25 May, the brood moved through the 500 foot wide closed buffer area corridor to 8 exclosure on 25 May, and chicks were on the 8 exclosure shoreline by the following morning. The brood moved south after this date and was raised on North Oso Flaco shoreline, two chicks were last seen 12 June, at 18-19 days old, and one chick fledged.

The SP65 nest was found in the Eucalyptus North revegetation island, approximately 610 feet east of 7 exclosure and adjacent to the open riding area. Nonpredator fencing was installed to provide a minimum buffer of 130 feet from the nest to the open riding area. Prior to hatching, an approximately 1,500 feet wide symbolically fenced corridor was in place to temporarily block off public access west of the nest site. The nest hatched three chicks on 3 June and the brood moved through the closed buffer area corridor to 6 exclosure on 4 June. The brood moved south after this date and was raised on 7 exclosure shoreline, three chicks were last seen 7 June, at four days old, one chick was likely depredated by American kestrel (*Falco sparverius*) (kestrel) on 8 June, two chicks were last seen 9 June, at six days old, and one chick fledged.

Three nests (SP53, SP131, and SP137) hatched within a closed buffer area east of the Southern Exclosure or from revegetation areas adjacent to the closed buffer area and broods were monitored closely as they moved toward the protected exclosure and shoreline. Eight chicks hatched from these nests, broods all moved to the exclosure shoreline two days after hatch, and a total of four chicks fledged.

**Chick fledging rate**

Of the 391 snowy plover chicks hatched, 167 were banded and the fate of 224 unbanded chicks is believed known (Appendix B). Chick survival and fledging rates of unbanded chicks are obtained through a combination of intense monitoring of broods, banded associated adults, banded chick(s) in broods with unbanded chick(s), and banded broods present in the same area (reducing density of unbanded broods). There were 43 unbanded broods (110 chicks) observed on-site and believed to be from nests that were not found. Three of the 43 broods were subsequently banded (see sections titled Banding chicks and Assignment of broods to nests in the Monitoring and Management Action section for details on banded and unbanded broods). The fledging rate for banded chicks was 62.3% (104/167) and 56.7% (127/224) for unbanded chicks. The fledging rate for all chicks combined in 2023 was 59.1% (231/391) and is above the average fledging rate of 37.7% (range=7.4-66.0%) for the 21-year period 2002-22 (Table 8, Table F.1 in Appendix F) (CDPR 2007-22).

In 2023, the early season had a higher chick fledging rate (67.0%) compared to the late season (56.0%). In 14 of 21 years from 2003-23, the fledging rate of chicks hatching in the early season (prior to 20 June) has been higher than chicks hatching in the late season (20 June or later) (see 2012 annual report for how early and late seasons were determined.) For all years in the 21-year period 2003-23, the average early season chick fledging rate (44.4%) was 11.4 percentage points higher than the average late season chick fledging rate (33.0%) (Figure 9, Figure 10, Figure 11).

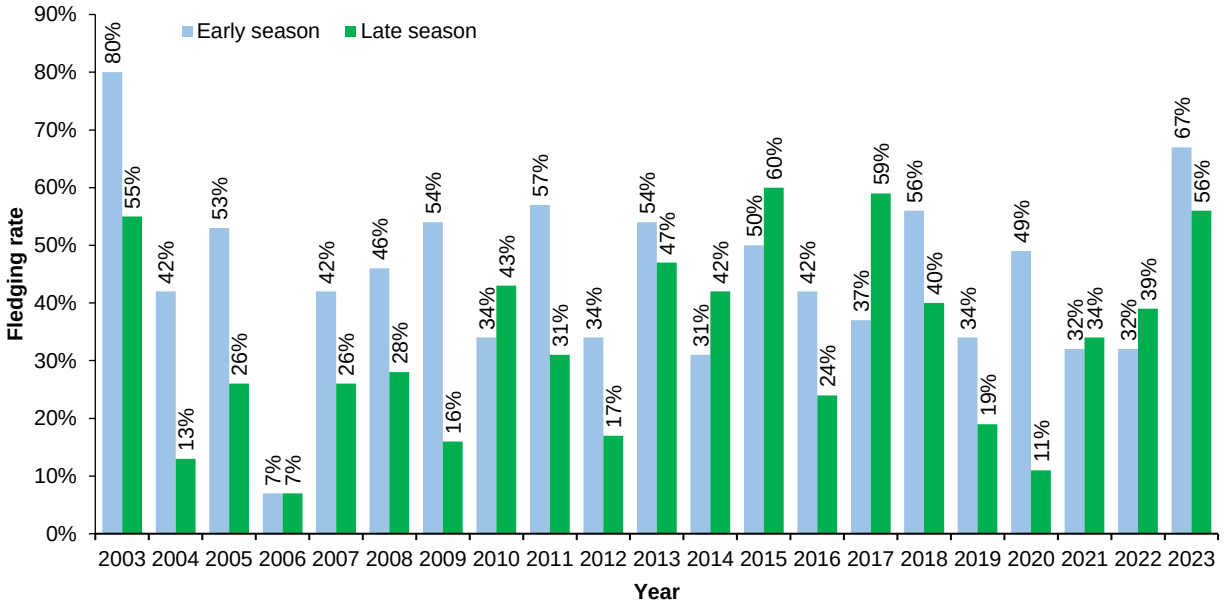


**Figure 9. Fledging rate of chicks hatching in early season (prior to 20 June) and late season (20 June or later) at ODSVRA from 2003-23.**

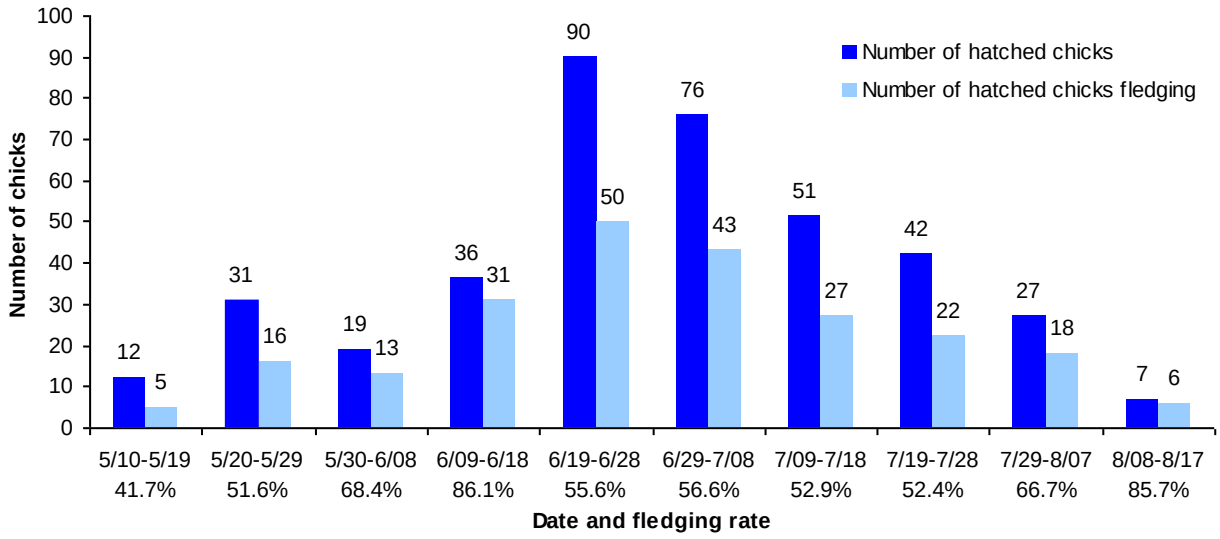


**Figure 10. Number of snowy plover chicks hatching per 10-day period and number subsequently fledging at ODSVRA in 2023.**

Includes all chicks with known fate (391). For broods that originated from unknown location (110 chicks from 43 broods) a hatch date was estimated within a 10-day period based on chick size.

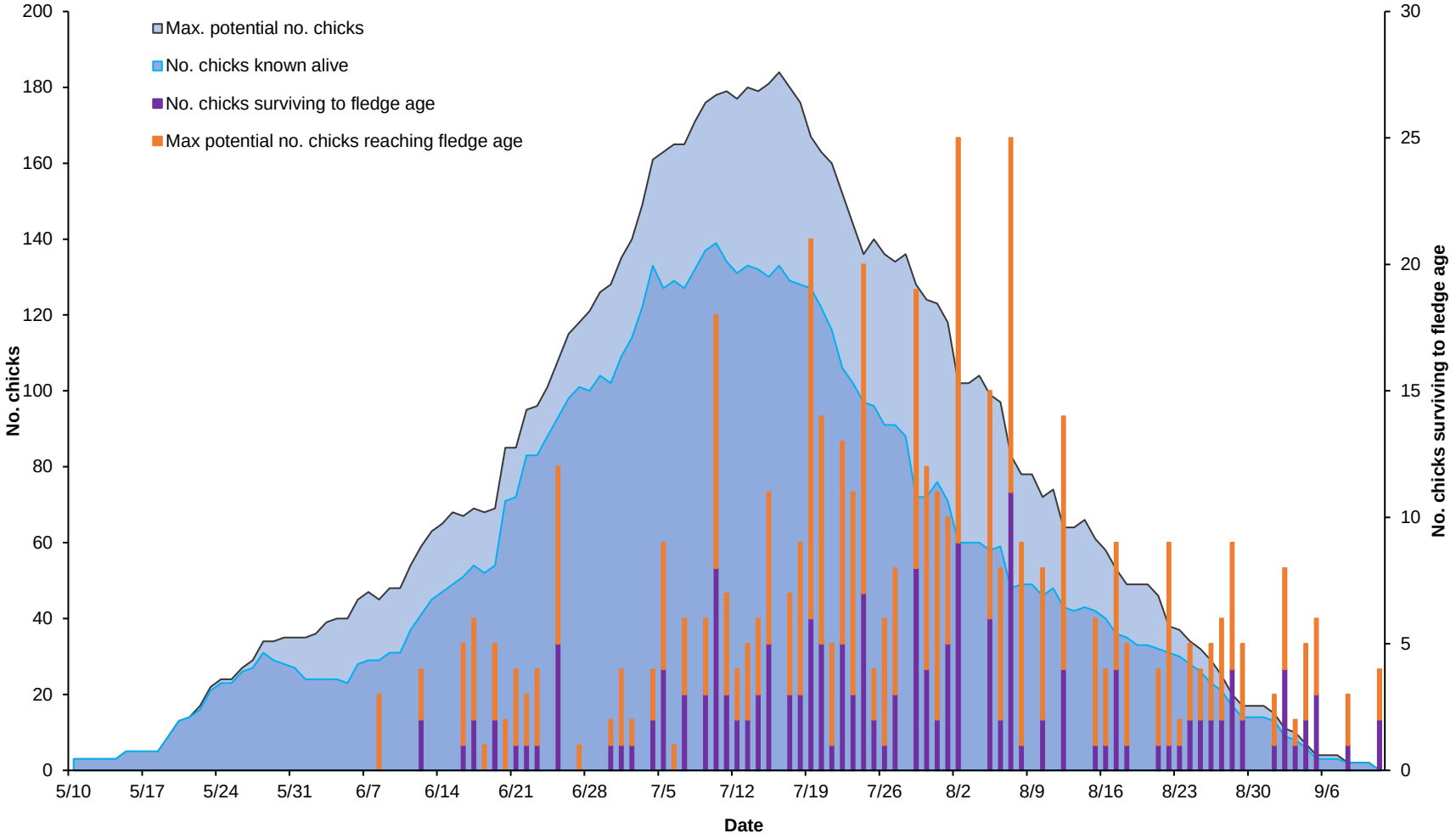


**Figure 11. Chick survival and fledge rate from 10 May to 11 September at ODSVRA in 2023.**
Of the total of 391 chicks hatching, 329 chicks (excludes 62 chicks that were found when approximately three days old or older) are represented in this figure. Number chicks known alive calculated using date of last sighting during regular surveys of all chicks.

**Age of chick loss**

Of 176 closely tracked chicks (167 banded and 9 unbanded chicks with banded siblings) from known location nests, 64 were believed lost. As has consistently been the case in previous years, chick loss measured in 5-day increments in 2023 was highest for very young chicks (0-4 days of age), accounting for 34.4% of total loss and is the lowest percent loss for this age group for the 15-year period 2009-23 (range=38-64%, average=48%) (Figure 12) (CDPR 2009-22). For 125 chicks reaching 16 days of age in 2023, the fledge rate was 84% (105/125). This is higher than the average of 79% (range=71-93%) for the previous 14-year period 2009-22 and 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) (CDPR 2009-22).

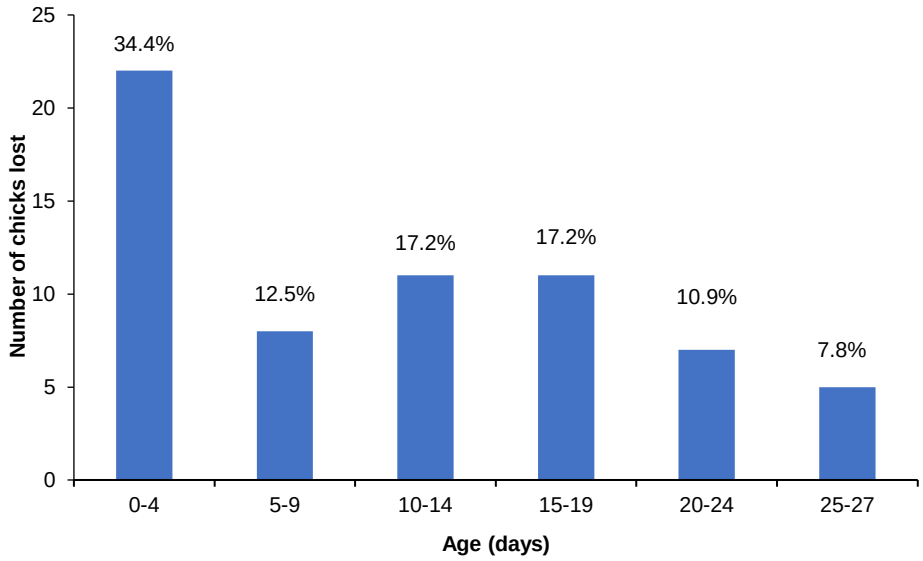


**Figure 12. Loss of snowy plover chicks by age at ODSVRA in 2023.**

Number and percentage of total chicks lost shown for each age group. There were 176 chicks included in the analysis (167 banded and 9 unbanded with banded siblings); 64 of these were lost. Data excludes broods that could not clearly be identified and tracked individually and broods with an estimated hatch date. If individual chick age could not be determined due to a split hatch, the earliest hatch date was used.

**Productivity measured by number of fledglings produced per adult male**

Based on a population viability analysis in the 2007 USFWS Pacific coast western snowy plover recovery plan, a rate of 1.0 fledglings produced per male is believed necessary to prevent population decline with 1.2 fledglings per male allowing for moderate population growth (assuming approximately 75% annual adult survival and 50% juvenile survival) (USFWS 2007). In 2023, the number of chicks fledging per male was 1.80, which is higher than 1.50 in 2022, and greater than the average of 1.43 during the previous 21-year period 2002-22. The number of fledglings produced per male has exceeded 1.2 in 16 of the 22 years from 2002-23 (Table 5). (Note that if the number of breeding males is underestimated, the number of chicks fledged per male is an overestimate).

**Productivity measured by breeding coefficient**

Breeding coefficient calculated from the number of fledglings produced per eggs laid provides a possible method to assess breeding effort (Lauten et al. 2017) (Colwell et al. 2017). A breeding coefficient below 0.15 fledglings per egg suggests productivity is low while a breeding coefficient above 0.20 indicates productivity is high for effort expended (Lauten et al. 2017-20). In 2023, the breeding coefficient was 0.33 and compares to 0.25 in 2022. For the 22-year period 2002-23, the average breeding coefficient was 0.26 fledglings per egg and the number of fledglings produced per egg has exceeded 0.20 in 15 of the 22 years (Table 8).

**Injuries, mortalities (other than eggs), and carcasses collected or observed**
In 2023, there were three adults, two juveniles, and one chick/juvenile observed with injuries, details of the injuries are provided in Table H.2 in Appendix H. There was a minimum of 15 documented snowy plover mortalities (other than eggs) at ODSVRA from 13 February to 12 September 2023. Eleven of the 15 mortalities were the result of predation. Predators involved were a juvenile peregrine (at least two juveniles and one chick), an adult male kestrel (one adult and at least five chicks), a kestrel of unknown sex (one chick), and a subadult western gull (*Larus occidentalis*) (one adult or juvenile). Documented mortality other than predation were three adults and one juvenile. Two adults were found in the open riding area, one adult was found on the North Oso Flaco shoreline, and one juvenile was found on 6 exclosure shoreline. No clear evidence of predation was observed at any of these carcasses. For carcasses that received a necropsy, reports are attached if available at the time of this report. Details of the individual depredations and carcasses are provided in Table H.5 and H.6 in Appendix H.

**Protection of known location and fate nests**
Of 208 nests with both known location and fate, the great majority (91.8%, 191/208) were initiated in areas closed for nesting with some form of protective fence and signage in place at the start of the nesting season. This fencing included Exclosure predator fencing inside the Southern Exclosure and a portion of North Oso Flaco to discourage human disturbance and coyote entry (78 nests); nonpredator fencing around the Foredune closure to discourage human disturbance (38 nests); and symbolic fencing to discourage public entry along the shoreline of the Foredune closure, Southern Exclosure, and North Oso Flaco (64 nests). And while the lower shoreline of South Oso Flaco is open to pedestrians during the nesting season the length of the upper beach is protected by symbolic fence (11 nests) (see section Closures and fencing in Management Actions on page 16 for additional details on types of protective fencing for nests) (Table F.3 and Table F.4 in Appendix F).

Seventeen nests were initiated in areas not closed for nesting at the start of the nesting season, including eight in the open riding area, two in the closed buffer area, and seven in the revegetation areas east of the Southern Exclosure and open riding area. The eight nests initiated in the open riding area received a nonpredator fence buffer on the date found, while nests found in the closed buffer area and the revegetation areas had nonpredator fence present at nest initiation (Table F.4 and Table F.5 in Appendix F).

All nests may also be assessed if individual nest protection, such as a circular exclosure or mini-exclosure (providing avian and mammalian predator protection), is appropriate and possible. In 2023, of the 208 nests with both known location and fate, 36 (17.3%) of the nests received either a circular exclosure or mini-exclosure and had a 94.4% hatch rate (34/36). This compares to a 48.8% hatch rate (84/172) for those nests not receiving individual nest protection. Nests may not receive individual nest protection due to a variety of concerns: adults abandoning incomplete clutches, windblown sand potentially burying eggs, topography making the eggs prone to rolling, disturbance to nearby broods, nest lost prior to chance to install circular or mini, or adult vulnerability to predators (See Table F.3, Table F.4 and Table F.5 in Appendix F for a further breakdown of nest protections and fates by location).

**Banded snowy plovers breeding at ODSVRA in 2023**
Banding of snowy plovers occurs at multiple breeding sites along the Pacific coast. The closest sites to ODSVRA where banding occurs are Monterey Bay in Monterey County to the north, and VSFB in Santa Barbara County to the south. In 2023, the minimum number of breeding adults at ODSVRA was 232 birds, and of these 89 (38.4%) were confirmed banded and with known origins (Figure 13). For known origin banded birds, the great majority (86.5%, 77/89) represent recruitment from chicks banded and fledged from ODSVRA. Twelve breeding birds originated from sites in California (all banded as chicks) other than ODSVRA at the following locations: one from Fort Ord State Park in Monterey County; 10 from VSFB in Santa Barbara County; and one from Naval Base Coronado, San Diego County (Table D.4 in Appendix D).

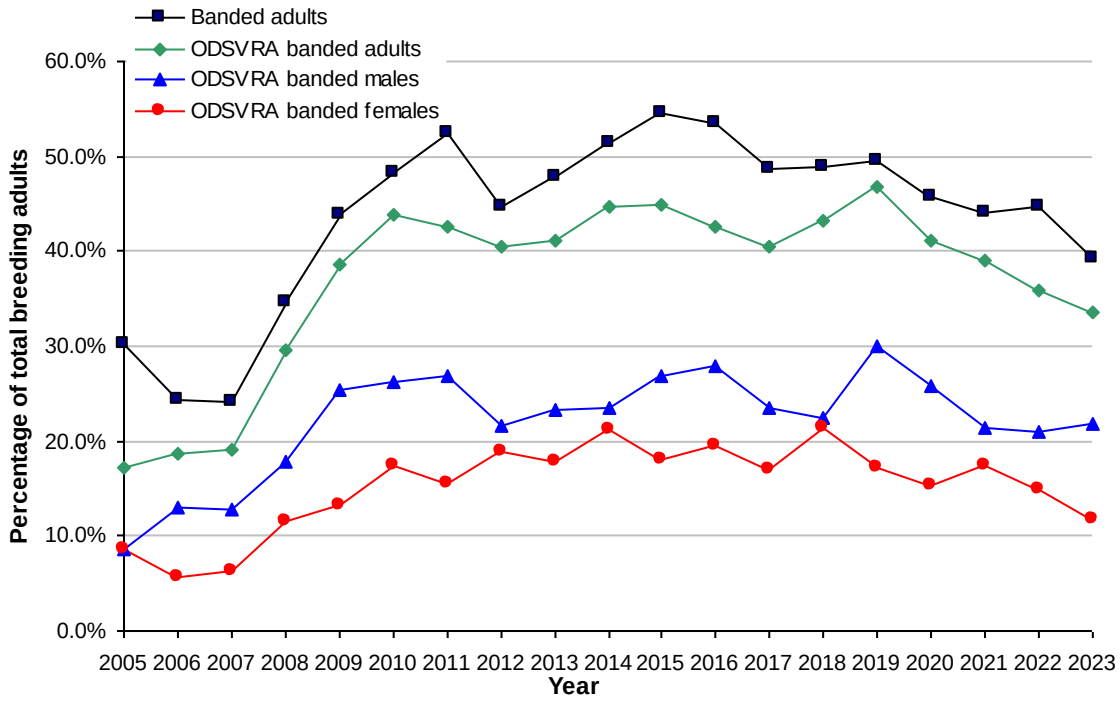


**Figure 13. Percentages over the total calculated breeding population at ODSVRA of all known origin banded adults and the sum of males and females originally banded at ODSVRA breeding from 2005-23.**
All ODSVRA banded adults were banded on-site when chicks.

**Snowy plovers banded as chicks at ODSVRA confirmed breeding elsewhere in 2023**
Eleven plovers banded at ODSVRA and breeding away from the park were confirmed in two counties of California: Monterey County (one at Moss Landing State Beach, two at Salinas River State Beach, and one at Salinas River National Wildlife Refuge) and Santa Barbara County (seven at VSFB). There was a minimum of 41 additional adult plovers banded at ODSVRA observed at other sites, ranging from New River in Coos County, Oregon to North Island Naval Air Station in San Diego County, California during the months of April through June. A portion of these likely represent breeding adults, but breeding was not confirmed (Table D.6 in Appendix D).

**Snowy plover surveys at ODSVRA during the nonbreeding season**
Surveys for wintering plovers (Pacific coast breeding birds joined by interior breeding birds) were conducted four to five times a month during the five-month period October through February (see paragraph titled Nonbreeding season monitoring of snowy plovers in the Monitoring section on page 15 for survey details). Between 5 October 2022 and 22 February 2023, single day wintering plover counts at ODSVRA ranged from 43-266 birds (single day high count on 12 January 2023). The shore was divided into five beach sections and the monthly average number of plovers was obtained for each section. An average number of plovers for each beach section for the five-month winter period was obtained by averaging each month's average count. Of the five sections, the beach north of Grand Avenue had an average of zero plovers (range=0-1) during the winter period; Grand Avenue to marker post 2 had an average of one (range=1-4); marker post 2 to marker post 6 had an average of 95 (range=67-123); marker post 6 to the northern boundary of Oso Flaco had an average of 41 (range=14-90); and Oso Flaco had an average of 24 (range=0-48) (Figure 14) (see Site Description section for details of allowed public use and access in these beach sections).

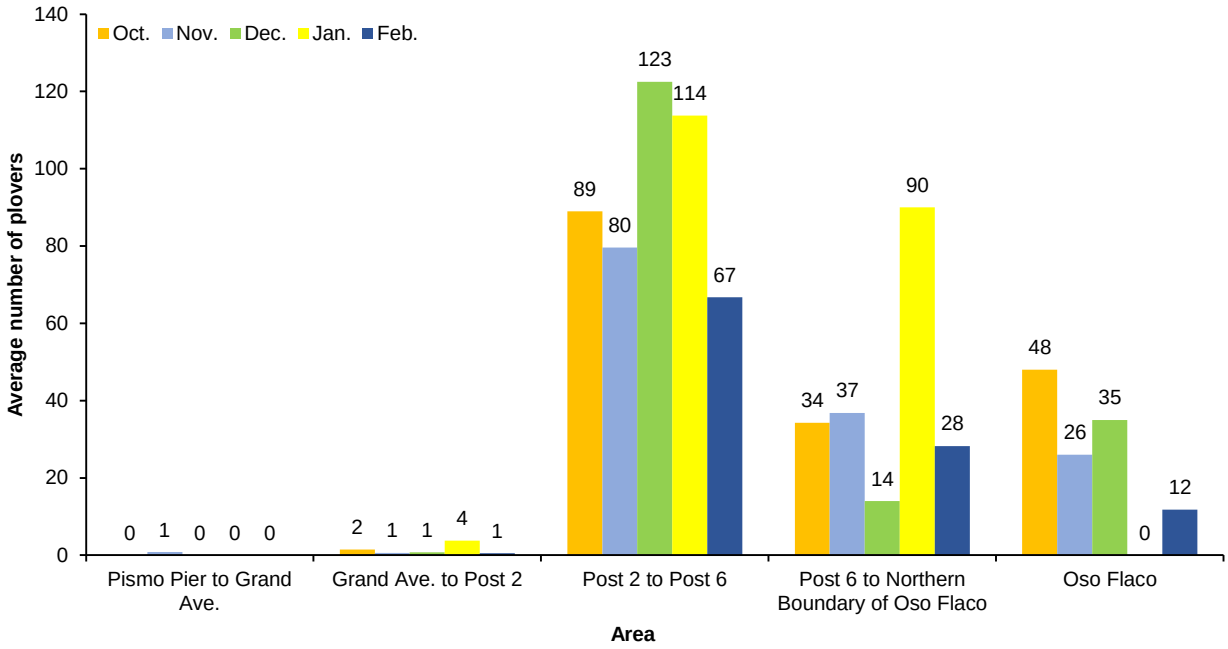


**Figure 14. Monthly average number of snowy plovers observed at beach sections of ODSVRA during nonbreeding season surveys from October 2022 to February 2023.**
Surveys conducted four to five times a month in 2022-23 winter.
Post = marker post.

Beginning in 2004, ODSVRA has participated in a snowy plover winter season window survey organized by USFWS and conducted in January throughout the U.S. Pacific coast. Plovers present during this time include birds from both the Pacific coast breeding population and interior breeding birds wintering on the coast. In 2023, the survey at ODSVRA counted 163 adult plovers and compares to an average of 147 (range=134-172) during the previous 3-year period 2020-22. During the 20-year period 2003-23, the winter window survey has averaged 155 plovers (range=62-260). Beginning in 2011, ODSVRA increased full park surveys for wintering plovers with one to five surveys (includes USFWS January window survey) per month for October to February. Over the 13-year-period 2011-23, January high counts for eight years were on dates other than the USFWS winter window survey (Figure 15).

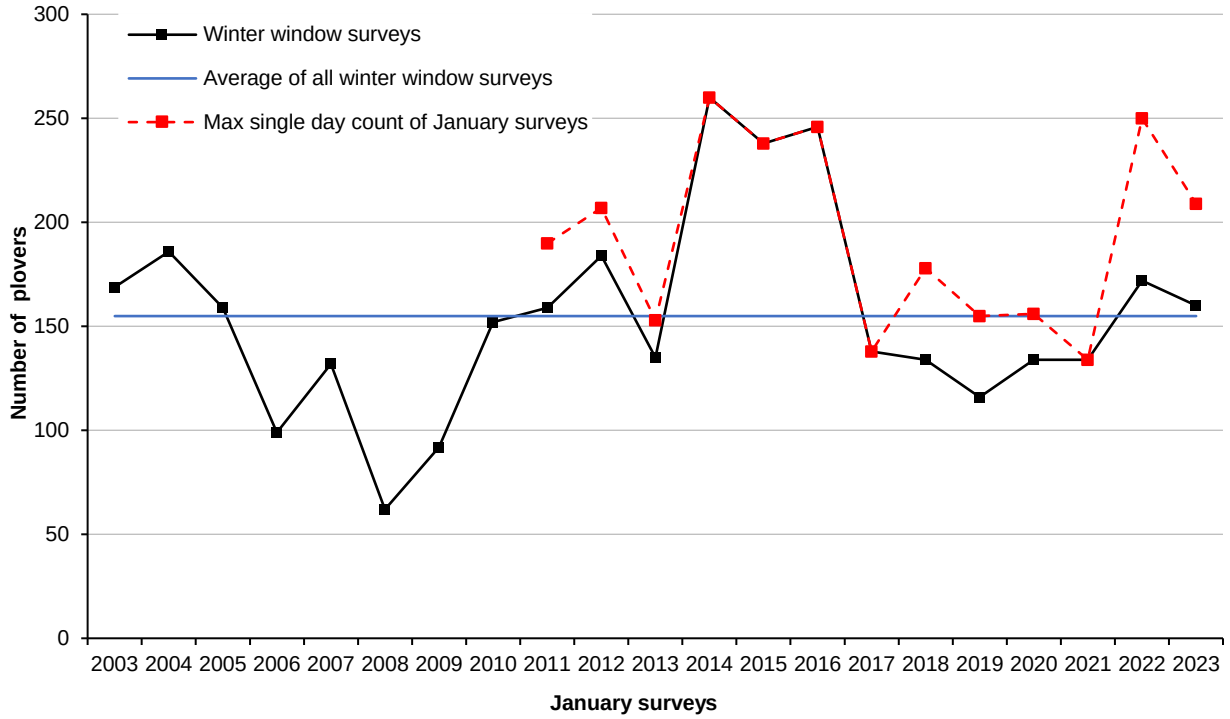


**Figure 15. Number of snowy plovers counted at ODSVRA on USFWS winter window surveys 2003-23 and the maximum number of snowy plovers counted in the month of January from 2011-23.**

Color band combinations of 78 banded snowy plovers were recorded during surveys from 1 October 2022 to 28 February 2023 at ODSVRA. Two were banded in Oregon at Douglas and Lane counties. All others, except one from unknown location, were banded in California at the following locations listed north to south: Point Reyes National Seashore, Marin County (1); Don Edwards National Wildlife Refuge, south San Francisco Bay (1); Eden Landing in Alameda County (1); Reservation Road, Monterey County (1); ODSVRA (60); and VSFB, Santa Barbara County (11) (Table D.3 in Appendix D).

## FACTORS INFLUENCING LEAST TERN AND SNOWY PLOVER REPRODUCTIVE SUCCESS

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

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

**Quality of protected habitat and food resources**
Habitat within the Southern Exclosure is protected and closed to public entry year-round. Some areas within the Southern Exclosure have very limited scattered natural debris, such as on the shoreline, and other areas are dominated by tall and densely vegetated hummocks, such as in 8 exclosure (see more details of the Southern Exclosure in Site Description section). Areas of patchy cover can benefit plovers and terns during the nesting and chick-rearing periods. Available materials, including surf-cast kelp (wrack), branches, driftwood, and woodchips, may be placed in bare areas of the Southern Exclosure and on the Foredune closure shoreline to make more areas of patchy cover available (see section titled Habitat Enhancement in the Management Actions section). On the shoreline of 6, 7, and 8 exclosures, talitrids may be added to help restore populations of this important invertebrate prey for snowy plover chicks, juveniles, and adults. Nearshore ocean waters provide the primary source of prey fish for the tern colony and nearby small freshwater lakes may provide additional sources of appropriately-sized fish to feed chicks (see paragraph titled Least tern use of freshwater lakes in the Monitoring section).

**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 disrupt incubating and brooding behavior. Presence of predators may result in eggs left unattended and subject to being overheated, chilled, or buried by windblown sand or a brood becoming scattered and the loss of any chick failing to reunite with the adult. Depredation of an adult tern or plover may result in egg abandonment or loss of dependent chicks.

## Documented predator activity and management response in 2023

Species known to be predators of terns and plovers were documented by both number of days detected, as well as number of sightings (avian) and occurrences (mammalian) in the Southern Exclosure and Oso Flaco (see Monitoring and Management Actions section for more detail). Predator activity in the Foredune closure was recorded using the same methods for the Southern Exclosure and Oso Flaco but is not included in the totals for sightings or occurrences to keep comparisons between years consistent. (Predators of concern in the Foredune closure closely tracked those impacting the Southern Exclosure and Oso Flaco).

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

and detection bias, predators of particular concern identified during the 2023 season included peregrine, kestrel, northern harrier (*Circus hudsonius*) (harrier), common raven (*Corvus corax*) (raven), great horned owl (*Bubo virginianus*), gull, and coyote. Four coyotes, one American crow (*Corvus brachyrhynchos*) (crow), eight ravens, one western gull, and one California gull (*Larus californicus*) were lethally removed. One harrier, one Cooper's hawk (*Accipiter cooperii*), and one peregrine were live-trapped and relocated (both the trapped Cooper's hawk and peregrine were not targeted individuals) (Table G.3 in Appendix G). Avian predators perched in sensitive areas were hazed when determined appropriate.

In 2023, no tern nests were identified as lost to predator. Sixty-seven plover nests were identified lost to the following predators: coyote (2), raven (36), crow (2), harrier (10), unidentified avian (10), and unidentified predator (7). From 2002-23, 2.2% (21/975) of all tern nests with known fate were documented lost to predators (14 mammalian, one gull, and six unidentified predator). During this same 22-year period, 11.7% (428/3660) of plover nests with known location and fate were documented lost to predation (55 mammalian, 293 avian, and 80 unidentified predator). In addition to documented loss, a number of failed nests attributed to "abandoned pre-term" and "unknown cause" are likely a result of predation (Appendices A and B) (Table F.3 in Appendix F).

In 2023, documented losses, other than eggs, to predation included three tern juveniles and at least 11 plover chicks, juveniles, and adults. Tern and plover losses were to kestrel (at least 7), peregrine (at least 6), and western gull (1) (Table H.3 and H.4 in Appendix H). The 14 tern and plover losses in 2023 compares to 14 documented losses (all plover) in 2022. During the 20-year period 2002-21, average loss was two terns (range=0-7) and nine plovers (range=0-19) (Table G.2 in Appendix G).

## Mammalian predators

### *Opossum*

Virginia opossum (*Didelphis virginiana*) (opossum) tracks were documented on five days in the Southern Exclosure in 2023, and averaged 12 days per season (range=3-25) from 2007-22 (Figure 16).

From 2002-23, known tern and plover loss to opossum was limited to two tern nests, occurring in 2010 and 2013 and two plover nests in 2021 (Figure 4, Table 2, Table F.2 in Appendix F).

### *Skunk*

Striped skunk (*Mephitis mephitis*) (skunk) was documented in 2023 on one day in the Southern Exclosure compared to an average of 29 days per season (range=2-87) from 2007-22 (Figure 16).

There were no known tern or plover nests lost to skunk from 2020-23, compared to one in 2019, zero in 2018 and 23 (18 plover, 5 tern) in 2017. From 2002-16, nest loss to skunk was limited to six plover nests: five in Oso Flaco from 2009-11 and one in Boneyard exclosure in 2016. From 2002-23, tern and plover loss to skunk, other than eggs, is limited to two plovers in 2005, although additional loss was suspected in 2017 (Figure 4, Table 2, Table F.3 in Appendix F, and Table G.2 in Appendix G).

### *Raccoon*

Raccoon (*Procyon lotor*) tracks were documented in 2023 on three days in the Southern Exclosure and is much lower than the average of 71 days (range=2-145) for the 16-year period 2007-22 (Figure 16).

From 2002-23, known plover and tern loss to raccoons was limited to one tern nest in 6 exclosure in 2015 and two plover nests in Oso Flaco (one in 2010 and one in 2011) (Figure 4, Table 2, Table F.2 in Appendix F).

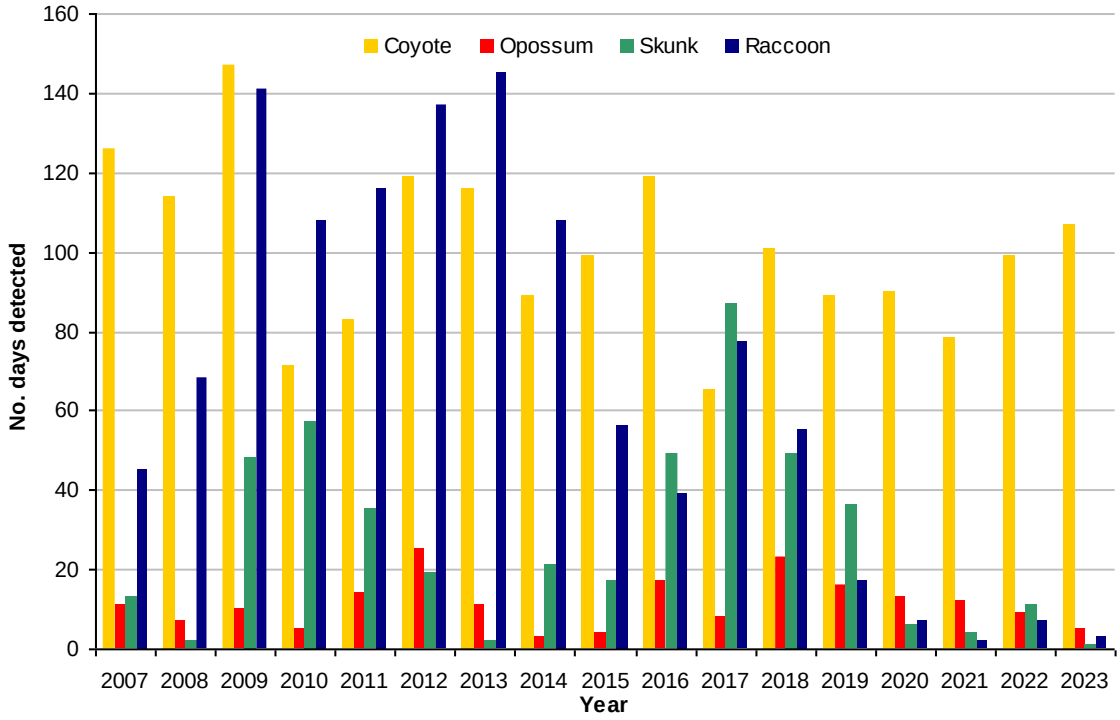


**Figure 16. Number of days coyote, opossum, skunk, and raccoon were detected in the Southern Exclosure and Oso Flaco at ODSVRA from 2007-23.**

***Coyote***

Live sightings of coyotes within the Exclosure predator fencing or along the shoreline during daytime hours are infrequent. 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. It should be noted that coyote tracks are documented opportunistically, and counts represent a minimum level of activity. In addition, shoreline accessibility for monitoring may vary between years, making direct comparison difficult.

In 2023, there were 61 occurrences inside the Exclosure predator fencing. This is higher than the average of 31 occurrences (range=5-92) for the 14-year period from 2009-22 and is likely due to prolonged periods of time when heavy equipment was not available to cover gaps under the fence created by wind scour. Documented coyote activity for the Southern Exclosure shoreline and North Oso Flaco shoreline was also above average with 124 occurrences in 2023 compared to an average of 103 for the 14-year period, 2009-22 (Table 10) (South Oso Flaco not included because coyote tracks are present daily).

Documented loss in 2023 was two plover nests, but plover chick loss was also suspected. From 2002-23, documented nest loss to coyote averaged less than one tern nest per year (range=0-2) and one plover nest per year (range=0-4) (Figure 4, Table 2, Table F.3 in Appendix F). During this same period, coyote scat was found containing a total of 38 plastic or aluminum bands, representing a minimum of 17 plovers and one tern (Table G.2 in Appendix G) (CDPR 2007-22). In 2023, four coyotes were removed in a targeted effort to reduce the threat of predation and disturbance due to coyote presence within sensitive nesting and chick-rearing habitat. This is just below the average of six removed per year from 2007-22 (range=2-12) (Table G.3 in Appendix G) (CDPR 2007-22).

**Table 10. Coyote occurrence in the Southern Exclosure and Oso Flaco at ODSVRA from 2009-23.**
Date range is from 1 March to 10 September (a 194-day period). Exclosure predator fencing includes all areas inside the Southern Exclosure and North Oso Flaco exclosed with predator fencing.

| Year | Exclosure predator fencing | 6, 7, 8 exclosures shoreline | North Oso Flaco shoreline | South Oso Flaco | Total no. occurrences (Total no. days detected) |
|---|---|---|---|---|---|
| **2009** | 19 | 99 | 94 | 95 | 307 (147) |
| **2010** | 5 | 24 | 23 | 47 | 99 (71) |
| **2011** | 10 | 17 | 20 | 55 | 102 (83) |
| **2012** | 92 | 100 | 47 | 35 | 274 (119) |
| **2013** | 49 | 55 | 38 | 60 | 202 (116) |
| **2014** | 28 | 115 | 38 | 42 | 223 (89) |
| **2015** | 48 | 104 | 32 | 29 | 213 (99) |
| **2016** | 36 | 61 | 49 | 63 | 209 (119) |
| **2017** | 25 | 1 | 4 | 43 | 73 (65) |
| **2018** | 22 | 55 | 52 | 69 | 198 (101) |
| **2019** | 17 | 40 | 53 | 69 | 179 (89) |
| **2020** | 27 | 84 | 30 | 32 | 173 (90) |
| **2021** | 26 | 61 | 37 | 33 | 157 (78) |
| **2022** | 30 | 84 | 39 | 70 | 223 (99) |
| **2023** | 61 | 90 | 34 | 33 | 218 (108) |

## Avian predators

### *American kestrel*

There were 49 documented sightings on 27 days of kestrels in specific areas of the Southern Exclosure and Oso Flaco in 2023 (Table 11, Table G.1 in Appendix G). This is slightly higher than the average of 23 days per season (range=6-52) for the 16-year period 2007-22 (CDPR 2007-22). Kestrels were primarily observed mid-March through early May and mid-May through mid-June perch-hunting and flying over sensitive areas. Most sightings were of an adult male kestrel frequently hunting plover chicks and documented depredating five plover chicks from 30 May to 9 June. On 9 June, what is suspected to be the same male kestrel was documented depredating a breeding female plover just outside a circular nest exclosure (Table H.4 Appendix H). Attempts to trap the male kestrel were unsuccessful and discontinued as sightings became less frequent after 9 June. In 2023, there was a minimum of three individual kestrels observed in the nesting area with three seen flying over South Oso Flaco and Boneyard at the same time on 25 March.

From 2002-23, documented tern and plover loss to kestrel was one tern in 2007, four plovers in 2021, six plovers in 2022, and seven plovers in 2023 (Table G.2 in Appendix G).

### *Owl*

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

In 2023, owl tracks and live sightings were irregularly documented in sensitive nesting and chick-rearing habitat, with owl presence detected on 17 days with 21 separate sightings in the Southern Exclosure and Oso Flaco (Table 11, Figure 17). For these same areas from 2007-22, owl activity was documented on an average of 29 days (range=5-53). Most sightings of owls in 2023 were of a great horned owl pair perched in South Oso Flaco and of a great horned owl near a trap set for owls in the eastern portion of 8 exclosure. Trapping attempts made for great horned owl in July were unsuccessful.

From 2002-23, documented plover and tern loss to owl included one tern in 2004, three terns and one plover in 2021, and two plovers in 2022. An additional two terns in 2006 and one plover of unknown age in 2011 were depredated by an unknown avian predator, suspected to be owl (Table G.2 in Appendix G).

***Red-tailed hawk***

Red-tailed hawks (*Buteo jamaicensis*) were observed perching and flying in the Southern Exclosure and Oso Flaco foredunes. In 2023, there was a minimum of three individuals (three individuals seen together on 15 April) observed in the nesting area. Red-tailed hawk presence in the Southern Exclosure and Oso Flaco was documented on 32 days (80 sightings) in 2023, slightly less than the average of 38 days (range=7-74) of activity from 2007-22 (Table 11, Figure 17).

In 2017, a juvenile red-tailed hawk was observed eating a plover chick. This is the only known predation by a red-tailed hawk at ODSVRA, but they have been a documented predator of plovers and terns at other sites (CDPR 2017).

***Northern harrier***

Northern harrier is a documented predator of plover and/or tern nests, chicks, and juveniles at ODSVRA. During the 11-year period 2008-18, harriers averaged 86 sightings on 39 days in the Southern Exclosure and Oso Flaco. In comparison, the average from 2019-23 is 180 sightings on 65 days, an increase in sightings of 109.3% and days seen of 66.7% (Table 11, Figure 17) (CDPR 2007-22). In 2023, harrier presence was documented on 51 days (132 sightings) in the Southern Exclosure and Oso Flaco. Based on age and sex, there was a minimum of five individuals observed this season (one adult female, one adult male trapped and banded on 1 May, a second adult male observed after trapping the first, and two juveniles seen together on 30 July).

In 2023, ten plover nests were documented lost to harrier, many of which were confirmed lost to a single adult male harrier that was trapped and relocated on 1 May. Additional undocumented loss is suspected, including one plover egg found cracked and near harrier tracks in Foredune North on 9 April. From 2002-23, total documented loss to harrier includes eight tern individuals, 34 plover nests, and 11 plover individuals (Figure 4, Table 2, Table F.3 in Appendix F, and Table G.2 in Appendix G).

**Table 11. Sightings of kestrel, large owl spp., red-tailed hawk, harrier, and peregrine in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA in 2023.**

Date range is from 1 March to 10 September (194-day period). Note most owl "detection" based on tracks.

| Location | Kestrel | Large owl spp. | Red-tailed hawk | Harrier | Peregrine | Total |
|---|---|---|---|---|---|---|
| **6 exclosure** | 14 | 1 | 5 | 36 | 20 | **76** |
| **7 exclosure** | 15 | 3 | 14 | 26 | 23 | **81** |
| **8 exclosure** | 7 | 6 | 20 | 22 | 24 | **79** |
| **Boneyard exclosure** | 4 | 4 | 18 | 9 | 15 | **50** |
| **North Oso Flaco** | 1 | 1 | 20 | 17 | 24 | **63** |
| **South Oso Flaco** | 8 | 6 | 3 | 22 | 8 | **47** |
| **TOTAL** | **49** | **21** | **80** | **132** | **114** | **396** |

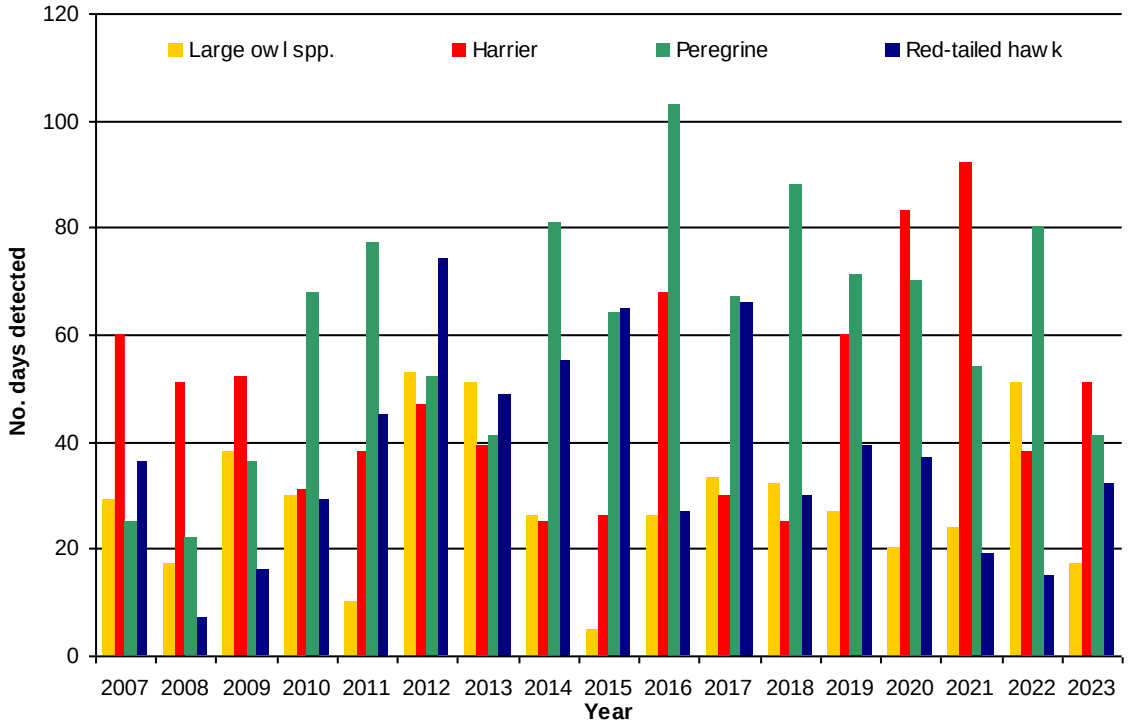


**Figure 17. Number of days large owl spp., harrier, peregrine, and red-tailed hawk were detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2007-23.**
Date range is from 1 March to 10 September (194-day period).

***American crow***
In 2023, crows were observed perching in and flying over South Oso Flaco and 8 exclosure.

From 2002-22, documented plover nest loss to crow was limited to one nest in Pismo Creek lagoon in 2009 and two crows were lethally removed (both removed in 2019). In 2023, documented loss to crow was limited to two plover nests north of marker post 4 from 4-5 May and one crow was lethally removed from the Foredune closure shoreline.

***Common raven***
During the 13-year period 2008-20, ravens averaged 15 sightings on 7 days in the Southern Exclosure and Oso Flaco. In comparison, the average from the 3-year period 2021-23 is 114 sightings on 27 days, an increase in sightings of 660.0% and days seen of 285.7%. In 2023, raven presence increased to 155 sightings on 41 days in the Southern Exclosure and Oso Flaco (Table G.1 in Appendix G) (CDPR 2008-22). In 2023, eight ravens were lethally removed 4 May–12 June and compares to none being removed from 2002-12, an average of 2.4 removed from 2013-21 (range=0-5), and 7 removed in 2022 (Table F.2 in Appendix F, CDPR 2002-23). In 2023, there were a minimum of 10 individuals observed during the nesting season based on two seen flying together on 22 June and eight removed prior to this date.

During the 30-year period 1992-2022, documented nest loss to raven was limited to 56 plover nests (average=1.87 nests per year), with first documented nest loss to raven occurring in 2003. For the past 7 years in a row, from 2017-2023, plover nest loss to raven has been documented annually. In 2023, documented loss to raven included 36 plover nests, with more loss suspected. Additionally, on 17 May, raven tracks were seen around two shell-lined possible nest bowls with plover overtracking that may have

represented two undocumented plover nests depredated by raven. Additionally, on 30 April, a raven was seen landing in vegetated hummocks in the northeast portion of 6 exclosure and flying off with an egg that may have represented another undocumented plover nest.

***Gulls***

In 2023, documented loss to gull was limited to a single plover adult or juvenile, although more plover chick loss to gulls was suspected during the season (Table H.4 Appendix H). Gulls can pose a substantial threat to snowy plover breeding success at ODSVRA, especially individual gulls that key in on adults with broods. Such gulls can become "specialists" searching for and preying on chicks over a wide area, and depredation events can happen quickly and easily go undetected. In 2023, a subadult western gull was observed eating a large plover (juvenile or adult) on 7 exclosure shoreline and was lethally removed. Pink and blue tape from two plover bands was recovered from the gut contents, indicating at least one plover was depredated. Additionally, on 26 July, adult plovers from nearby nests were observed displaying at a subadult California gull walking on the 8 exclosure shoreline. This gull was lethally removed and no evidence of plover remains were found in the gut contents.

From 2002-23, documented loss to gulls is one tern nest, 32 plover nests, and 63 plover individuals (Figure 4, Table 2, Table F.3 in Appendix F, and Table G.2 in Appendix G).

***Peregrine falcon***

Peregrine falcons were observed from mid-April through September, actively hunting, perching, and consuming prey in the Southern Exclosure, and Oso Flaco. In 2023, there were 114 sightings on 41 days of peregrines in the Southern Exclosure and Oso Flaco, compared to the previous year (240 sightings on 80 days) and an average of 183 sightings (range=38-362) on 65 days (range=22-103) from 2008-22 (Table 12). A minimum of three individual peregrines were identified at ODSVRA this season: one juvenile, one subadult, and one adult female.

From 21 July to 12 September, there were multiple sightings of a juvenile peregrine falcon hunting areas of the Southern Exclosure and Oso Flaco. Documented loss to this likely single individual included three juvenile terns, one plover chick, and two juvenile plovers, with additional loss suspected (Table H.4 in Appendix H). Attempts to trap this juvenile peregrine were unsuccessful. On 31 July, an adult female peregrine was hunting the exclosure shoreline and was inadvertently caught in a trap placed for the juvenile peregrine. Due to the potential threat this adult female peregrine posed to terns and plovers, it was banded with a black VID band 94AK on the left leg and relocated 3 August to Shasta County, 414 miles northeast of ODSVRA.

From 2002-23, peregrines were observed depredating 11 terns and 53 plover chicks, juveniles, and adults (Table G.2 in Appendix G). Additionally, a subadult peregrine was observed eating an active plover nest in 6 exclosure in 2012, the only known nest predation by a peregrine at ODSVRA (CDPR 2002-22).

**Table 12. Sightings of peregrine in specific areas of the Southern Exclosure and Oso Flaco at ODSVRA from 2008-23.**

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

| Year | 6 exclosure | 7 exclosure | 8 exclosure | Boneyard exclosure | North Oso Flaco | South Oso Flaco | Total no. sightings (Total no. days detected) | No. peregrines trapped |
|---|---|---|---|---|---|---|---|---|
| 2008 | 11 | 11 | 5 | 6 | 4 | 1 | 38 (22) | 0 |
| 2009 | 13 | 13 | 13 | 6 | 9 | 20 | 74 (36) | 1 |
| 2010 | 37 | 29 | 25 | 11 | 24 | 18 | 144 (68) | 3 |
| 2011 | 39 | 45 | 40 | 32 | 37 | 12 | 205 (77) | 0 |
| 2012 | 41 | 37 | 31 | 9 | 27 | 11 | 156 (52) | 1 |
| 2013 | 28 | 23 | 19 | 2 | 14 | 14 | 100 (41) | 0 |
| 2014 | 75 | 85 | 67 | 11 | 69 | 55 | 362 (81) | 1 |
| 2015 | 41 | 31 | 28 | 15 | 19 | 29 | 163 (64) | 1 |
| 2016 | 54 | 50 | 45 | 16 | 32 | 57 | 254 (103) | 0 |
| 2017 | 31 | 35 | 40 | 8 | 37 | 41 | 192 (67) | 1 |
| 2018 | 60 | 55 | 52 | 17 | 55 | 56 | 295 (88) | 2 |
| 2019 | 45 | 36 | 28 | 15 | 32 | 33 | 189 (71) | 2 |
| 2020 | 46 | 34 | 31 | 4 | 19 | 44 | 178 (70) | 1 |
| 2021 | 40 | 40 | 36 | 11 | 21 | 14 | 162 (54) | 2 |
| 2022 | 70 | 60 | 48 | 33 | 7 | 22 | 240 (80) | 0 |
| 2023 | 20 | 23 | 24 | 15 | 24 | 8 | 114 (41) | 1 |

# 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 the effectiveness of those actions. 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.

**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. Banding a large portion of the tern and plover chicks hatching from ODSVRA is necessary to determine the seasonal productivity and for assessing the management effectiveness. Additionally, bands provide an opportunity to gain insight into predator impacts on chicks and fledglings. Banding of tern and plover chicks also provides information on natal site fidelity of terns and plovers fledged at ODSVRA, as well as migration to other sites.

Every year, ODSVRA bands as many tern and plover chicks as possible, but there are situations when park staff will determine the banding effort is not suitable or could be detrimental to the birds. Chicks are not banded at ODSVRA when it will cause a disturbance to nearby young tern and plover broods. A variety of other factors will prohibit banding including, but not limited to, very young unbanded chicks lost prior to any banding opportunity, weather conditions (and other conditions defined in the USFWS permit) that would make banding unsafe, topography and vegetation in area of chicks making them difficult to locate, and chicks from nests with unknown locations found when too old and mobile to capture for banding. In 2023, there were the highest percentages of unbanded tern chicks (42%, 28/66) and plover chicks (57.3%, 224/391) compared to any other season since banding began. In 2022, there were 27.5% (19/69) unbanded tern chicks and 32.6% (169/515) unbanded plover chicks, and compares to 19.2% (range=9.4-35.9%) for tern and 34.5% (range=12.3-52.4%) for plover during the previous 10-year period 2012-21. The increase in unbanded chicks of both tern and plover in 2023 is likely a result of the highest number of plover nests hatching during a period that occurred simultaneously with tern nests hatching. This caused increased densities of young chicks in many areas, and banding is not possible in these dense brood situations since it would cause a high amount of detrimental disturbance to the broods. In addition, there has been an increase in density of vegetation and size of hummocks in the Southern Exclosure and Foredune closure, making chicks more difficult to view and locate for banding.

Even though the number of unbanded chicks was high in 2023, all of the unbanded plover chicks were successfully tracked and fates for them were determined with intensive brood monitoring. Tern broods do not tend to remain in one area compared to plovers and may leave the site very quickly after fledgling, which makes unbanded tern chicks more difficult to track and determine fate.

Since 2022, Point Blue has been training ODSVRA staff to band plover chicks and it is recommended to continue to train additional staff in 2024 with the goal to apply for additional permits to band. For 2024, Point Blue will continue banding efforts at ODSVRA and have agreed to provide more than one banding contractor if needed during the busier part of the season as an option to attempt to band additional chicks if conditions allow.

**Continue banding least tern chicks to individual**
Beginning in 2006, least tern chicks were banded to allow individual chicks to be identified. This was done, in part, by placing one or two different colors of tape on the federal band, creating a unique combination

for each chick. Banding to individual provides the opportunity to gain additional information that otherwise may not be obtainable, including:

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

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

**Continue option to band adult snowy plovers**

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

**Continue to provide bumpouts and buffer fencing to protect least tern and snowy plover nests and chicks in or close to the open riding area**

Least tern and snowy plover nests inside fenced areas of the Southern Exclosure, Foredune closure, and revegetation areas, may receive temporary additional fencing if a buffer is needed to increase the nest distance from recreational activities in the open riding area. These bumpouts connect to the fence adjacent to nests and extend into the open riding area. Buffer fencing for nests and the tern night roost, when found in the open riding area, is connected to the closest adjacent closure fencing, if appropriate. The bumpout and buffer sizes, determined in consultation with USFWS and CDFW, differs for plover and tern.

It is recommended for 2024 to provide the buffer distances listed below to comply with the January 2021 Biodiversity Management Plan (BMP) using a bumpout or nonpredator fencing (CDFW 2021):

Least tern nests: Provide a tern nest buffer distance of 984 feet (300 meters).

Least tern night roost in the open riding area: Install a bumpout or nonpredator fencing to maintain a minimum of 330 feet (100 meters) from the tern night roost location.

Snowy plover nests in the Southern Exclosure and Foredune closure: Continue to install bumpouts to provide a minimum 100-foot buffer distance between the plover nest and the open riding area for plover nests found inside the Southern Exclosure or Foredune closure, and located close to the fence that borders the open riding area.

Snowy plover nests outside the Southern Exclosure and Foredune closure: Continue to experiment with various plover nest buffer sizes for nests found outside the Southern Exclosure and Foredune closure (such as the open riding area or revegetation areas), in consultation with CDFW, with buffer distances no smaller than 100 feet and no greater than 492 feet (150 meters). Hatch rates for the various buffer sizes will be compared over time. Chicks hatching from these plover nests are monitored closely as they move from nest to determine the daily location of brood for the week after hatch, survival of chicks, and ultimate fledge rates.

Nest bumpouts and buffers may be smaller in size for cases where topography will not allow the minimum size or as necessary to maintain a safe vehicle corridor adjacent to the north and east fence of any bumpout

or buffer. Additionally, to immediately protect the nest when it is first found, and because the buffer requirements are so large, a smaller size buffer consisting of symbolic rope fencing with signs or a smaller single nest wire exclosure may be installed until a larger buffer installation can be scheduled when staff time, material availability, and weather conditions permit. The bumpout and buffer material consists of nonpredator fencing. Access to enter bumpouts or closed buffer areas will not be allowed by the public, but ODSVRA staff vehicles and equipment are allowed within these areas for tasks related to daily tern and plover monitoring, periodic vegetation monitoring, and regular fence maintenance. Other vehicles and personnel will also be allowed to access these areas as necessary to respond to public emergency situations. The bumpout or buffer fencing is removed once nesting activity ceases or there are no longer broods inside the fenced area.

Nests will be monitored closely to assess the adequacy of protective fencing in reducing disturbance. If necessary, bumpouts or buffers may increase in size if disturbance to incubating birds is observed as a result of recreational activity. The buffer size may also be adjusted if tern chicks or nocturnal roosting terns are observed to remain close to the closed buffer area fence.

For plover nests in the open riding area or any area outside of the Southern Exclosure and Foredune closure, a fence corridor that can be closed to the public may be provided as appropriate once nest is close to hatch. This may be done by extending fencing westerly to the surf line to provide a secure chick travel corridor to a protected area of shoreline for foraging habitat.

**Continue to protect snowy plover broods in the open riding area**
The shoreline is important as foraging habitat and for raising snowy plover chicks. After a nest hatches, broods typically move toward the closest shoreline and establish a territory. Portions of the open riding area are temporarily closed, using symbolic fence or nonpredator fencing and signs, to provide a corridor of safe passage for broods moving in the open riding area between nests and foraging areas (see section titled Snowy plover chicks in the open riding area and closed buffer areas on page 39).

In 2024, it is recommended to provide protection to plover broods in the open riding area in consultation with USFWS and CDFW, including methods to allow staff to guide broods to a protected area when necessary (see section titled Broods in the open riding area on page 19). For broods found in the open riding area that are in critical danger from recreational activities, and when it is not practical for a chick closure or travel corridor to be installed, it is recommended that chicks be captured and relocated to an approved rehabilitation facility. Examples of circumstances where chick capture would be needed include: broods that are found far away from any closed shoreline and surrounded by campers where a chick corridor or closed area is not feasible; chicks become separated or appear weak while moving on their own within the riding area to a closed area; or no adult is present and chicks are unattended in the open riding area for an extended period. If possible, USFWS and CDFW will be consulted prior to any capture of chicks, however immediate action may be taken as necessary to avoid loss of chicks due to recreational activities.

**Continue to use predator proof fencing and allow staff and heavy equipment access throughout the season to maintain the effectiveness of the exclosure perimeter fence protecting terns and plovers breeding in the Southern Exclosure and North Oso Flaco**
The contiguous area enclosed by predator fencing within the Southern Exclosure and North Oso Flaco is important in discouraging coyotes during the nesting season from entering nesting and chick-rearing habitat, as well as to limit vehicle and human trespass year-round. The Exclosure predator fencing was installed seasonally 2006-21 and the area has been closed to the public year-round since October 2021 based on operational needs and for consistency with other agency requirements. The fence during the nesting season is composed of two layers of wire fencing six feet above the surface, with the bottom layer of two-inch by four-inch mesh buried a minimum of eight inches to discourage coyote entry. High winds at ODSVRA can cause gaps or blowouts at the bottom of the fence, and the fence is prone to falling if not

repaired in a timely manner. Other areas may become buried by sand which creates low sections in the fence. Coyotes can take advantage of the gaps and low spots to enter the exclosure, making nests and chicks vulnerable to predation. Additionally, gaps and downed fence can cause trespass issues. In 2023, and in past years, heavy equipment was used to repair and maintain the fence for the nesting season by pushing or pulling sand away from the fence, usually once per week (or more as needed) on the eastern fence line that borders the open riding area to maintain the fence for predator control. Staff also access closed buffer areas to repair fencing by hand and add fence material to close gaps and keep the fence at an optimal height.

During the 2023-24 winter months (October to February), it is recommended to continue to repair damaged fence to prevent public trespass, but it will not be necessary to maintain the fence to the same level as during the breeding season since it will not be intended for predator protection. The western fence will be removed during the winter to avoid damage by winter storms and high surf events. Although the predator fencing is effective for the nesting season, it requires almost daily maintenance, multiple hours of staff time, and is not intended to be used as a permanent fence. Prior to the 2023 season, taller and more sturdy posts were used for approximately one mile of the fencing for Boneyard exclosure and the southern portion of 8 exclosure as an experiment and we are evaluating the durability and longevity of this new fence. For 2024, if the Southern Exclosure and North Oso Flaco is expected to remain in place year-round, it is recommended that additional fencing options be explored, with the goal of finding materials that can last more than a single season, in order to maintain the integrity of the predator exclosure fencing. Incorporating new fence materials into the management program at ODSVRA, determined in consultation with USFWS and CDFW, will depend on year-round closure plans, available materials, and staff time.

Prior to the 2024 nesting season, it is recommended to replace the western exclosure predator fencing and repair the fence using heavy equipment and hand crews, to remove any gaps or low spots that may have developed over the winter. Throughout the 2024 nesting season, it is also recommended to maintain the predator fence and continue to allow staff and heavy equipment access to the fence for repairs within closed buffer areas if necessary. The heavy equipment is necessary to cover gaps or pull sand away from heavily buried areas, usually on a weekly basis to maintain the fence. Prior to equipment use, staff would scan the area within and outside the exclosure fence line to determine if there is nesting activity near the fence and any sensitive areas would be avoided by the equipment operator.

**Continue to assess habitat in the Southern Exclosure and, as necessary, distribute natural materials and increase efficiency in distributing woodchips with the help of maintenance staff and heavy equipment**

Natural materials such as driftwood, woodchips, and wrack (surf-cast kelp) have been distributed since 2002 within the Southern Exclosure (including the shoreline) to enhance habitat features to benefit nests and chicks. Tern shelters have not been used since 2014 because the natural habitat enhancement material, such as driftwood, are preferred as a source of cover for chicks. In 2023, woodchips and wrack were not distributed because the exclosure had sufficient materials remaining from previous years. Driftwood was collected on the shoreline at the end of the season, since it would have otherwise washed out during winter high tide and storm events, but was left in other upland areas of the Southern Exclosure. Driftwood was redistributed in bare areas of the Southern Exclosure shoreline and, in lesser amounts on the Foredune closure shoreline, at the beginning of the 2023 nesting season. Driftwood and wrack is gathered into trucks or trailers and unloaded into the Southern Exclosure by hand. From 2008 to 2022, woodchips were loaded into dump trucks, truck beds, or trailers using ODSVRA heavy equipment operators and distributed by hand into the Southern Exclosure.

In 2024, it is recommended to assess the habitat and substrate present in the Southern Exclosure and Foredune closure shoreline prior to the nesting season and, if determined necessary, distribute driftwood, woodchips, and wrack to bare areas. It is also recommended to continue using available heavy equipment and dump trucks for woodchip dispersal. The equipment increases staff efficiency, allows larger amounts

of woodchips to be dispersed, and a broader distribution of material to provide shelter from wind and cover from predators. The use of heavy equipment needs to be balanced with other operational needs in the park.

**Continue to monitor wrack levels on the Southern Exclosure shoreline and, if necessary, implement distribution of wrack and inoculate with wrack-associated invertebrates (these invertebrates are an important part of the prey base for snowy plover chicks, juveniles, and adults)**

A five-year study (2007-11) by Drs. Jenifer Dugan and Mark Page, researchers from the Marine Science Institute at the University of California Santa Barbara (UCSB), examined the responses of invertebrate numbers and diversity in areas where wrack was added to the Southern Exclosure shoreline throughout the breeding season. The unpublished results indicated that, prior to 2021, when the exclosure was seasonally closed only for the breeding season (March-September), there was not a sufficient period of time for invertebrates to effectively and naturally recover species diversity and abundance on the Southern Exclosure shoreline following five months of recreational use. In 2012-22, park staff inoculated wrack added to the Southern Exclosure shoreline with invertebrates, but this was not done in 2023 because the year-round closure allowed for sufficient natural wrack to accumulate. Staff continued the UCSB method of invertebrate surveys used since 2012 (see paragraph titled Wrack and talitrids in the Management Actions section on page 18 for more detail) and recommend continuing these surveys in 2024. The surveys would help to document trends over time and determine if the invertebrate population is recovering on the Foredune closure and Southern Exclosure shorelines to assist management decisions for the future. Wrack addition and inoculation using UCSB methods may occur on the shoreline in 2024 if abundance of talitrids or wrack amounts appears low, depending on available materials, accessibility of beach areas, equipment, and staff time.

**Experiment with vegetation and topography management in the Southern Exclosure to improve nesting habitat**

Over the last several years, areas developed dense vegetation within 6, 7, and 8 exclosures, resulting in increasingly tall vegetated hummocks and severe topography. This is especially evident in 8 exclosure. Concurrently, nesting by terns and plovers in these areas shows a marked decrease. Although nests in dense vegetation are more difficult to locate, the lower nest numbers are likely due to the combination of substrate and viewshed not being appropriate for nesting, the large dune hummocks attracting avian predators as perch locations, and the amount of area closed for nest buffers or revegetation elsewhere in the park has increased over time in areas with better quality nesting habitat.

Least terns and snowy plovers typically select open habitats with low dunes and limited vegetation cover (less than 10%), to allow the birds to have a larger viewshed for earlier detection of predators (Swaisgood et al. 2018) (Muir and Colwell 2010) (Page et al. 1995). Approximately 25% of the acreage in 6, 7, and 8 exclosures (roughly 40 acres mostly on the west side) has become less productive for tern and plover, with nest numbers in this area having 16.5% of the total nests during the 2016-20 period compared to only 5.8% since the year-round closure from 2021-23. There were a total of 53 tern and plover nests in an approximate 20 acre area on the west side of 8 exclosure where topography is highest from 2016-20, and only 3 nests from 2021-23 in the same area. Since 2021, possibly in response to increased vegetation and topography on the west side of the Southern Exclosure, there has been a substantial increase of nesting closer to the east fence of the exclosure, placing more nests closer to recreational activities and requiring additional buffer fencing to protect these nests (see maps showing topography and nest abundance changes in Figures C.12 to C.14 in Appendix C).

The foredune plants that have persisted in the exclosure include mainly sea rocket (*Cakile maritima*), beach bur (*Ambrosia chamissonis*), and Coastal sand verbena (*Abronia latifolia*). It is recommended to design an experimental habitat manipulation plan in 2024 to improve nesting habitat to be distributed for review and approval by outside agencies. The plan would focus on removal during the nonbreeding season of the nonnative sea rocket and larger dune hummocks in heavily vegetated areas where nesting has reduced in

the Southern Exclosure. The intent of the vegetation removal would be to mimic the natural action of creek and river mouths, which can clear out acres of vegetation in one storm event to create "blow-out" areas within the foredune habitat, extremes for which foredune habitats are adapted. Vegetation at the very western edge of the exclosure would be avoided since these hummocks are beneficial to plover broods as a place to take cover from predators and shelter from wind. Only large hummocks would be targeted, small hummocks left in place, with a goal of creating a mosaic of plants and open sand areas attractive to snowy plovers for nesting. Prior to any habitat manipulation, trained park staff would verify sensitive listed plant species and small mammal burrows are absent. A trained monitor would also be present during mechanical removal to ensure all wildlife remains safe and any sensitive plants are avoided. Changes in tern and plover nesting numbers and nest fates in the experimental vegetation removal areas would be documented and evaluated as part of the plan.

**Continue to evaluate physical features of the nesting and chick-rearing habitat in the Southern Exclosure using drone/Uncrewed Aircraft Systems (UAS) equipment during the nonbreeding season**
Beginning in 2018, and each year afterward, drone equipment was used to photograph the Southern Exclosure habitat using protocols created in consultation with USFWS or CDFW. Flights were performed prior to any nests being established or after nests hatched and chicks fledged from the flight area. All areas with drone flights were continuously monitored for snowy plovers and their behavior. Snowy plovers generally showed no signs of disturbance. The information collected during flights recorded placement of enhancement materials distributed by staff and can be used to assess nesting habitat. It is recommended for 2024 to continue scheduling drone flights in February, prior to the initiation of nests, and flights at the end of September or early October, after all plover chicks have fledged and are flight-capable.

**Continue to use the trash dumpster design at marker post 2 that has been used since the fall 2020**
The predator management strategy at ODSVRA includes methods to discourage attracting predators to the site, including to the trash dumpsters at marker post 2. In the past, experiments with trash dumpster covers of different configurations presented logistical and operational challenges and were discontinued. ODSVRA worked with the local trash company and they provided a new trash cover design that was installed on the beach near marker post 2 beginning in the fall of 2020. Prior to this, four to six large trash dumpsters (22 feet long, eight feet wide, and four feet high with 20 cubic yards capacity and open on top) were used and attracted a large number of gulls landing on and foraging in the dumpsters. The new dumpster design has the same dimensions, but with a closed top and a side door that is left open. This design meets the park requirements and may have helped lower the number of gulls attracted to our park. Reduction in gull numbers at the park may also be partly a result of lower camper and visitor numbers since 2020 and less waste produced. The maximum number of gulls present at one time at the dumpster area during 2021-23 nesting seasons ranged from 59-170. This is much lower than the max of 297 and 445 recorded in 2019 and 2018, respectively, years when the park was at full capacity and dumpsters uncovered on the top were used. It is recommended for 2024 to continue using the newer design of covered trash dumpsters in the marker post 2 area, as it is effective in lowering the number of gulls attracted to the area. Gull surveys are not recommended to continue, as there is ample data previously collected, but the twice per week surveys may recommence using previous methods if there are changes in the dumpster design used at marker post 2 (see Monitoring and Management section for survey details).

**Ongoing management actions that will continue in 2024**
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, symbolic rope, and signs, as practiced since 2006 (Site Description).
- A thermal scope (Trijicon REAP-IR) acquired in 2019, will continue to be used for monitoring the least tern night roost and additional equipment options will continue to be explored.
- Continue monitoring least tern juveniles and the night roost. Continue monitoring foraging activity at nearby freshwater lakes if time allows.
- Continue use of motion detection cameras for nest monitoring and train and permit additional monitoring staff as needed.
- Continue to use an anemometer with data logger from a wind monitoring tower to record daily wind speeds and direction.
- Continue option to use least tern chick fencing on the east side of the exclosure if a method to maintain the tern chick fencing is found.
- Predator monitoring and management actions that have been in place since 2002 will continue.
- The Foredune closure, Southern Exclosure, and North Oso Flaco shoreline will continue to be protected during the breeding season; this includes maintaining the posts and rope at marker post 4.5 and Oso Flaco boardwalk intertidal zones to minimize trespass. The Southern Exclosure and North Oso Flaco are closed year-round (since October 2021), and the shoreline of the Foredune closure is open 1 October to 29 February.
- Continue use of circular exclosures with net tops and mini-exclosures as needed to protect nests from mammalian and avian predators. These small exclosures are not without risks to incubating adults and will continue to be closely monitored and evaluated for their use.
- Surveys for plovers will continue during the nonbreeding season. These weekly surveys have been conducted since the winter of 2009-10.
- Continue to maintain option to salvage and rescue eggs, chicks, juveniles, and adults under very limited circumstances.
- Continue to document impacts and, when possible, reduce disturbance caused by low-flying aircraft over the Southern Exclosure and Oso Flaco.
- Continue to work to address water quality issues at Oso Flaco Lake.
- Continue to work on outreach methods and informational signage at ODSVRA to increase public awareness of threats to nesting and roosting terns and plovers.
- Efforts to hire and retain skilled monitors throughout the year will continue at ODSVRA.

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# APPENDICES

## APPENDIX A. CALIFORNIA LEAST TERN NESTS AT ODSVRA IN 2023.

Least tern chicks were banded with red over aqua vinyl tape on a size 1A numbered aluminum federal band on the left leg and a size 1A blank aluminum band on the right. Color tape was placed on the right band to create combinations unique to individual. Chicks were weighed immediately prior to banding, typically at two to five days old. Twenty-eight chicks from nineteen hatching nests were not banded. A minimum of five unbanded young fledglings were confirmed. Evidence supports these five unbanded fledglings originated at ODSVRA. Information on adult pair is provided where known. Sex of adults is typically not known.

All nests were protected within the Southern Exclosure with Exclosure predator fencing and bumpout fencing (see Management Actions for descriptions of fencing and see maps in Appendix C).

In reading the codes of color-banded birds the left leg is shown first and separated by a colon from the right leg. If two bands are on a single leg the upper band is shown first. If two or three colors are on a single band, the colors are separated by a slash. Colors for letter codes: a = aqua (light blue), b = dark blue, g = dark green, l = lime (light green), k = black, n = brown, o = orange, p = pink, r = red, s = silver (bare metal federal band), v = violet, w= white, y = yellow.

Location: 6 = 6 exclosure, 7 = 7 exclosure

na = estimated date not available due to insufficient information, U = unbanded, unk = unknown, ? = unconfirmed band combinations or colors

| Nest | Location | Adult pair | Est. initiation date (on or prior) | Nest fate | Fate date | No. eggs | No. chicks (no. fledged) | Chick band combination and weight (grams) | Confirmed fledged | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | banded<br>unk | 29 May | Hatch | 19 Jun | 2 | 2 (2) | r/a:b (9.7)<br>r/a:g (12.8) | r/a:b<br>r/a:g | |
| 2 | 7 | U<br>unk | (29 May) | Abandoned post-term | 8 Jul | 2 | 0 (0) | | | Nest was incubated for a minimum of 40 days from 29 May to 7 July. On 3 July, 1 egg missing, unknown if pre- or post-term, and second egg missing post-term on 18 August. On 3 July, 1 abandoned chick from the LT36 nest was placed in the LT2 nest (see section titled Collection and transfer of abandoned least tern chick to a nest with nonviable eggs on page 28 for more detail). |
| 3 | 6 | U<br>unk | 30 May | Hatch | 23 Jun | 3 | 3 (unk) | U<br>U<br>U | | Three unbanded chicks last seen on 24 June at 0 and 1 day old, and 2 unbanded chicks last seen 7 July at 13 or 14 days old. |
| 4 | 6 | U<br>unk | 28 May | Hatch | 18 Jun | 2 | 2 (≥1) | r/a:y (11.3)<br>U | r/a:y | Unbanded chick last seen on 5 July at 16 days old with r/a:y sibling. |
| 5 | 6 | U<br>unk | 1 Jun | Hatch | 23 Jun | 2 | 2 (1) | r/a:p (10.9)<br>r/a:v (11.8) | r/a:v | Chick banded r/a:p last seen on 4 July at 11 days old. |
| 6 | 6 | U<br>unk | 27 May | Hatch | 17 Jun | 2 | 2 (unk) | U<br>U (dead) | | On 22 June, an unbanded chick suspected to be LB6 based on timing and location was found dead in 6 exclosure (see table H.3 in Appendix H). Both unbanded chicks last seen together on 21 June at 3 and 4 days old. |
| 7 | 7 | U<br>unk | 3 Jun | Hatch | 25 Jun | 2 | 2 (2) | r/a:a/r (9.3)<br>r/a:g/r (6.9) | r/a:a/r<br>r/a:g/r | |
| 8 | 7 | U<br>U | 3 Jun | Hatch | 25 Jun | 2 | 2 (unk) | r/a:o (5.8)<br>U | | Both chicks last seen on 13 July at 17 and 18 days old. |
| 9 | 6 | w/b:w<br>b/w:o/y | 2 Jun | Hatch | 24 Jun | 2 | 2 (2) | r/a:r/g (22.8)<br>r/a:w/r (26.5) | r/a:r/g<br>r/a:w/r | |

**Appendix A. California least tern nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date (on or prior) | Nest fate | Fate date | No. eggs | No. chicks (no. fledged) | Chick band combination and weight (grams) | Confirmed fledged | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 7 | U<br>y/g:b/w | 2 Jun | Hatch | 23 Jun | 2 | 2 (2) | r/a:r/y (10.3)<br>r/a:y/r (9.5) | r/a:r/y<br>r/a:y/r | |
| 11 | 7 | U<br>w:(b)? | 3 Jun | Hatch | 27 Jun | 2 | 1 (0) | U (not banded due to existing injury) | | One egg abandoned post-term. No sign of fertilization when egg contents examined post season. On 30 June, unbanded chick near nest site with wound on back (see Table H.1 in Appendix H). Chick was last seen on 1 July at 4 days old. |
| 12 | 7 | U<br>b/a:g/y | 30 May | Hatch | 20 Jun | 2 | 2 (1) | r/a:a (7.0)<br>U (dead) | r/a:a | On 23 June, unbanded chick found dead at nest site (see table H.3 in Appendix H). |
| 13 | 7 | ?:w<br>unk | 2 Jun | Hatch | 23 Jun | 2 | 2 (2) | r/a:l (10.7)<br>r/a:k (12.3) | r/a:l<br>r/a:k | |
| 14 | 6 | (b or r)?:y/g<br>banded | 5 Jun | Hatch | 27 Jun | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen on 6 July at 9 days old, and 1 unbanded chick last seen on 16 July at 19 days old. |
| 15 | 6 | U<br>unk | 3 Jun | Hatch | 25 Jun | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen on 7 July at 11 and 12 days old. |
| 16 | 6 | U<br>(b or r)?:y/g | 4 Jun | Hatch | 26 Jun | 2 | 2 (1) | r/a:r/w (14.0)<br>r/a:a/w (14.3) | r/a:r/w | Chick banded r/a:a/w last seen on 2 July at 6 days old. |
| 17 | 6 | U<br>banded | 3 Jun | Hatch | 24 Jun | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen on date of hatch, and 1 unbanded chick last seen on 26 June at 2 days old. |
| 18 | 7 | U<br>unk | 6 Jun | Hatch | 30 Jun | 2 | 1 (unk) | U | | One egg with unknown fate. Unbanded chick last seen on 16 July at 16 days old. |
| 19 | 6 | o/w:o/y<br>unk | 4 Jun | Hatch | 25 Jun | 2 | 2 (2) | r/a:o/b (23.3)<br>r/a:a/o (16.8) | r/a:o/b<br>r/a:a/o | On 28 July, the 33-day-old r/a:a/o fledgling depredated by peregrine in 6 exclosure (see Table H.3 in Appendix H). |
| 20 | 6 | U<br>(r/w:o/y)? | 6 Jun | Hatch | 28 Jun | 2 | 2 (≥1) | r/a:o/g (21.5)<br>U | r/a:o/g | Unbanded chick last seen 16 July at 18 days old. |
| 21 | 6 | U<br>b/w:b/y | 5 Jun | Hatch | 29 Jun | 2 | 1 (unk) | U | | One egg with unknown fate. Unbanded chick last seen on 16 July at 17 days old. |
| 22 | 6 | U<br>unk | 6 Jun | Hatch | 29 Jun | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen together on 3 July at 4 days old, and 1 unbanded chick last seen on 5 July at 6 days old. |
| 23 | 6 | U<br>g/y:w/a | 7 Jun | Hatch | 28 Jun | 2 | 1 (1) | r/a:b/y (21.3) | r/a:b/y | One egg abandoned post term. Egg had a late stage embryo when contents examined post season. |
| 24 | 6 | U<br>unk | 31 May | Hatch | 21 Jun | 2 | 2 (2) | r/a:w (10.3)<br>r/a:r (10.9) | r/a:w<br>r/a:r | |
| 25 | 7 | U<br>y/w:y/g | 7 Jun | Hatch | 1 Jul | 2 | 1 (0) | r/a:b/a (11.1) | | One egg abandoned post-term. No sign of fertilization when egg contents examined post season. Chick banded r/a:b/a last seen on 16 July at 15 days old. |
| 26 | 6 | U<br>g/y:g | 7 Jun | Hatch | 28 Jun | 1 | 1 (1) | r/a:g/w (30.0) | r/a:g/w | |

**Appendix A. California least tern nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date (on or prior) | Nest fate | Fate date | No. eggs | No. chicks (no. fledged) | Chick band combination and weight (grams) | Confirmed fledged | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 6 | s:b<br>banded | 6 Jun | Hatch | 27 Jun | 1 | 1 (0) | r/a:w/g (31.2) | | Chick banded r/a:w/g last seen on 7 July at 10 days old. |
| 28 | 7 | U<br>w/o:r | 8 Jun | Hatch | 30 Jun | 2 | 2 (1) | r/a:o/y (14.3)<br>r/a:b/o (9.6) | r/a:o/y | On 21 July, the 22-day-old r/a:o/y fledgling confirmed depredated by peregrine in 7 exclosure (see table H.3 in Appendix H). |
| 29 | 7 | unk<br>unk | (7 Jun) | Unknown | na | 2 | 0 (0) | | | Nest was incubated for a minimum of 19 days from 7-25 June. Two eggs with unknown fate. |
| 30 | 6 | U<br>unk | 2 Jun | Hatch | 23 Jun | 2 | 2 (2) | r/a:n (13.8)<br>r/a:b/r (15.8) | r/a:n<br>r/a:b/r | |
| 31 | 6 | unk<br>unk | 7 Jun | Hatch | 28 Jun | 2 | 2 (unk) | r/a:g/o (29.2)<br>U | | Both chicks last seen on 7 July at 8 and 9 days old. |
| 32 | 6 | unk<br>unk | 7 Jun | Hatch | 28 Jun | 1 | 1 (unk) | U | | Unbanded chick last seen on 3 July at 5 days old. |
| 33 | 6 | g/y:y<br>unk | 9 Jun | Hatch | 2 Jul | 2 | 2 (unk) | r/a:w/a (12.0)<br>U | | Unbanded chick last seen on 12 July at 10 days old, and chick banded r/a:w/a last seen on 18 July at 15 days old. |
| 34 | 6 | b/o:-<br>unk | 8 Jun | Hatch | 29 Jun | 2 | 2 (2) | r/a:r/b (12.4)<br>r/a:o/a (11.1) | r/a:r/b<br>r/a:o/a | |
| 35 | 6 | o/w:w/o<br>banded | 9 Jun | Hatch | 1 Jul | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen 21 July at 20 days old. |
| 36 | 6 | U<br>unk | 12 Jun | Hatch | 3 Jul | 1 | 1 (1) | r/a:r/a (27.5) | r/a:r/a | Nest was incubated for 22 days from 12 June to 3 July. On 3 July, 1 chick from LT36 was observed on date of hatch for extended period of time without attending adult. The abandoned chick was placed in LT2 nest (see section titled Collection and transfer of abandoned least tern chick to a nest with nonviable eggs on page 28 for more detail). |
| 37 | 6 | unk<br>unk | 4 Jun | Hatch | 25 Jun | 2 | 2 (unk) | U<br>U | | Both unbanded chicks last seen on 15 July at 20 days old. |
| 38 | 6 | U<br>unk | 9 Jun | Hatch | 30 Jun | 2 | 2 (2) | r/a:r/o (12.5)<br>r/a:o/r (17.4) | r/a:r/o<br>r/a:o/r | |
| 39 | 6 | unk<br>unk | (13 Jun) | Unknown | 28 Jun | 2 | 0 (0) | | | Nest was incubated for a minimum of 15 days from 13-27 June. Two eggs with unknown fate. |
| 40 | 6 | U<br>w/o:g/w | 16 Jun | Hatch | 7 Jul | 2 | 2 (≥1) | U<br>r/a:y/b (7.3) | r/a:y/b | Unbanded chick last seen on 16 July at 9 days old. |
| 41 | 6 | U<br>U | (20 Jun) | Abandoned, unknown if pre- or post-term | 5 Jul | 2 | 0 (0) | | | Nest was incubated for a 15-day period from 20 June to 4 July. Both eggs had a late stage embryo when contents examined post season. |
| 42 | 6 | U<br>unk | (28 Jun) | Abandoned, unknown if pre- or post-term | 10 Jul | 1 | 0 (0) | | | Nest was incubated for 12-day period from 28 June to 9 July. One egg had an early stage embryo when contents examined post season. |

## APPENDIX B. SNOWY PLOVER NESTS AT ODSVRA IN 2023.

Split hatch noted for nests when hatching of all chicks in the brood may have occurred over more than one day. Plover chicks were banded to brood. The majority of unbanded chicks were not banded to avoid disturbing nearby young snowy plover broods. Adopted chicks that fledge are counted as fledged under their nest of origin entry. See Appendix A for description of reading bands and color letter codes.

Location: 6 = 6 exclosure, 7 = 7 exclosure, 8 = 8 exclosure, BY = Boneyard exclosure, NOF = North Oso Flaco, SOF = South Oso Flaco, Foredune = Foredune closure, CBA = closed buffer area, ORA = open riding area, Reveg. area = revegetation area (specific location in notes column).

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

Nest protection type: see Management Actions for description of Exclosure predator fencing, circular, nonpredator fencing, symbolic fence, and bumpout.

Exclosure = Exclosure predator fencing

? = unconfirmed band combinations or colors, ≥ = minimum of one or two eggs in nest and unable to confirm final egg number

na = estimated date not available due to insufficient information

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Foredune | F=ga:wy M=U | 16 Mar | Depredated, northern harrier | 28 Mar | 3 | 0 (0) | | Bumpout, Nonpredator fence | |
| 2 | 6 | F=U M=U | 20 Mar | Depredated, northern harrier | 7 Apr | 3 | 0 (0) | | Exclosure | |
| 3 | 7 | F=U M=banded | 15 Mar | Depredated, raven | 14 Apr | 2 | 0 (0) | | Exclosure | |
| 4 | 6 | F=bb:wv M=U | 23 Mar | Depredated, raven | 14 Apr | 3 | 0 (0) | | Exclosure | |
| 5 | Foredune | F=rr:bb M=U | 3 Apr | Wind | 13 Apr | 3 | 0 (0) | | Nonpredator fence | |
| 6 | ORA | F=ga:wy M=U | 5 Apr | Depredated, crow | 5 May | 3 | 0 (0) | | Nonpredator fence, Symbolic fence | Nest established near marker post 4. |
| 7 | 8 | F= M= | na | Abandoned pre-term | 9 Apr | 1 | 0 (0) | | Symbolic fence | On 5 April, nest found as 1 egg in location that would unlikely have been undetected previously. Nest never observed attended but had plover tracks at nest until 8 April. |
| 8 | ORA | F=U M=U | 8 Apr | Depredated, crow | 4 May | 3 | 0 (0) | | Nonpredator fence, Symbolic fence | Nest established near marker post 4. |
| 9 | Foredune | F= M= | na | Abandoned pre-term | 10 Apr | 1 | 0 (0) | | Bumpout, Nonpredator fence | On 10 April, 1 egg found at nest. No sign of fertilization in egg when contents examined post season. |
| 10 | Foredune | F=U M=ga:bg | 8 Apr | Hatch (Split) | 10 May | 3 | 3 (0) | 3 gg:ro | Nonpredator fence | On 5 June, 1 chick likely depredated by kestrel from Foredune North shoreline (see Table H.5 in Appendix H). |
| 11 | 7 | F= M= | 3 Apr | Depredated, avian | 19 Apr | 2 | 0 (0) | | Exclosure | Nest considered depredated by avian predator with raven or harrier suspected. |
| 12 | Foredune | F=U M=banded | 2 Apr | Depredated, raven | 17 Apr | 3 | 0 (0) | | Symbolic fence | |
| 13 | 8 | F= M= | 2 Apr | Depredated, raven | 14 Apr | 3 | 0 (0) | | Exclosure | |
| 14 | 7 | F= M= | na | Depredated, avian | 15 Apr | ≥1 | 0 (0) | | Symbolic fence | Nest considered depredated by avian predator with raven or harrier suspected. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 8 | F=<br>M= | 11 Apr | Depredated, raven | 16 Apr | 3 | 0 (0) | | Exclosure | |
| 16 | 8 | F=<br>M= | na | Depredated | 17 Apr | ≥1 | 0 (0) | | Exclosure | On 15 April, nest found at 1 egg. On 17 April, no eggs at nest and eggshell fragments nearby. Lost during period of nest loss to raven and harrier. |
| 17 | ORA | F=U<br>M=ga:ba | 14 Apr | Depredated, raven | 5 May | 3 | 0 (0) | | Bumpout, Symbolic fence | Nest established in Foredune closure alleyway. |
| 18 | ORA | F=rr:pw<br>M=pg:by | 18 Apr | Hatch | 23 May | 3 | 2 (0) | 2 ga:pg | Mini-exclosure, Nonpredator fence, Symbolic fence | Nest established east of 7 exclosure. On 24 May, 1 egg found 100 feet away from nest area with 2 large holes on either end, and a dead approximately 3-week-old dried embryo when contents examined. On 22 May, brood moves from nest through closed buffer area into 7 exclosure. |
| 19 | Euc Tree | F=<br>M= | 17 Apr | Depredated, raven | 27 Apr | 3 | 0 (0) | | Bumpout | |
| 20 | 6 | F=U<br>M= | 3 Apr | Depredated, avian | 24 Apr | 3 | 0 (0) | | Exclosure | Nest considered depredated by avian predator with raven or harrier suspected. |
| 21 | 7 | F=bb:ar<br>M= | 22 Mar | Unknown | 25 Apr | 3 | 0 (0) | | Exclosure | On 21 April, 3 eggs at nest, 1 egg had faint cracks, 1 egg had faint cracks and tapping, and 1 egg had no cracks or sounds. Nest last seen incubated on 24 April. On 25 April, no eggs at nest with plover tracks present. Nest fate occurred during period of nest loss to raven and harrier. |
| 22 | Foredune | F=<br>M= | 16 Apr | Depredated, northern harrier | 29 Apr | 2 | 0 (0) | | Nonpredator fence | |
| 23 | ORA | F=U<br>M= | 22 Apr | Depredated, raven | 14 May | 3 | 0 (0) | | Nonpredator fence, Symbolic fence | Nest established east of northern 8 exclosure. |
| 24 | Foredune | F=<br>M=gg:gg | 23 Apr | Failed, unknown cause | 2 May | 3 | 0 (0) | | Bumpout, Nonpredator fence | Lost during period of nest loss to raven. |
| 25 | Foredune | F=ny:gv<br>M=U | 13 Apr | Hatch | 15 May | 3 | 2 (2) | 2 ga:po | Nonpredator fence | One egg (without cracks) abandoned post-term. |
| 26 | Foredune | F=U<br>M= | 7 Apr | Depredated, northern harrier | 27 Apr | 3 | 0 (0) | | Nonpredator fence | |
| 27 | Foredune | F=U<br>M= | 13 Apr | Depredated, northern harrier | 28 Apr | 3 | 0 (0) | | Nonpredator fence | |
| 28 | ORA | F=U<br>M=ga:vb | 17 Apr | Depredated, northern harrier | 28 Apr | 3 | 0 (0) | | Nonpredator fence | Nest established east of 7 exclosure. |
| 29 | 8 | F=U<br>M= | 23 Apr | Depredated, raven | 30 Apr | 3 | 0 (0) | | Exclosure | On 29 April, camera confirms raven eating 1 egg, then returned and ate remaining 2 eggs on 30 April. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 7 | F=U<br>M= | 14 Apr | Depredated, raven | 7 May | 3 | 0 (0) | | Symbolic fence | |
| 31 | 6 | F=U<br>M= | 14 Apr | Depredated, avian | 28 Apr | 3 | 0 (0) | | Symbolic fence | Nest considered depredated by avian predator with harrier suspected. |
| 32 | NOF | F=<br>M= | na | Depredated | 2 May | ≥1 | 0 (0) | | Symbolic fence | On 30 April, 1 egg present and nest seen incubated. On 2 May, no eggs at nest. Lost during period of nest loss to raven. |
| 33 | Foredune | F=U<br>M=U | 25 Apr | Hatch (Split) | 27 May | 3 | 2 (2) | 2 pg:oo | Nonpredator fence | One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 34 | 7 | F=U<br>M= | 17 Apr | Depredated, northern harrier | 29 Apr | 3 | 0 (0) | | Symbolic fence | |
| 35 | Foredune | F=<br>M= | 14 Apr | Depredated | (2 May) | 2 | 0 (0) | | Nonpredator fence | On 26 April, nest found at 2 eggs and were still present until 1 May. On 4 May, no eggs at nest. Lost during period of nest loss to raven. |
| 36 | Foredune | F=<br>M= | 12 Apr | Depredated, avian | 5 May | 3 | 0 (0) | | Nonpredator fence | Nest considered depredated by avian predator with raven suspected. |
| 37 | Euc Tree | F=<br>M= | 25 Apr | Depredated, avian | 27 Apr | ≥2 | 0 (0) | | Bumpout | Nest considered depredated by avian predator with harrier suspected. |
| 38 | BY | F=<br>M=U | 18 Apr | Hatch | 20 May | 3 | 2 (2) | 2 unbanded | Exclosure | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 39 | Foredune | F=bb:go<br>M= | 26 Apr | Hatch | 28 May | 3 | 3 (2) | 3 gg:ry | Bumpout, Symbolic fence, Nonpredator fence | |
| 40 | ORA | F=U<br>M=pg:by | 22 Apr | Hatch (Split) | 24 May | 3 | 2 (1) | 2 gg:yy | Circular, Nonpredator fence, Symbolic fence | Nest established east of northern 8 exclosure. One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. On 25 May, brood moves from nest through closed buffer area into 8 exclosure. |
| 41 | Foredune | F=<br>M= | 26 Apr | Depredated, raven | 1 May | ≥2 | 0 (0) | | Bumpout, Nonpredator fence | |
| 42 | 6 | F=U<br>M=U | 19 Apr | Hatch | 21 May | 2 | 1 (0) | 1 rr:ow | Symbolic fence | One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. On 2 June, 1 chick likely depredated by kestrel from 6 shoreline (see Table H.5 in Appendix H). |
| 43 | 7 | F=<br>M= | 26 Apr | Depredated, northern harrier | 29 Apr | ≥2 | 0 (0) | | Symbolic fence | |
| 44 | 6 | F=<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Exclosure | From 27-28 April, 1 egg present at nest. Sometime between 29 April and 3 May, 1 egg no longer present. Egg loss occurred during period of nest loss to raven and harrier. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 6 | F=<br>M=U | 24 Apr | Depredated | 2 May | 3 | 0 (0) | | Bumpout, Exclosure | On 28 April, 3 eggs present and nest last seen incubated on 1 May. On 3 May, no eggs at nest. Lost during period of nest loss to raven. |
| 46 | 6 | F=U<br>M=banded | 27 Apr | Depredated, avian | 11 May | 2 | 0 (0) | | Exclosure | Nest considered depredated by avian predator with raven suspected. |
| 47 | 7 | F=<br>M= | 27 Apr | Depredated | 2 May | ≥2 | 0 (0) | | Exclosure | On 29 April, 2 eggs present and nest last seen incubated on 1 May. On 2 May, no eggs at nest. Lost during period of nest loss to raven. |
| 48 | Foredune | F=<br>M= | na | Depredated, northern harrier | 29 Apr | ≥2 | 0 (0) | | Nonpredator fence | On 29 April, evidence of nest found after observation of harrier depredating nest. |
| 49 | Foredune | F=<br>M= | na | Depredated, northern harrier | 29 Apr | ≥2 | 0 (0) | | Nonpredator fence | On 29 April, evidence of nest found after observation of harrier depredating nest. |
| 50 | Euc North | F=U<br>M= | 22 Apr | Depredated, raven | 19 May | 3 | 0 (0) | | Bumpout, Symbolic fence | |
| 51 | 7 | F=<br>M=(pg:yr)? | 22 Apr | Depredated, raven | 8 May | 3 | 0 (0) | | Exclosure | |
| 52 | 6 | F=U<br>M=pg:ba | 28 Apr | Hatch | 2 Jun | 3 | 1 (1) | 1 unbanded | Mini-exclosure, Exclosure | Sometime between 9-22 May, 1 egg missing pre-term. One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 53 | Euc Tree | F=U<br>M=U | 1 May | Hatch (Split) | 6 Jun | 3 | 3 (2) | 3 gg:ab | Bumpout, Mini-exclosure | On 7 June, brood moves from nest through closed buffer area into 7 exclosure. Brood raised on 7 exclosure shoreline. Brood last seen with 3 chicks on 8 June at 1 and 2 days old. |
| 54 | 6 | F=<br>M= | 25 Apr | Abandoned pre-term | 10 May | 3 | 0 (0) | | Exclosure | Two eggs with no sign of fertilization and 1 egg with an approximately 1-week-old embryo when contents examined post season. |
| 55 | 8 | F=U<br>M=vg:wo | 30 Apr | Depredated, raven | 8 May | 3 | 0 (0) | | Exclosure | |
| 56 | Euc Tree | F=<br>M=U | 30 Apr | Depredated, raven | 6 May | 3 | 0 (0) | | Bumpout, Symbolic fence | |
| 57 | 7 | F=<br>M= | 2 May | Depredated, raven | 8 May | ≥2 | 0 (0) | | Exclosure | |
| 58 | Foredune | F=<br>M=vv:ra | 26 Apr | Depredated, avian | 6 May | 3 | 0 (0) | | Nonpredator fence | Nest considered depredated by avian predator with raven suspected. |
| 59 | Foredune | F=n?:y?<br>M=l:y/g | 1 May | Failed, unknown cause | 11 May | 3 | 0 (0) | | Bumpout, Nonpredator fence | On 10 May, 3 eggs present and nest last seen incubated on 11 May. On 11 May, no eggs at nest. Lost during period of nest loss to raven. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 60 | ORA | F=<br>M= | 4 May | Abandoned pre-term | 9 May | 1 | 0 (0) | | Nonpredator fence, Symbolic fence | Nest established east of 7 exclosure. On 9 May, 1 egg becoming partially buried and never seen previously or subsequently attended by adult. Determined abandoned pre-term and taken to Santa Barbara Zoo on 11 May (see Table F.6 in Appendix F). |
| 61 | BY | F=<br>M= | na | Abandoned pre-term | 8 May | 1 | 0 (0) | | Exclosure | No sign of fertilization in egg when contents examined post season. |
| 62 | Foredune | F=ga:py<br>M= | 19 Apr | Failed, eggs removed by staff | 1 Jul | 3 | 0 (0) | | Bumpout, Symbolic fence, Nonpredator fence | Nest was observed incubated for 59 days from 4 May to 1 July. On 1 July 3 eggs removed by staff, in consultation with USFWS, to give adults opportunity to renest. Two eggs with no sign of fertilization and 1 egg with an approximately 3-week-old embryo when contents examined post season. |
| 63 | 6 | F=rr:ao<br>M= | 28 Apr | Depredated, raven | 8 May | 3 | 0 (0) | | Exclosure | |
| 64 | 7 | F=<br>M= | 4 May | Depredated, raven | 22 May | 3 | 0 (0) | | Exclosure | |
| 65 | Euc North | F=ga:bo<br>M=U | 2 May | Hatch | 3 Jun | 3 | 3 (1) | 3 gg:ga | Mini-exclosure, Symbolic fence | On 4 June, brood moves through closed buffer area from nest and into 6 exclosure. Brood raised on 7 exclosure shoreline. Brood last seen with 3 chicks on 7 June at 4 days old. On 8 June, 1 chick likely depredated by kestrel on 7 exclosure shoreline (see Table H.5 in Appendix H). Brood last seen with 2 chicks on 9 June at 6 days old. |
| 66 | 7 | F=U<br>M=U | na | Depredated | 9 May | ≥1 | 0 (0) | | Exclosure | On 8 May, 1 egg present. On 12 May, no eggs at nest and depredated eggshell fragments found 85 feet away. Lost during period of nest loss to raven. |
| 67 | 7 | F=<br>M= | 3 May | Depredated | 8 May | 3 | 0 (0) | | Exclosure | On 7 May, 3 eggs present and nest last seen incubated. On 8 May, no eggs at nest. Lost during period of nest loss to raven. |
| 68 | SOF | F=<br>M= | na | Wind | 8 May | ≥1 | 0 (0) | | Symbolic fence | No sign of fertilization in egg when contents examined post season. |
| 69 | SOF | F=<br>M= | 7 May | Depredated, raven | 16 May | 3 | 0 (0) | | Symbolic fence | |
| 70 | 6 | F=U<br>M= | 5 May | Depredated, raven | 16 May | 3 | 0 (0) | | Exclosure | |
| 71 | 6 | F=U<br>M=U | 8 May | Depredated, raven | 22 May | 3 | 0 (0) | | Exclosure | |
| 72 | 6 | F=U<br>M= | na | Depredated, avian | 14 May | 2 | 0 (0) | | Symbolic fence | Nest considered depredated by avian predator with raven suspected. |
| 73 | 6 | F=U<br>M=U | 10 May | Hatch | 12 Jun | 3 | 3 (2) | 3 unbanded | Circular, Symbolic fence | |
| 74 | NOF | F=ga:ry<br>M= | 8 May | Depredated, raven | 14 May | 3 | 0 (0) | | Symbolic fence | |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 75 | Foredune | F=<br>M=U | 21 Apr | Hatch (Split) | 23 May | 3 | 3 (1) | 3 unbanded | Nonpredator fence | |
| 76 | BY | F=U<br>M=U | 11 May | Hatch | 12 Jun | 3 | 2 (1) | 2 bb:vg | Mini-exclosure, Exclosure | One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 77 | Foredune | F=U<br>M=U | 17 Apr | Hatch | 19 May | 3 | 1 (0) | 1 gg:ar | Nonpredator fence | Two eggs abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 78 | Foredune | F=ga:wy<br>M=U | 12 May | Hatch | 13 Jun | 3 | 1 (1) | 1 bb:pg | Bumpout, Mini-exclosure, Symbolic fence, Nonpredator fence | Two eggs (without cracks) abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 79 | 6 | F=U<br>M=U | 28 Apr | Hatch | 30 May | 2 | 1 (0) | 1 pg:og | Circular, Symbolic fence | One egg abandoned post-term. On 1 June, a 2-day-old chick was taken to the Santa Barbara Zoo for captive-rearing (see Table F.6 in Appendix F). |
| 80 | SOF | F=U<br>M=U | 10 May | Hatch | 11 Jun | 2 | 1 (1) | 1 unbanded | Symbolic fence | On 14 May, symbolic fence moved west to decrease possible pedestrian disturbance. On 16 May, nest found overwashed by tide and both eggs displaced 20-30 feet from original nest bowl, 1 egg was in active bowl and 1 egg appeared unattended. On 18 May, 1 egg moved 4 inches out from under log 10 feet away from nest bowl. On 8 June, 2 eggs approximately 4 feet apart with adult alternating between both eggs to incubate, and eggs repositioned together in nest bowl. One egg abandoned post- term. No sign of fertilization in egg when contents examined post season. |
| 81 | 7 | F=<br>M=r:w/y | 15 May | Depredated, raven | 19 May | 2 | 0 (0) | | Exclosure | |
| 82 | 8 | F=<br>M= | 15 May | Depredated, raven | 20 May | 2 | 0 (0) | | Exclosure | |
| 83 | BY | F=<br>M= | 1 May | Depredated, coyote | 24 May | 3 | 0 (0) | | Exclosure | |
| 84 | Foredune | F=<br>M= | na | Depredated, avian | 22 May | 1 | 0 (0) | | Symbolic fence | Nest considered depredated by avian predator with raven suspected. |
| 85 | Foredune | F=<br>M=pg:br | 16 May | Hatch | 17 Jun | 2 | 1 (1) | 1 unbanded | Circular, Symbolic fence | On 5 June, circular exclosure found overwashed by tide and the two eggs displaced 4 and 8 feet outside of exclosure (and 4 feet apart). One of the eggs is in an active bowl. Second egg is unattended and moved to this bowl. On 7 June, circular repositioned over nest. One egg unknown fate. |
| 86 | Foredune | F=<br>M= | 9 May | Depredated, raven | 23 May | 3 | 0 (0) | | Symbolic fence | |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 87 | Foredune | F=U<br>M=U | 3 May | Hatch | 4 Jun | 2 | 1 (1) | 1 unbanded | Circular, Symbolic fence | One egg unknown fate. |
| 88 | Foredune | F=banded<br>M= | 3 May | Depredated, raven | 25 May | 3 | 0 (0) | | Symbolic fence | |
| 89 | Unknown | F=<br>M=bb:or | na | Hatch | (12 May) | 3 | 3 (2) | 3 unbanded | | On 17 May, found as a brood of 3 unbanded chicks on South Oso Flaco shoreline. |
| 90 | 8 | F=<br>M= | 10 May | Depredated, raven | 18 May | 3 | 0 (0) | | Exclosure | |
| 91 | 6 | F=<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Exclosure | From 17-19 May, 1 egg present at nest. On 22 May, 1 egg found buried at nest bowl, egg marked and reset. No evidence of adult attendance subsequently. No sign of fertilization in egg when contents examined post season. |
| 92 | 7 | F=<br>M= | 17 May | Depredated, raven | 1 Jun | 2 | 0 (0) | | Exclosure | |
| 93 | 8 | F=<br>M= | na | Depredated, raven | 19 May | 1 | 0 (0) | | Symbolic fence | |
| 94 | Foredune | F=U<br>M=U | 7 May | Hatch | 8 Jun | 3 | 1 (0) | 1 unbanded | Circular, Symbolic fence | Two eggs abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 95 | 8 | F=U<br>M= | 17 May | Depredated, raven | 22 May | 3 | 0 (0) | | Exclosure | |
| 96 | Foredune | F=U<br>M=vv:ra | 12 May | Hatch | 13 Jun | 3 | 3 (2) | 3 bb:av | Nonpredator fence | |
| 97 | 7 | F=<br>M= | na | Depredated, raven | 18 May | 2 | 0 (0) | | Symbolic fence | |
| 98 | 6 | F=gg:(oa?)<br>M=rr:ga | 10 May | Hatch | 11 Jun | 3 | 2 (2) | 2 gg:vb | Circular, Symbolic fence | One egg unknown fate. |
| 99 | 6 | F=rr:ao<br>M=bb:pg | 18 May | Hatch (Split) | 20 Jun | 3 | 3 (1) | 3 unbanded | Circular, Symbolic fence | On 8 June, associated female observed depredated by kestrel (see Table H.5 in Appendix H). |
| 100 | 6 | F=<br>M= | na | Depredated, raven | 21 May | ≥2 | 0 (0) | | Symbolic fence | |
| 101 | 7 | F=<br>M= | na | Unknown | 22 May | ≥2 | 0 (0) | | Exclosure | On 19 May, nest found with 2 eggs and was last seen incubated the same day. On 22 May, no eggs at nest. Nest fate occurred during period of nest loss to raven. |
| 102 | 6 | F=U<br>M=U | 18 May | Hatch | 19 Jun | 3 | 3 (3) | 3 pv:ab | Mini-exclosure, Exclosure | On 1 June, female observed with blood on underside of body and spots of dried blood present at nest. On 28 July, juvenile found dead on 6 exclosure shoreline (see Table H.2 and H.6 in Appendix H). |
| 103 | 6 | F=U<br>M=U | 16 May | Hatch | 17 Jun | 3 | 3 (2) | 3 rr:pg | Exclosure | |
| 104 | SOF | F=U?<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Symbolic fence | On 20 May, nest found as 1 egg in active nest bowl in location that would likely have been undetected previously. Nest never observed attended. No sign of fertilization in egg when contents examined post season. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 105 | Foredune | F=U<br>M= | 12 May | Abandoned pre-term | 30 May | 3 | 0 (0) | | Nonpredator fence | On 30 May, 3 eggs determined abandoned pre-term and taken to Santa Barbara Zoo on 3 June (see Table F.6 in Appendix F). |
| 106 | Foredune | F=U<br>M=U | 5 May | Hatch | 6 Jun | 3 | 2 (2) | 2 bb:ay | Bumpout, Mini-exclosure, Symbolic fence, Nonpredator fence | On 29 May, 1 egg missing pre-term. |
| 107 | Foredune | F=U<br>M=rr:ya | 13 May | Hatch | 14 Jun | 3 | 1 (1) | 1 bb:wy | Nonpredator fence | On 11 June, 1 egg missing pre-term. One egg (without cracks) abandoned post-term. |
| 108 | 6 | F=rr:oy<br>M=ga:br | 14 May | Hatch | 15 Jun | 3 | 3 (2) | 2 bb:rg<br>1 unbanded | Mini-exclosure, Exclosure | Two banded chicks fledged. |
| 109 | CBA | F=bb:yy<br>M=pv:gb | 8 May | Hatch | 9 Jun | 3 | 3 (3) | 3 ga:ya | Mini-exclosure, Nonpredator fence | Nest established in Foredune closure alleyway. Brood raised on Foredune closure shoreline. |
| 110 | Unknown | F=U<br>M=nb:rr | na | Hatch | (19 May) | 3 | 3 (1) | 3 bb:wb | | On 21 May, found as brood of 3 unbanded chicks on Foredune closure shoreline. On 30 May and 3 June, 2 chicks likely depredated by kestrel (see Table H.5 in Appendix H). |
| 111 | Foredune | F=U<br>M= | 8 May | Overwash by tide | 5 Jun | 3 | 0 (0) | | Symbolic fence | |
| 112 | 6 | F=<br>M= | 8 May | Depredated, raven | 25 May | 3 | 0 (0) | | Exclosure | On 25 May, 2 eggs depredated by raven and remaining egg not seen incubated subsequently. |
| 113 | 6 | F=<br>M=ga:pv | 6 May | Hatch | 7 Jun | 3 | 2 (2) | 2 bb:aw | Exclosure | One egg (without cracks) abandoned post-term. |
| 114 | Unknown | F=<br>M=U | na | Hatch | (22 May) | 3 | 3 (2) | 3 unbanded | | On 23 May, found as brood of 2 small, unbanded chicks in Foredune closure. Three chicks seen with brood beginning 27 May. |
| 115 | Foredune | F=U<br>M= | 8 May | Depredated, raven | 27 May | 3 | 0 (0) | | Symbolic fence | |
| 116 | 6 | F=U<br>M=ga:wb | 21 May | Hatch (Split) | 22 Jun | 3 | 3 (1) | 3 ga:rw | Exclosure | |
| 117 | 6 | F=<br>M= | na | Depredated, raven | 25 May | 3 | 0 (0) | | Exclosure | |
| 118 | 6 | F=U<br>M=U | 22 May | Hatch (Split) | 23 Jun | 3 | 3 (3) | 2 vg:va<br>1 unbanded | Exclosure | |
| 119 | 7 | F=rr:wo<br>M=U | 24 May | Hatch | 25 Jun | 3 | 3 (2) | 3 unbanded | Exclosure | |
| 120 | 6 | F=U<br>M=w-:s- | 19 May | Hatch (Split) | 20 Jun | 3 | 3 (2) | 2 vg:gw<br>1 unbanded | Mini-exclosure, Exclosure | On 26 May, 1 egg with faint inward dent. One banded and 1 unbanded chick fledged. |
| 121 | Foredune | F=<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Bumpout, Nonpredator fence | On 25 May, nest found as 1 egg in location that would likely have been undetected for a long enough period to hatch. Nest never observed attended. Egg missing on 1 June. |
| 122 | Foredune | F=U<br>M=U | 10 May | Hatch (Split) | 11 Jun | 3 | 3 (3) | 3 gg:bv | Mini-exclosure, Nonpredator fence | |
| 123 | 7 | F=U<br>M=U | 25 May | Overwash by tide | 2 Jun | 2 | 0 (0) | | Symbolic fence | |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 124 | 7 | F=rr:ry<br>M=ga:yo | 16 May | Hatch | 17 Jun | 3 | 2 (2) | 2 vg:bg | Exclosure | One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. Female observed with left leg injury on 18 and 20 June (see Table H.2 in Appendix H). |
| 125 | 6 | F=U<br>M=ga:wr | 20 May | Hatch | 21 Jun | 3 | 2 (0) | 2 unbanded | Mini-exclosure, Exclosure | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 126 | Foredune | F=U<br>M= | 13 May | Hatch | 14 Jun | 3 | 1 (1) | 1 unbanded | Circular, Symbolic fence | Two eggs unknown fate. |
| 127 | BY | F=<br>M= | 19 May | Depredated, raven | 27 May | 2 | 0 (0) | | Exclosure | |
| 128 | BY | F=bb:ww<br>M=U | 15 May | Hatch | 16 Jun | 3 | 3 (3) | 3 bb:gv | Mini-exclosure, Exclosure | On 12 June, Brewer's blackbird lands on the mini-exclosure, banded female flies from nest into side of mini-exclosure, then runs out of exclosure and displays. Blackbird leaves, female returns to nest and is subsequently seen without injury. |
| 129 | 7 | F=banded<br>M=U | 19 May | Hatch (Split) | 20 Jun | 3 | 3 (3) | 3 ga:bv | Mini-exclosure, Exclosure | On 20 June, 2 eggs and 1 chick inside the mini-exclosure were only 6 inches from edge of the exclosure. All moved to center of mini-exclosure. |
| 130 | 6 | F=<br>M=pg:or | 24 May | Hatch | 25 Jun | 3 | 2 (1) | 2 unbanded | Exclosure | One egg unknown fate. |
| 131 | CBA | F=U<br>M=a:g/o/g | 27 May | Hatch | 26 Jun | 2 | 2 (1) | 2 vg:vb | Mini-exclosure, Symbolic fence, Nonpredator fence | Nest established east of 7 exclosure just inside the single next exclosure for inactive SP28 nest. Brood last seen with 2 chicks on day of hatch moving into Eucalyptus Tree revegetation area. Remaining chick raised on 8 exclosure shoreline beginning 28 June. |
| 132 | 8 | F=vg:ra<br>M= | 20 May | Overwash by tide | 5 Jun | 3 | 0 (0) | | Circular, Symbolic fence | |
| 133 | Unknown | F=<br>M=vg:rw | na | Hatch | (26 May) | 3 | 3 (1) | 3 unbanded | | On 28 May, found as brood of 3 unbanded chicks on 8 exclosure shoreline. |
| 134 | Foredune | F=ow:wr<br>M=U | 24 May | Hatch (Split) | 25 Jun | 3 | 3 (0) | 2 bb:vr<br>1 gg:rg | Bumpout, Nonpredator fence | On 29 June, a turkey vulture seen eating a cormorant carcass on Foredune North shoreline and associated adult displays and leads 2 chicks away from area. Vulture flushed and 1 chick found crouched and unattended near carcass. The unattended chick was placed in brooder, warmed, banded gg:rg, and reunited with adult and 2 chicks. |
| 135 | Foredune | F=<br>M=vg:yr | na | Failed, eggs removed by staff | 18 Jul | 3 | 0 (0) | | Nonpredator fence | Nest incubated for 49 days from 30 May to 18 July. On 18 July, 3 eggs collected post-term. No sign of fertilization in all 3 eggs when contents examined post season. |
| 136 | 7 | F=<br>M=pg:ow | 26 May | Hatch | 27 Jun | 3 | 2 (2) | 2 vv:ba | Exclosure | One egg (without cracks) abandoned post-term. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 137 | Euc North | F=U M=U | 19 May | Hatch | 20 Jun | 3 | 3 (1) | 3 vg:ww | Mini-exclosure, Symbolic fence | On 21 June, brood moves through closed buffer area from nest into 6 exclosure. Brood raised on 6 exclosure shoreline beginning 21 June. Brood last seen with 3 chicks on 25 June at 5 days old and with 2 chicks on 26 June at 6 days old. |
| 138 | Foredune | F= M=U | na | Overwash by tide | 5 Jun | 2 | 0 (0) | | Symbolic fence | |
| 139 | 8 | F=U M=rr:aw | 27 May | Hatch | 28 Jun | 3 | 3 (1) | 3 unbanded | Circular, Symbolic fence | On 21 July, a 23-day-old chick from SP139 broods with female incubating at SP206 nest. |
| 140 | SOF | F=gg:ag M=U | 24 May | Overwash by tide | 5 Jun | 3 | 0 (0) | | Symbolic fence | |
| 141 | 7 | F=U M=U | 31 May | Hatch | 2 Jul | 3 | 3 (2) | 3 vv:gb | Exclosure | |
| 142 | 7 | F=U M=banded | 19 May | Hatch (Split) | 20 Jun | 3 | 3 (0) | 3 unbanded | Exclosure | |
| 143 | 7 | F=U M=U | 1 Jun | Hatch | 3 Jul | 3 | 3 (2) | 3 bb:oo | Exclosure | One 2-day-old chick of the SP143 nest adopted by SP242 male beginning 5 July and it fledged. |
| 144 | NOF | F= M=gg:rb | 25 May | Hatch | 26 Jun | 3 | 2 (2) | 2 unbanded | Mini-exclosure, Exclosure | One egg unknown fate. |
| 145 | 6 | F=vv:ar M=U | 22 May | Hatch | 23 Jun | 2 | 1 (0) | 1 unbanded | Exclosure | One egg abandoned post-term. Approximately 3.5-week-old embryo in egg when contents examined post season. |
| 146 | NOF | F=U M=U | 30 May | Hatch (Split) | 1 Jul | 3 | 2 (0) | 2 unbanded | Mini-exclosure, Exclosure | One egg unknown fate. |
| 147 | Foredune | F=U M=pv:pb | 29 May | Hatch (Split) | 30 Jun | 3 | 3 (2) | 3 vv:bb | Nonpredator fence | |
| 148 | 6 | F=U M=U | 30 May | Hatch | 1 Jul | 3 | 2 (1) | 2 unbanded | Exclosure | On 5 June, nest found with 2 eggs at nest and 1 egg 3 feet northwest of nest with inward dent and crack from pointed end to base of egg. Cracked egg last seen near nest 1 July with the 2 hatched chicks and assumed not to have hatched. |
| 149 | Foredune | F=U M=U | 2 Jun | Hatch (Split) | 4 Jul | 3 | 3 (0) | 3 unbanded | Symbolic fence | |
| 150 | SOF | F=U M=pv:vb | 2 Jun | Hatch | 4 Jul | 3 | 2 (2) | 2 unbanded | Circular, Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 151 | Unknown | F= M=U | na | Hatch | (20 May) | ≥2 | 2 (0) | 2 unbanded | | On 25 May, found as brood of 2 unbanded chicks on 8 exclosure shoreline. On 30 May, one chick possibly depredated by kestrel (see Table H.5 in Appendix H). |
| 152 | 6 | F=yp:ga M=U | 2 Jun | Hatch (Split) | 4 Jul | 3 | 3 (3) | 3 ga:go | Exclosure | |
| 153 | 6 | F=U M=bb:bw | 21 May | Hatch | 22 Jun | 3 | 3 (3) | 3 unbanded | Exclosure | |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 154 | Foredune | F=U<br>M= | 18 May | Hatch | 19 Jun | 3 | 1 (0) | 1 unbanded | Nonpredator fence | Two eggs abandoned post-term, only 1 egg present on day collected. No sign of fertilization in egg when contents examined post season. |
| 155 | 6 | F=U<br>M=U | 1 Jun | Hatch | 3 Jul | 3 | 3 (0) | 3 vg:rb | Exclosure | |
| 156 | 7 | F=y:a/r<br>M=U | 23 May | Hatch | 24 Jun | 3 | 3 (1) | 3 unbanded | Exclosure | |
| 157 | 7 | F=U<br>M=U | 6 Jun | Hatch (Split) | 8 Jul | 3 | 3 (0) | 3 unbanded | Exclosure | |
| 158 | 6 | F=U<br>M=pg:ba | 5 Jun | Hatch (Split) | 7 Jul | 3 | 3 (1) | 2 gg:wg<br>1 unbanded | Exclosure | One banded chick fledged. |
| 159 | 6 | F=U<br>M=rr:yo | 3 Jun | Hatch | 5 Jul | 3 | 3 (0) | 3 vg:bb | Exclosure | |
| 160 | 6 | F=bb:bb<br>M=rr:ra | 6 Jun | Hatch (Split) | 9 Jul | 3 | 2 (1) | 2 ga:vv | Exclosure | One egg (without cracks) abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 161 | Foredune | F=U<br>M=pg:yr | 2 Jun | Hatch (Split) | 4 Jul | 3 | 3 (3) | 3 unbanded | Symbolic fence | |
| 162 | 6 | F=U<br>M= | 12 Jun | Hatch (Split) | 24 Jul | 3 | 2 (1) | 2 pg:bw | Exclosure | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 163 | 6 | F=vv:rv<br>M=n-:oy | 8 Jun | Hatch | 10 Jul | 3 | 3 (3) | 3 vg:vv | Exclosure | |
| 164 | BY | F=U<br>M=nw:yw | 8 Jun | Hatch | 10 Jul | 3 | 3 (2) | 3 bb:ya | Mini-exclosure, Exclosure | |
| 165 | 8 | F=U<br>M=ga:ga | 7 Jun | Hatch (Split) | 9 Jul | 3 | 3 (2) | 3 unbanded | Mini-exclosure, Exclosure | |
| 166 | Foredune | F=o:a/b/a<br>M=gg:gg | 24 May | Hatch (Split) | 25 Jun | 3 | 3 (2) | 3 unbanded | Nonpredator fence | On 21 July, brood seen in the open riding area and Bigfoot revegetation area. |
| 167 | 8 | F=U<br>M=U | 2 Jun | Hatch | 4 Jul | 3 | 3 (3) | 3 vv:gg | Symbolic fence | |
| 168 | 6 | F=U<br>M=U | 8 Jun | Hatch (Split) | 10 Jul | 3 | 3 (0) | 3 unbanded | Symbolic fence | |
| 169 | Unknown | F=<br>M=U | na | Hatch | (27 May) | 3 | 3 (2) | 3 unbanded | | On 30 May, found as brood of 3 unbanded chicks on 6 exclosure shoreline. |
| 170 | Unknown | F=<br>M=U | na | Hatch | (29 May) | 3 | 3 (2) | 3 unbanded | | On 1 June, found as brood of 2 small unbanded chicks on 6 exclosure shoreline. Three chicks seen with brood beginning 4 June. |
| 171 | Unknown | F=bb:bb<br>M=U | na | Hatch | (28 May) | ≥2 | 2 (1) | 2 pg:ro | | On 30 May, found as brood of 2 unbanded chicks on 7 exclosure shoreline. |
| 172 | NOF | F=U<br>M=U | 11 Jun | Hatch | 13 Jul | 3 | 1 (0) | 1 unbanded | Exclosure | One egg unknown fate and 1 egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 173 | Unknown | F=U<br>M=U | na | Hatch | (5 Jun) | 3 | 3 (2) | 3 unbanded | | On 8 June, found as brood of 3 unbanded chicks on 7 exclosure shoreline. |
| 174 | Unknown | F=<br>M=ga:ob | na | Hatch | (6 Jun) | ≥2 | 2 (2) | 2 bb:pw | | On 9 June, found as brood of 2 unbanded chicks on 7 exclosure shoreline. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 175 | Foredune | F=U M=U | 21 May | Hatch | 22 Jun | 3 | 3 (0) | 3 unbanded | Nonpredator fence | |
| 176 | 7 | F=U M=U | 7 Jun | Hatch | 9 Jul | 3 | 3 (2) | 3 gg:vv | Exclosure | |
| 177 | 7 | F= M=(U)? | 20 May | Hatch | 21 Jun | 3 | 1 (0) | 1 unbanded | Exclosure | Two eggs unknown fate. |
| 178 | Foredune | F=U M=vv:ga | 30 May | Hatch | 1 Jul | 3 | 3 (3) | 3 unbanded | Nonpredator fence | |
| 179 | SOF | F=gg:ag M=U | 7 Jun | Failed, unknown cause | 21 Jun | 3 | 0 (0) | | Symbolic fence | Two eggs missing pre-term and one egg abandoned pre-term. No sign of fertilization in egg when contents examined post season. |
| 180 | Foredune | F=U M= | 30 May | Wind | 28 Jun | 3 | 0 (0) | | Nonpredator fence | |
| 181 | Foredune | F=U M=U | 28 May | Hatch | 29 Jun | 2 | 2 (0) | 2 unbanded | Nonpredator fence | |
| 182 | 8 | F= M= | 7 Jun | Depredated, coyote | 24 Jun | 3 | 0 (0) | | Exclosure | |
| 183 | 8 | F=vg:ra M=U | 9 Jun | Hatch | 11 Jul | 3 | 2 (0) | 2 unbanded | Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 184 | Foredune | F= M=U | 30 May | Hatch | 1 Jul | 3 | 3 (2) | 3 unbanded | Nonpredator fence | |
| 185 | Foredune | F=U M=U | 11 Jun | Hatch | 13 Jul | 3 | 3 (0) | 3 ga:gw | Symbolic fence | |
| 186 | 7 | F=rr:ra M=U | 6 Jun | Hatch | 8 Jul | 3 | 3 (2) | 3 unbanded | Symbolic fence | |
| 187 | 6 | F=U M=U | 13 Jun | Hatch | 15 Jul | 3 | 3 (1) | 3 gg:vw | Symbolic fence | |
| 188 | Foredune | F=U (dark) M=rr:yr | 17 Jun | Hatch (Split) | 19 Jul | 3 | 3 (2) | 3 pv:gg | Nonpredator fence | On 19 July, nest of 3 eggs repositioned 2 feet away of encroaching sand dune. |
| 189 | Foredune | F=U M=nb:rr | 18 Jun | Hatch (Split) | 20 Jul | 3 | 3 (0) | 2 pg:wb 1 unbanded | Symbolic fence | |
| 190 | 7 | F= M=banded | 26 May | Hatch (Split) | 27 Jun | ≥2 | 2 (0) | 2 unbanded | Exclosure | Nest location known by multiple observations of incubating adult. To avoid disturbing young snowy plover and least tern broods, nest not walked to and total egg number unknown. |
| 191 | Foredune | F=U M=U | 16 Jun | Hatch | 18 Jul | 3 | 2 (0) | 2 unbanded | Symbolic fence | One egg unknown fate. |
| 192 | Foredune | F= M=U | 14 Jun | Hatch (Split) | 16 Jul | 3 | 3 (1) | 3 unbanded | Symbolic fence | |
| 193 | 6 | F=bb:yy M=pg:yw | 19 Jun | Hatch | 21 Jul | 3 | 1 (1) | 1 unbanded | Exclosure | Two eggs (without cracks) abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 194 | 7 | F=rr:bb M=U | 4 Jun | Hatch (Split) | 6 Jul | 3 | 3 (3) | 3 unbanded | Symbolic fence | |
| 195 | 7 | F=U M=U | 23 Jun | Hatch | 25 Jul | 3 | 3 (0) | 3 pg:gb | Symbolic fence | |
| 196 | NOF | F=U M=gn:ya | 12 Jun | Hatch (Split) | 14 Jul | 2 | 2 (2) | 2 unbanded | Circular, Symbolic fence | |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 197 | SOF | F=U<br>M=U | 11 Jun | Hatch | 13 Jul | 3 | 2 (2) | 2 gg:rw | Circular, Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. Associated male adopted a 16-day-old chick from SP198 brood and an approximately 14-day-old chick from SP250 beginning 27 July. |
| 198 | SOF | F=ga:bo<br>M=bb:or | 9 Jun | Hatch | 11 Jul | 3 | 3 (1) | 3 gg:yg | Symbolic fence | One 16-day-old chick of the SP198 nest adopted by SP197 male beginning 27 July and not seen to fledge. |
| 199 | Foredune | F=U<br>M=U | 17 Jun | Hatch | 19 Jul | 3 | 3 (1) | 3 vv:wb | Symbolic fence | On 22 July, brood seen in the open riding area and Bigfoot revegetation area. From 23-29 July, brood seen in closed buffer area (1 occasion) and in Bigfoot revegetation area east of the closed buffer area (3 occasions). From 6 August to 11 September, 1 vv:wb chick and then fledgling observed on Foredune closure shoreline with left leg injury (see Table H.2 in Appendix H). |
| 200 | 7 | F=ga:av<br>M=U | 28 Jun | Hatch | 30 Jul | 3 | 2 (1) | 2 vv:vb | Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 201 | Foredune | F=banded<br>M=U | 26 Jun | Hatch | 28 Jul | 2 | 2 (2) | 2 ga:yw | Symbolic fence | |
| 202 | 6 | F=U<br>M=pg:ba | 29 Jun | Hatch | 31 Jul | 3 | 2 (2) | 2 unbanded | Symbolic fence | One egg unknown fate. |
| 203 | 6 | F=gg:oa<br>M=U | 18 Jun | Hatch | 20 Jul | 3 | 2 (2) | 2 unbanded | Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. |
| 204 | 8 | F=banded<br>M=U | 29 Jun | Hatch | 31 Jul | 3 | 3 (2) | 3 ga:yg | Symbolic fence | |
| 205 | 6 | F=U<br>M=U | 24 Jun | Hatch | 26 Jul | 3 | 1 (1) | 1 vv:vv | Symbolic fence | Two eggs abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 206 | 8 | F=U<br>M=rr:aw | 4 Jul | Hatch | 11 Aug | 3 | 2 (1) | 2 unbanded | Symbolic fence | One egg abandoned post-term. No sign of fertilization in egg when contents examined post season. On 21 July, a 23-day-old chick from SP139 broods with female incubating at SP206 nest. |
| 207 | 8 | F=<br>M=vg:yg | 28 Jun | Hatch | 30 Jul | 3 | 2 (1) | 1 ga:ao<br>1 unbanded | Symbolic fence | On 25 July, one egg with inward dent and visible yolk. One egg unknown fate. Banded chick fledged. |
| 208 | Foredune | F=rr:ay<br>M=ga:bg | 13 Jun | Hatch | 15 Jul | 3 | 3 (0) | | Symbolic fence | |
| 209 | Foredune | F=banded<br>M=U | 5 Jul | Hatch | 6 Aug | 3 | 1 (1) | 1 gg:gy | Symbolic fence | Two eggs (without cracks) abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 210 | SOF | F=U<br>M=U | 4 Jul | Hatch | 5 Aug | 3 | 3 (3) | 2 ga:pw<br>1 unbanded | Symbolic fence | |
| 211 | 7 | F=U<br>M=U | 29 Jun | Hatch (Split) | 31 Jul | 3 | 3 (2) | 2 pg:ga<br>1 unbanded | Symbolic fence | One banded and one unbanded chick fledged. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 212 | BY | F=U M=rr:wr | 22 Jun | Hatch | 24 Jul | 3 | 3 (1) | 3 unbanded | Exclosure | |
| 213 | BY | F=U M=gg:wo | 13 Jun | Hatch | 15 Jul | 3 | 2 (1) | 2 gg:br | Exclosure | On 13 July, pip portion of egg broke off during handling, exposing membrane with small tear and visible chick. Egg placed back in nest bowl. One egg unknown fate. |
| 214 | SOF | F=banded M= | 20 Jun | Vandalism | 19 Jul | 3 | 0 (0) | | Circular, Symbolic fence | Nest last observed incubated on 18 July. On 20 July, circular exclosure damaged and eggs missing. |
| 215 | 6 | F=U M=ga:ob | 5 Jul | Hatch (Split) | 6 Aug | 3 | 3 (2) | 3 gg:ya | Symbolic fence | On 27 August, 1 chick depredated by peregrine on 6 exclosure shoreline (see Table H.5 in Appendix H). |
| 216 | 6 | F= M=ga:pv | 7 Jul | Hatch | 8 Aug | 3 | 3 (3) | 2 gg:ow 1 unbanded | Symbolic fence | |
| 217 | 6 | F= M=ga:pr | 23 Jun | Hatch | 25 Jul | 3 | 3 (0) | 3 unbanded | Exclosure | |
| 218 | Foredune | F=U M=U | 4 Jul | Hatch | 5 Aug | 3 | 1 (1) | 1 ga:wg | Symbolic fence | Two eggs (without cracks) abandoned post-term. No sign of fertilization in both eggs when contents examined post season. |
| 219 | 6 | F=U M=U | 15 Jul | Abandoned pre-term | 4 Aug | 2 | 0 (0) | | Symbolic fence | Approximately 1.5- and 2-week-old embryos in eggs when contents examined post season. |
| 220 | SOF | F=pv:by M=gg:wo | 25 Jun | Hatch | 27 Jul | 3 | 3 (2) | 3 pg:aa | Symbolic fence | |
| 221 | 6 | F=U M=rr:pa | 3 Jul | Hatch | 4 Aug | 2 | 2 (1) | 2 unbanded | Exclosure | |
| 222 | Foredune | F=banded M=U | 13 Jul | Hatch | 14 Aug | 2 | 2 (2) | 2 gg:pw | Symbolic fence | On 12 September, 1 fledgling depredated by peregrine on 6 exclosure shoreline (see Table H.5 in Appendix H). |
| 223 | 7 | F= M= | na | Abandoned, unknown if pre- or post-term | na | 3 | 0 (0) | | Symbolic fence | On 8 September, nest found as 3 eggs abandoned, unknown if pre- or post-term. No sign of fertilization in all 3 eggs when contents examined post season. |
| 224 | Foredune | F= M= | na | Abandoned, unknown if pre- or post-term | na | 3 | 0 (0) | | Symbolic fence | On 14 September, nest found as 3 eggs abandoned, unknown if pre- or post-term. Two eggs with no sign of fertilization and 1 egg with an approximately 1-week-old embryo when contents examined post season. |
| 225 | 7 | F= M= | na | Unknown | na | ≥2 | 0 (0) | | Symbolic fence | On 16 September, nest found as 2 eggs abandoned, unknown if pre- or post-term. Approximately 2-week-old embryo in both eggs when contents examined post season. |
| 226 | Unknown | F= M=ga:ba | na | Hatch | (12 Jun) | ≥2 | 2 (2) | 2 unbanded | | On 14 June, found as brood of 2 unbanded chicks on Foredune closure shoreline. |
| 227 | Unknown | F= M=U | na | Hatch | (18 Jun) | ≥2 | 2 (2) | 2 unbanded | | On 23 June, found as brood of 2 unbanded chicks on 8 exclosure shoreline. |
| 228 | Unknown | F=banded M=U | na | Hatch | (20 Jun) | 3 | 3 (2) | 3 unbanded | | On 22 June, found as brood of 3 unbanded chicks in 6 exclosure. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 229 | Unknown | F=ga:ry M=U | na | Hatch | (20 Jun) | 3 | 3 (3) | 3 unbanded | | On 23 June, found as brood of 3 unbanded chicks on North Oso Flaco shoreline. |
| 230 | Unknown | F= M=U | na | Hatch | (20 Jun) | 3 | 3 (2) | 3 unbanded | | On 24 June, found as brood of 3 unbanded chicks on 6 exclosure shoreline. |
| 231 | Unknown | F=U M=U | na | Hatch | (22 Jun) | 3 | 3 (2) | 2 unbanded | | On 22 June, found as a brood of 2 small unbanded chicks in 6 exclosure. On the same day, a third unbanded chick, believed to be from the same brood, was found immobile in 6 exclosure. The unattended chick was placed in brooder, and taken to Santa Barbara Zoo (see Table F.6 in Appendix F). |
| 232 | Unknown | F=ny:gv M=U | na | Hatch | (24 Jun) | ≥2 | 2 (1) | 2 unbanded | | On 26 June, found as brood of 2 unbanded chicks on Foredune closure shoreline. |
| 233 | Unknown | F= M=vg:ob | na | Hatch | (24 Jun) | 3 | 3 (3) | 3 unbanded | | On 28 June, found as brood of 3 unbanded chicks on 8 exclosure shoreline. |
| 234 | Unknown | F=U M=l:y/g | na | Hatch | (26 Jun) | 3 | 3 (2) | 3 unbanded | | On 28 June, found as brood of 3 unbanded chicks on South Oso Flaco shoreline. |
| 235 | Unknown | F= M=ny:wg | na | Hatch | (25 Jun) | ≥2 | 2 (2) | 2 unbanded | | On 29 June, found as brood of 2 unbanded chicks on 6 exclosure shoreline. |
| 236 | Unknown | F= M=U | na | Hatch | (25 Jun) | 3 | 3 (0) | 3 unbanded | | On 26 June, found as brood of 3 unbanded chicks in 6 exclosure. |
| 237 | Unknown | F= M=ga:wo | na | Hatch | (28 Jun) | ≥2 | 2 (2) | 2 unbanded | | On 1 July, found as brood of 2 unbanded chicks on 6 exclosure shoreline. |
| 238 | Unknown | F= M=U | na | Hatch | (28 Jun) | 3 | 3 (2) | 3 unbanded | | On 3 July, found as brood of 3 unbanded chicks on 6 exclosure shoreline. |
| 239 | Unknown | F=pv:pv M=rr:bw | na | Hatch | (29 Jun) | 3 | 3 (3) | 3 unbanded | | On 1 July, found as brood of 3 unbanded chicks on Foredune closure shoreline. |
| 240 | Unknown | F= M=U | na | Hatch | (29 Jun) | 3 | 3 (1) | 3 unbanded | | On 3 July, found as brood of 3 unbanded chicks on Foredune closure shoreline. |
| 241 | Unknown | F= M=U | na | Hatch | (2 Jul) | 3 | 3 (2) | 3 unbanded | | On 3 July, found as brood of 3 unbanded chicks on South Oso Flaco shoreline. |
| 242 | Unknown | F=rr:pw M=U | na | Hatch | (2 Jul) | 3 | 3 (2) | 3 unbanded | | On 5 July, found as brood of 2 unbanded chicks on 8 exclosure shoreline. Three chicks seen with brood beginning 8 July. Associated male adopted a 2-day-old chick from SP143 brood beginning 5 July. |
| 243 | Unknown | F=bb:ar M=U | na | Hatch | (1 Jul) | ≥2 | 2 (1) | 2 unbanded | | On 6 July, found as brood of 2 unbanded chicks on 7 exclosure shoreline. |
| 244 | Unknown | F=U M=U | na | Hatch | (3 Jul) | 3 | 3 (0) | 3 unbanded | | On 5 July, found as brood of 3 unbanded chicks on 6 exclosure shoreline. |
| 245 | Unknown | F= M=vv:wr | na | Hatch | (5 Jul) | 3 | 3 (2) | 3 unbanded | | On 7 July, found as brood of 3 unbanded chicks on 8 exclosure shoreline. |
| 246 | Unknown | F=U M=U | na | Hatch | (7 Jul) | ≥2 | 2 (2) | 2 unbanded | | On 10 July, found as brood of 2 unbanded chicks on 7 exclosure shoreline. |
| 247 | Unknown | F=pg:gw M=U | na | Hatch | (10 Jul) | 3 | 3 (3) | 3 unbanded | | On 12 July, found as brood of 3 unbanded chicks on 8 exclosure shoreline. |
| 248 | Unknown | F= M=pg:b- | na | Hatch | (11 Jul) | 3 | 3 (3) | 3 unbanded | | On 17 July, found as brood of 3 unbanded chicks on 7 exclosure shoreline. |

**Appendix B. Snowy plover nests at ODSVRA in 2023 (continued).**

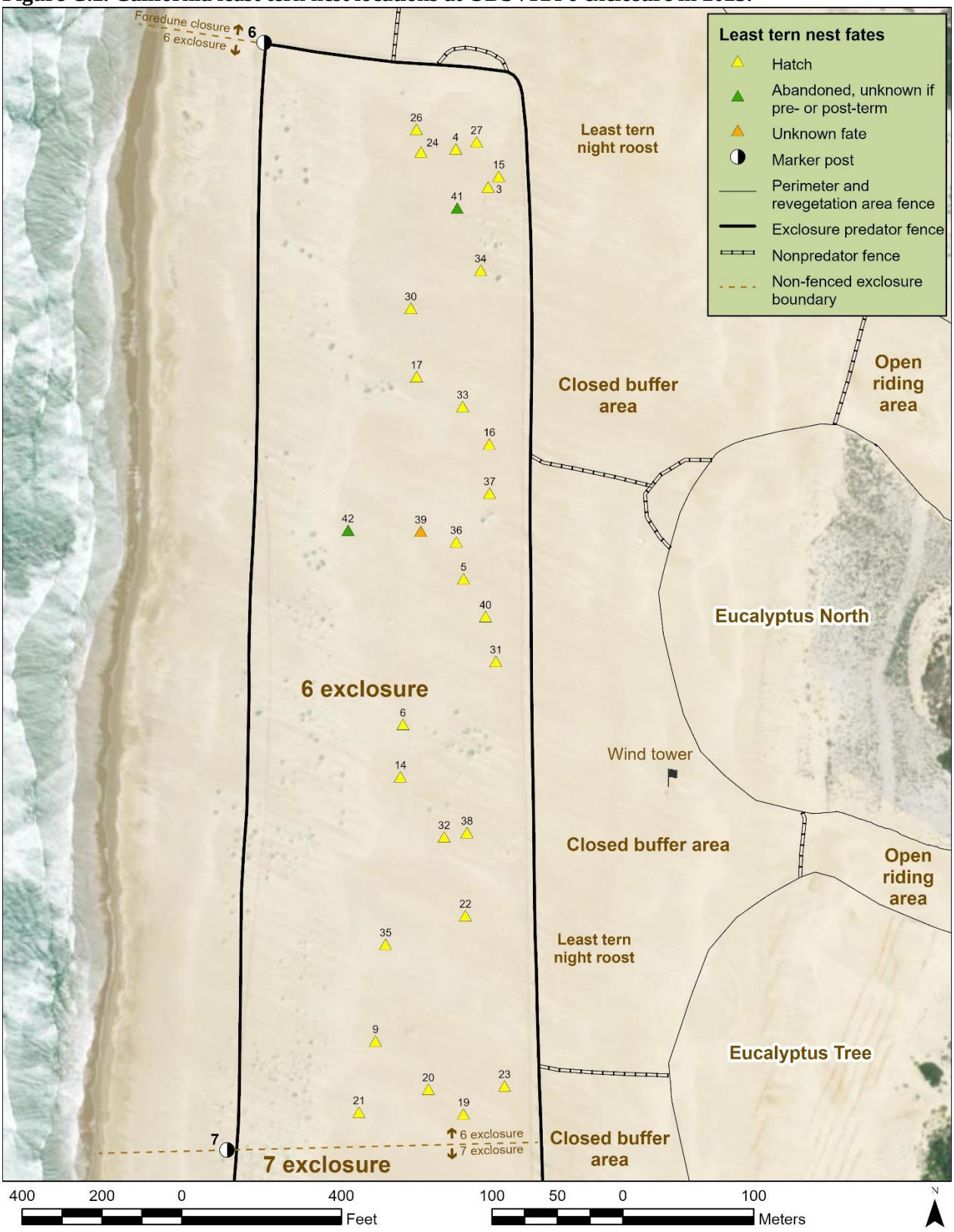
| Nest | Location | Adult pair | Est. initiation date | Nest fate | Fate date (est.) | No. eggs | No. chicks (no. fledged) | No. chicks banded and combination | Nest protection type | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 249 | Unknown | F=U<br>M=U | na | Hatch | (11 Jul) | 3 | 3 (2) | 3 unbanded | | On 14 July, found as brood of 3 unbanded chicks on Fordune closure shoreline. |
| 250 | Unknown | F=<br>M= | na | Hatch | (13 Jul) | ≥1 | 1 (1) | 1 unbanded | | On 27 July, found as 1 unbanded adopted chick with SP197 male on South Oso Flaco shoreline. |
| 251 | Unknown | F=ga:wy<br>M= | na | Hatch | (18 Jul) | ≥1 | 1 (0) | 1 unbanded | | On 25 July, found as brood of 1 unbanded chick on North Oso Flaco shoreline. |
| 252 | Unknown | F=<br>M=vg:rw | na | Hatch | (22 Jul) | 3 | 3 (2) | 3 unbanded | | On 26 July, found as brood of 2 unbanded chicks on 8 exclosure shoreline. Three chicks seen with brood beginning 27 July. |
| 253 | Unknown | F=<br>M=pg:by | na | Hatch | (21 Jul) | ≥2 | 2 (2) | 2 unbanded | | On 26 July, found as brood of 1 unbanded chick on North Oso Flaco shoreline. Two chicks seen with brood beginning 26 July. |
| 254 | Unknown | F=<br>M=U | na | Hatch | (22 Jul) | ≥2 | 2 (2) | 2 unbanded | | On 2 August, found as brood of 2 unbanded chicks in South Oso Flaco. |
| 255 | Unknown | F=<br>M=U | na | Hatch | (26 Jul) | 3 | 3 (3) | 3 unbanded | | On 2 August, found as brood of 3 unbanded chicks in South Oso Flaco. |
| 256 | Unknown | F=ga:ry<br>M=U | na | Hatch | (29 Jul) | 3 | 3 (2) | 3 unbanded | | On July 31, found as brood of 3 unbanded chicks on 7 exclosure shoreline. |
| 257 | Unknown | F=<br>M=U | na | Hatch | (7 Aug) | ≥2 | 2 (0) | 2 unbanded | | On 12 August, found as brood of 2 unbanded chicks on 8 exclosure shoreline. |
| 258 | Unknown | F=<br>M=U | na | Hatch | (5 Jul) | ≥1 | 1 (1) | 1 unbanded | | On 7 July, found as brood of 1 unbanded chick on 8 exclosure shoreline. |
| 259 | Foredune | F=<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Symbolic fence | On 17 September, nest found as 1 egg abandoned, unknown if pre- or post-term. Approximately 1-week-old embryo in egg when contents examined post season. |
| 260 | 7 | F=<br>M= | na | Unknown | na | ≥1 | 0 (0) | | Symbolic fence | On 8 September, nest found as 1 egg abandoned, unknown if pre- or post-term. Approximately 1-week-old embryo in egg when contents examined post season. |

## APPENDIX C. MAPS OF ALL CALIFORNIA LEAST TERN AND SNOWY PLOVER NEST LOCATIONS AT ODSVRA IN 2023.

**Figure C.1. California least tern and snowy plover nest locations at ODSVRA in 2023.**

**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

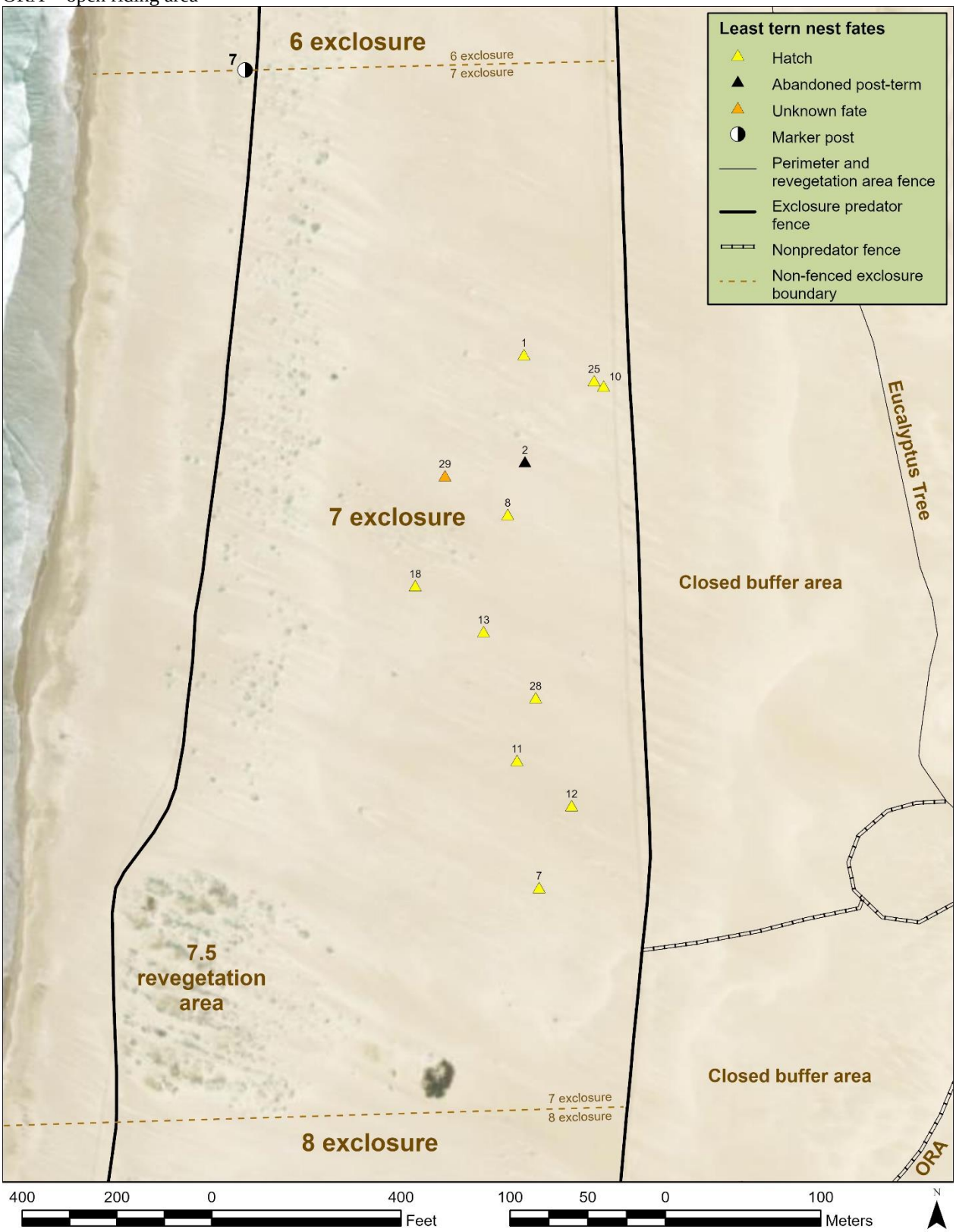
**Figure C.2. California least tern nest locations at ODSVRA 6 exclosure in 2023.**



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.3. California least tern nest locations at ODSVRA 7 exclosure in 2023.**

ORA = open riding area



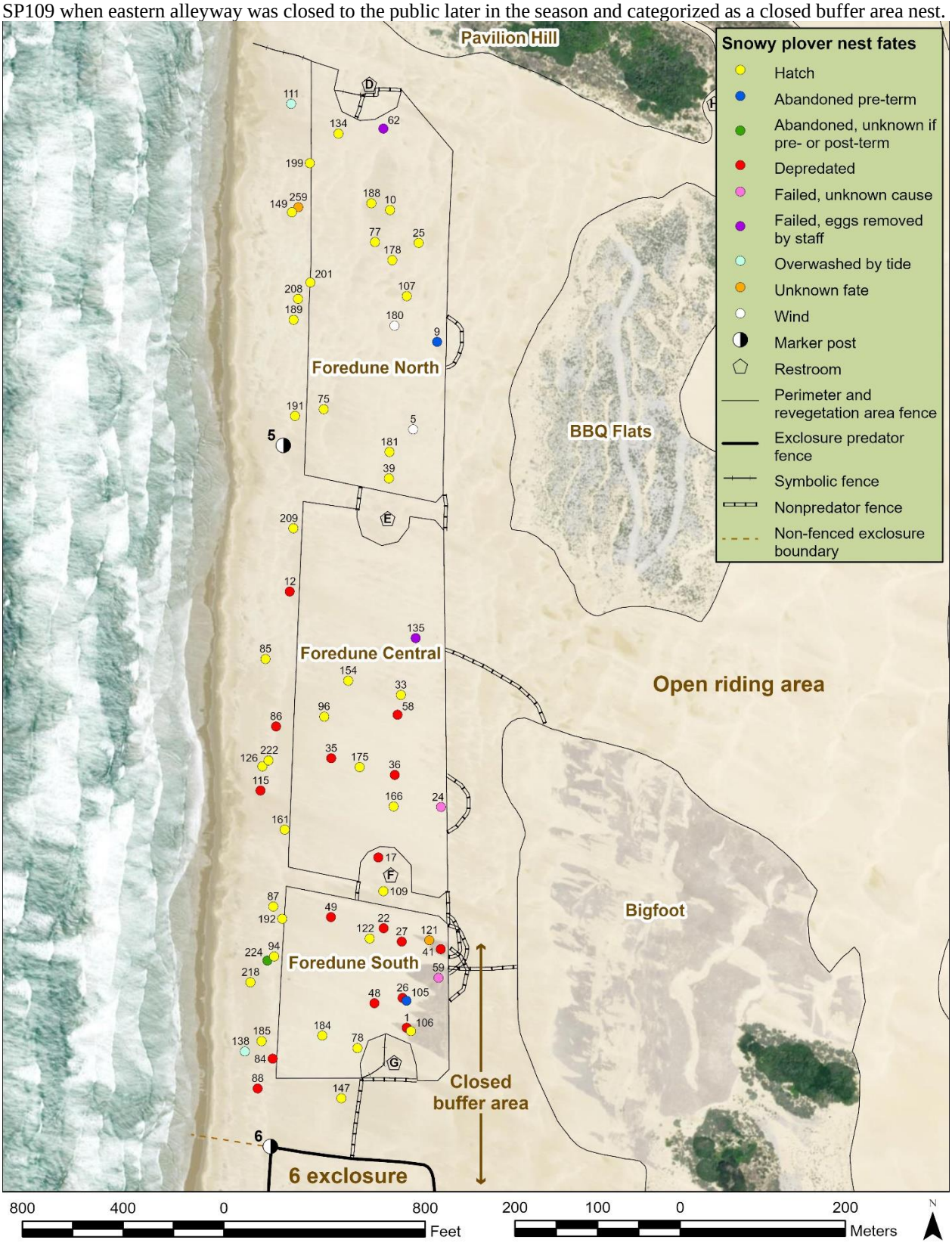
**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.4. Snowy plover nest locations at ODSVRA north of marker post 4 in 2023.**

**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.5. Snowy plover nest locations at ODSVRA Foredune closure in 2023.**

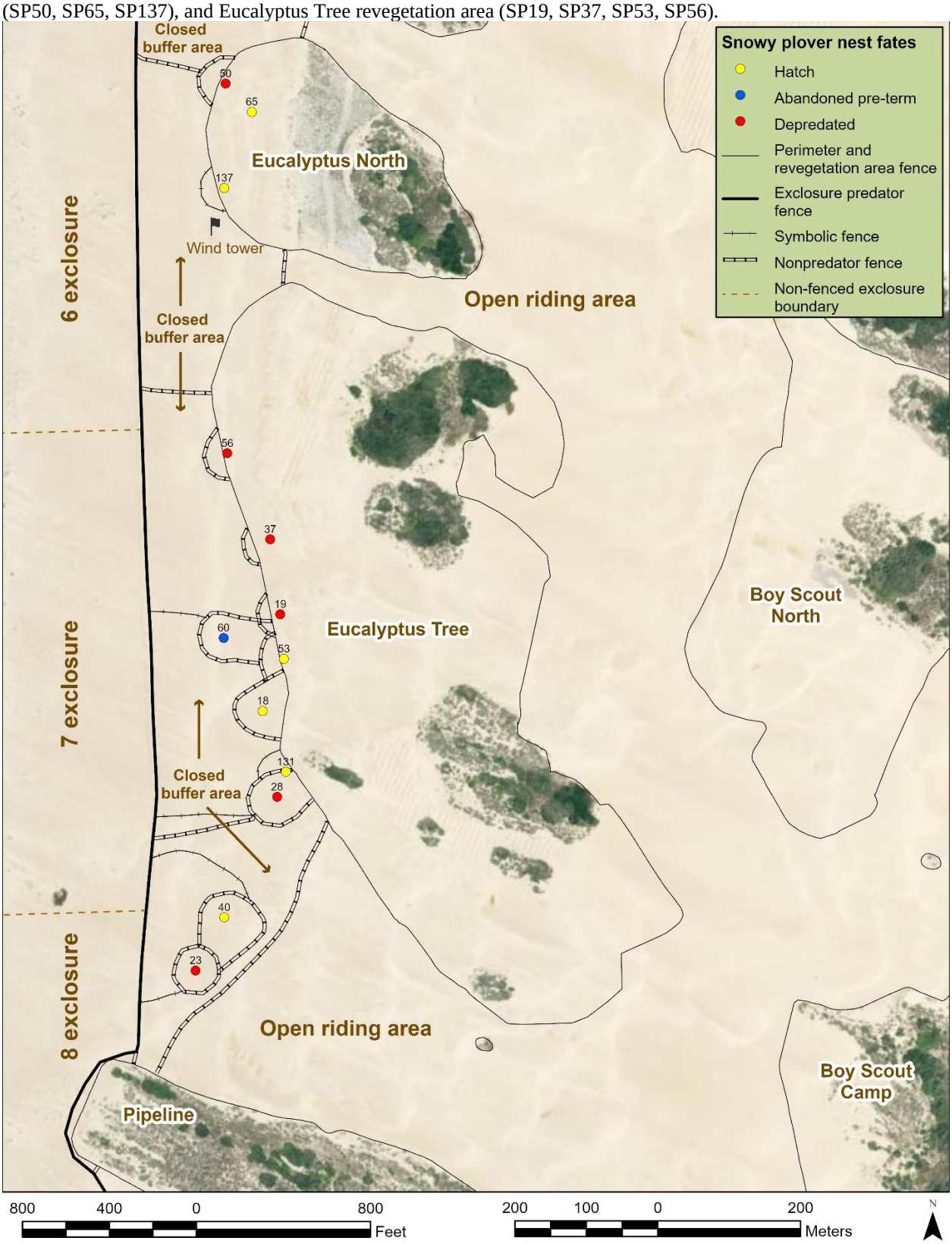
Includes SP17 established when eastern alleyway open to the public and categorized as an open riding area nest and SP109 when eastern alleyway was closed to the public later in the season and categorized as a closed buffer area nest.



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

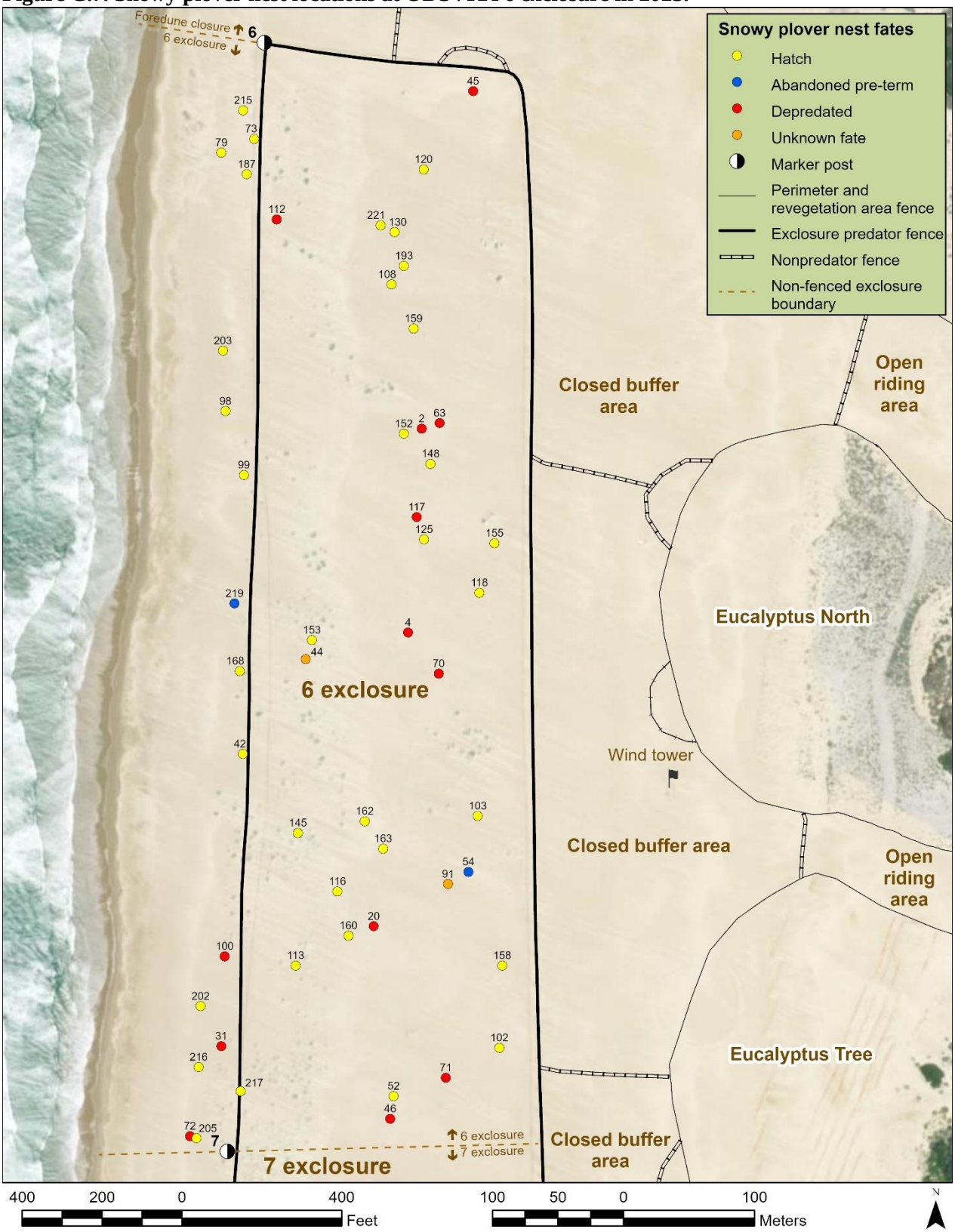
**Figure C.6. Snowy plover nest locations at ODSVRA open riding area, closed buffer area, Eucalyptus North and Eucalyptus Tree revegetation areas in 2023.**

Five nests in open riding area (SP18, SP23, SP28, SP40, SP60) initiated prior to installation of closed buffer area fencing. Other nests shown were initiated within the closed buffer area (SP131), Eucalyptus North revegetation area (SP50, SP65, SP137), and Eucalyptus Tree revegetation area (SP19, SP37, SP53, SP56).



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

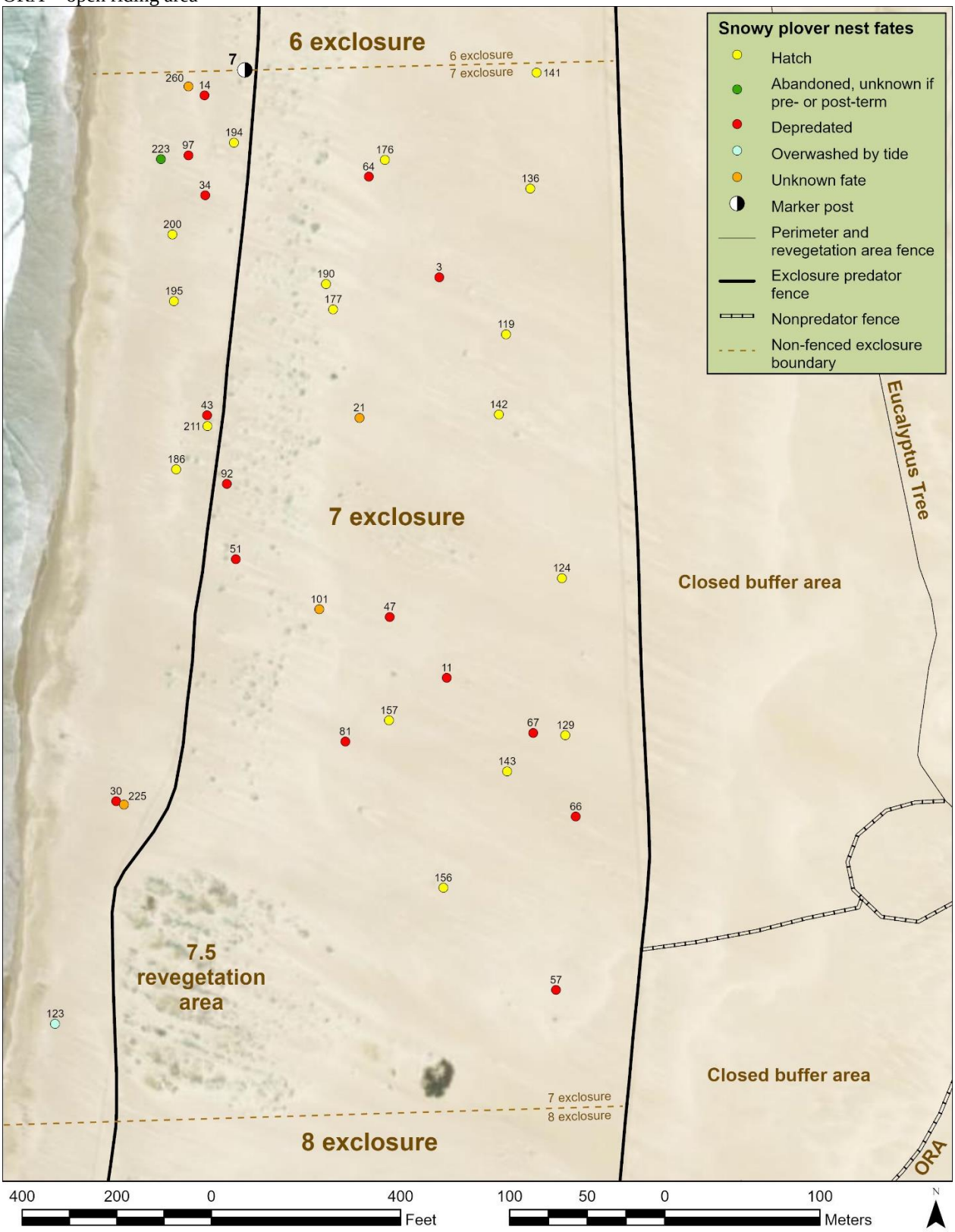
**Figure C.7. Snowy plover nest locations at ODSVRA 6 exclosure in 2023.**



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

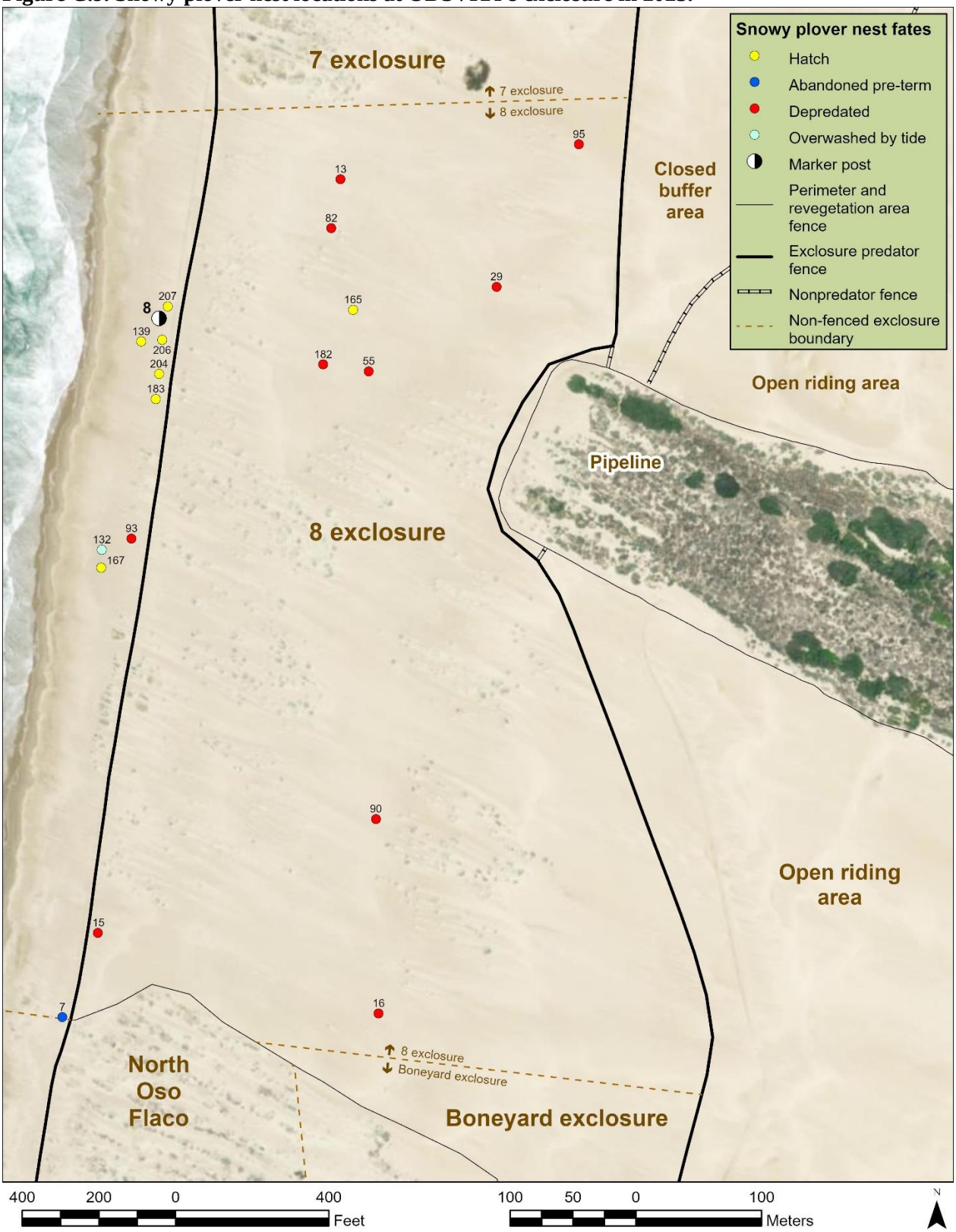
**Figure C.8. Snowy plover nest locations at ODSVRA 7 exclosure in 2023.**

ORA = open riding area



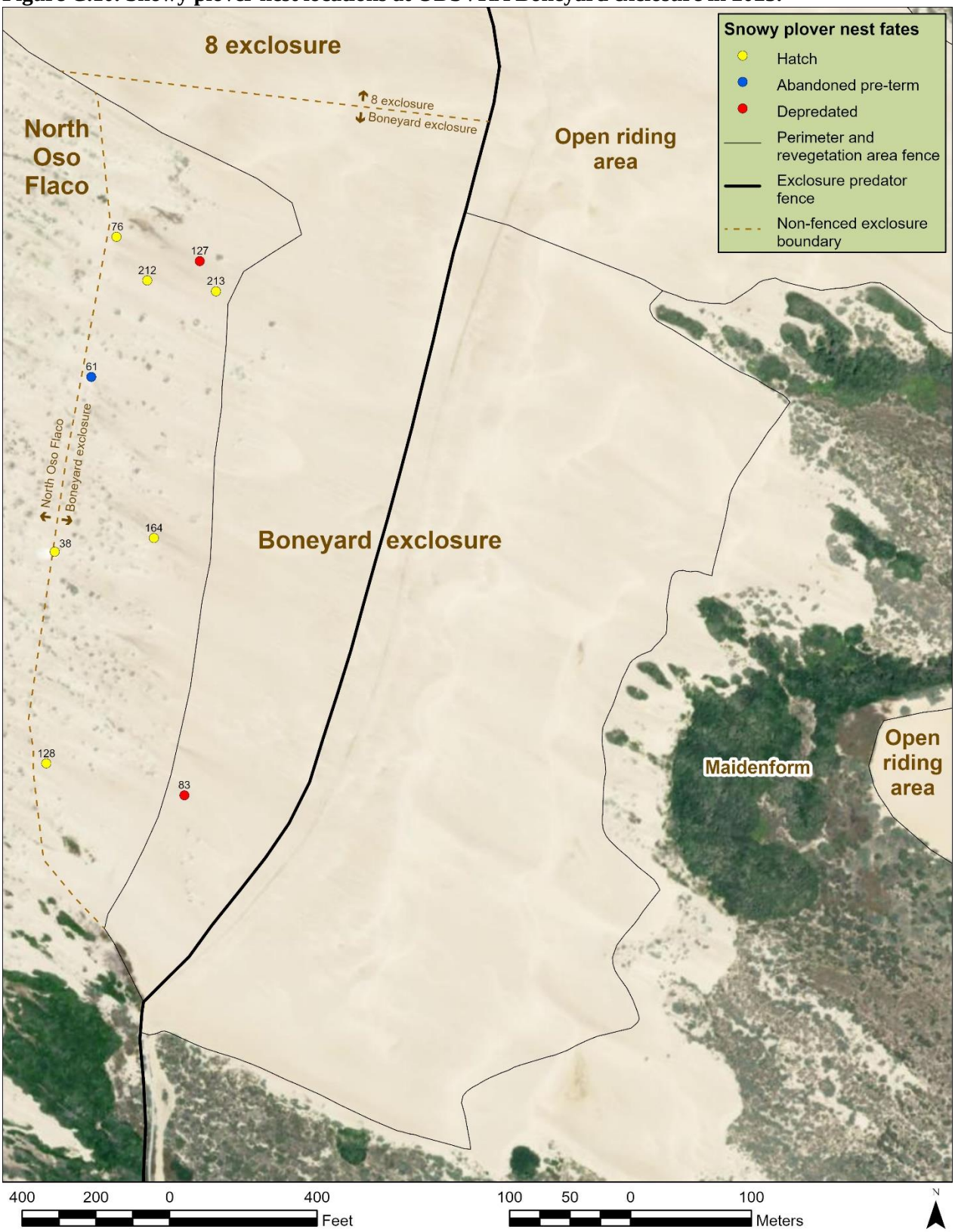
**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.9. Snowy plover nest locations at ODSVRA 8 exclosure in 2023.**



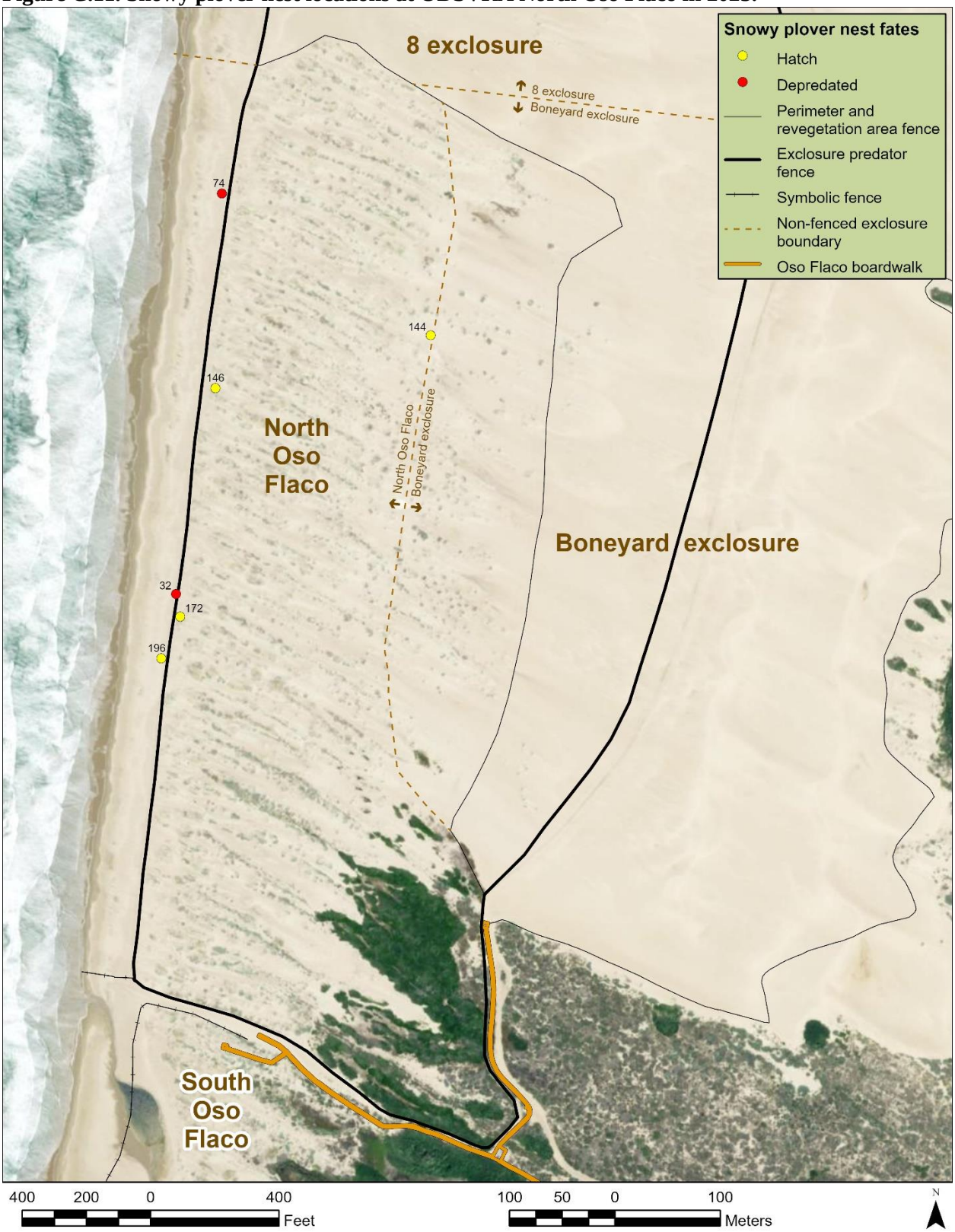
**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.10. Snowy plover nest locations at ODSVRA Boneyard exclosure in 2023.**



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.11. Snowy plover nest locations at ODSVRA North Oso Flaco in 2023.**



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

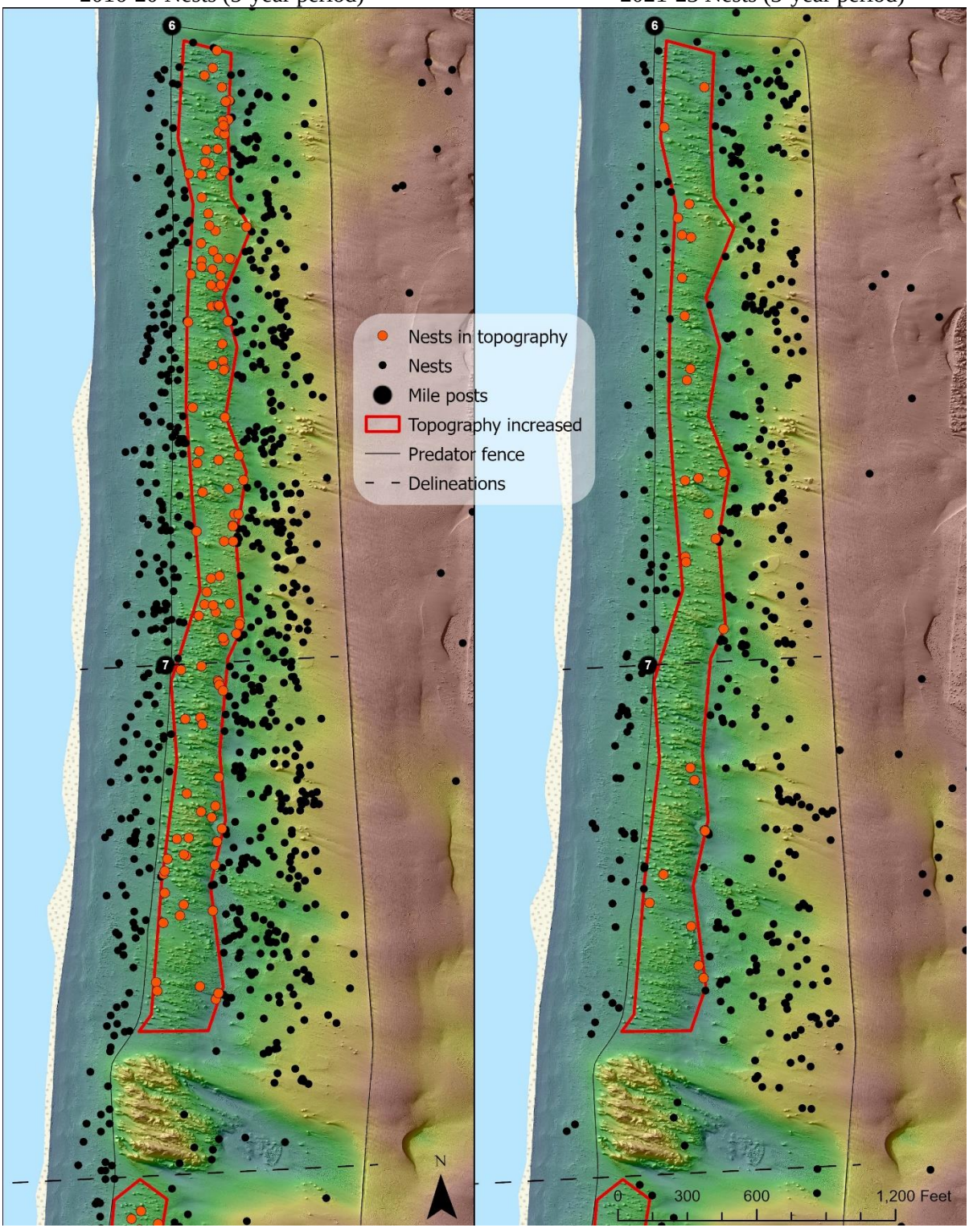
**Figure C.12. Snowy plover nest locations at ODSVRA South Oso Flaco in 2023.**

**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.13. California least tern and snowy plover nest locations in relation to topography (hillshade and digital elevation modeling from October 2022) at ODSVRA 6 and 7 exclosures 2016-20 compared to 2021-23.**

Approximately 40 acres outlined in red shows reduced nesting due to increased topography and vegetation density.

2016-20 Nests (5-year period) 2021-23 Nests (3-year period)

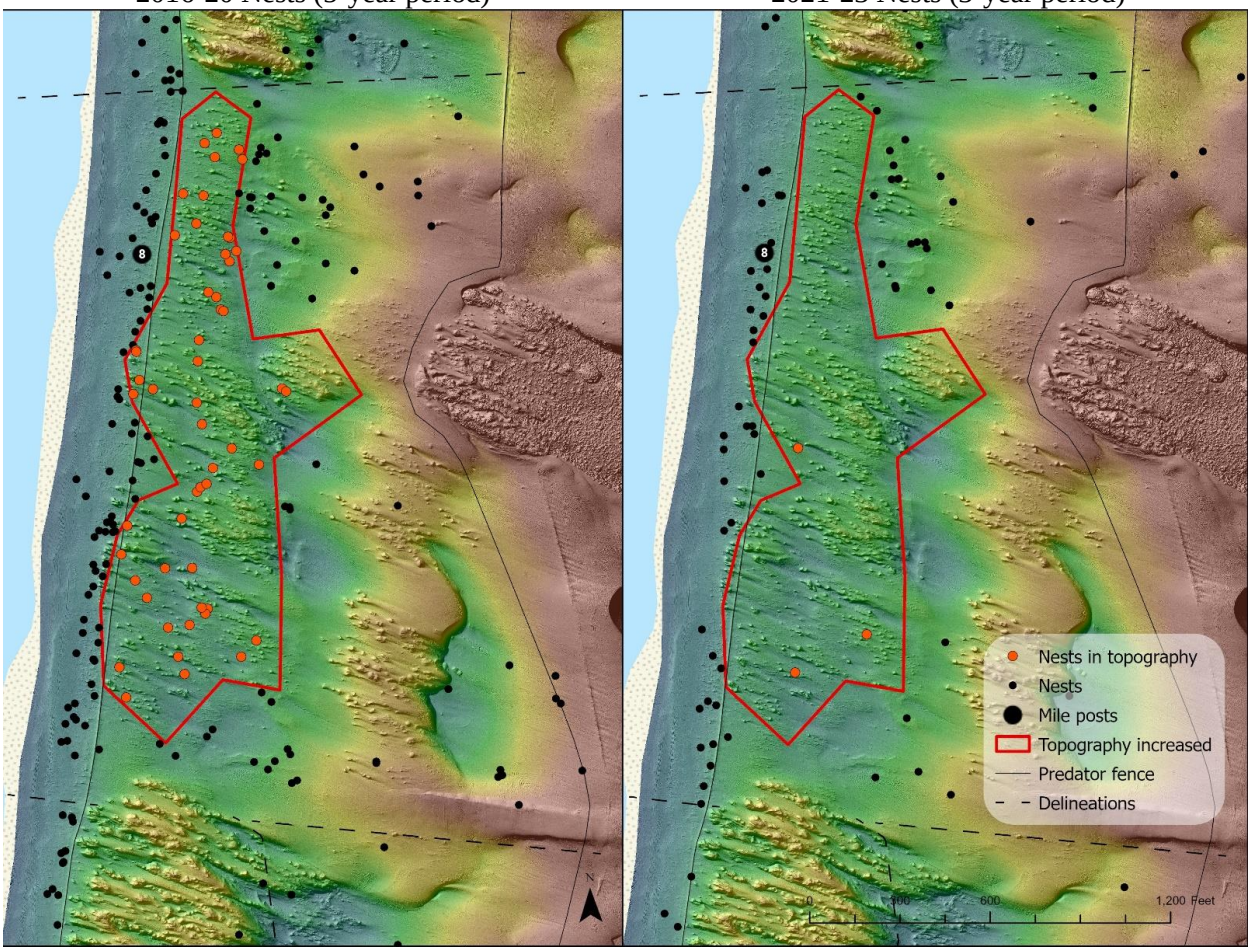


**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.14. California least tern and snowy plover nest locations in relation to topography (hillshade and digital elevation modeling from October 2022) at ODSVRA 8 exclosure 2016-20 compared to 2021-23.**

Approximately 20 acres outlined in red shows reduced nesting due to increased topography and vegetation density.

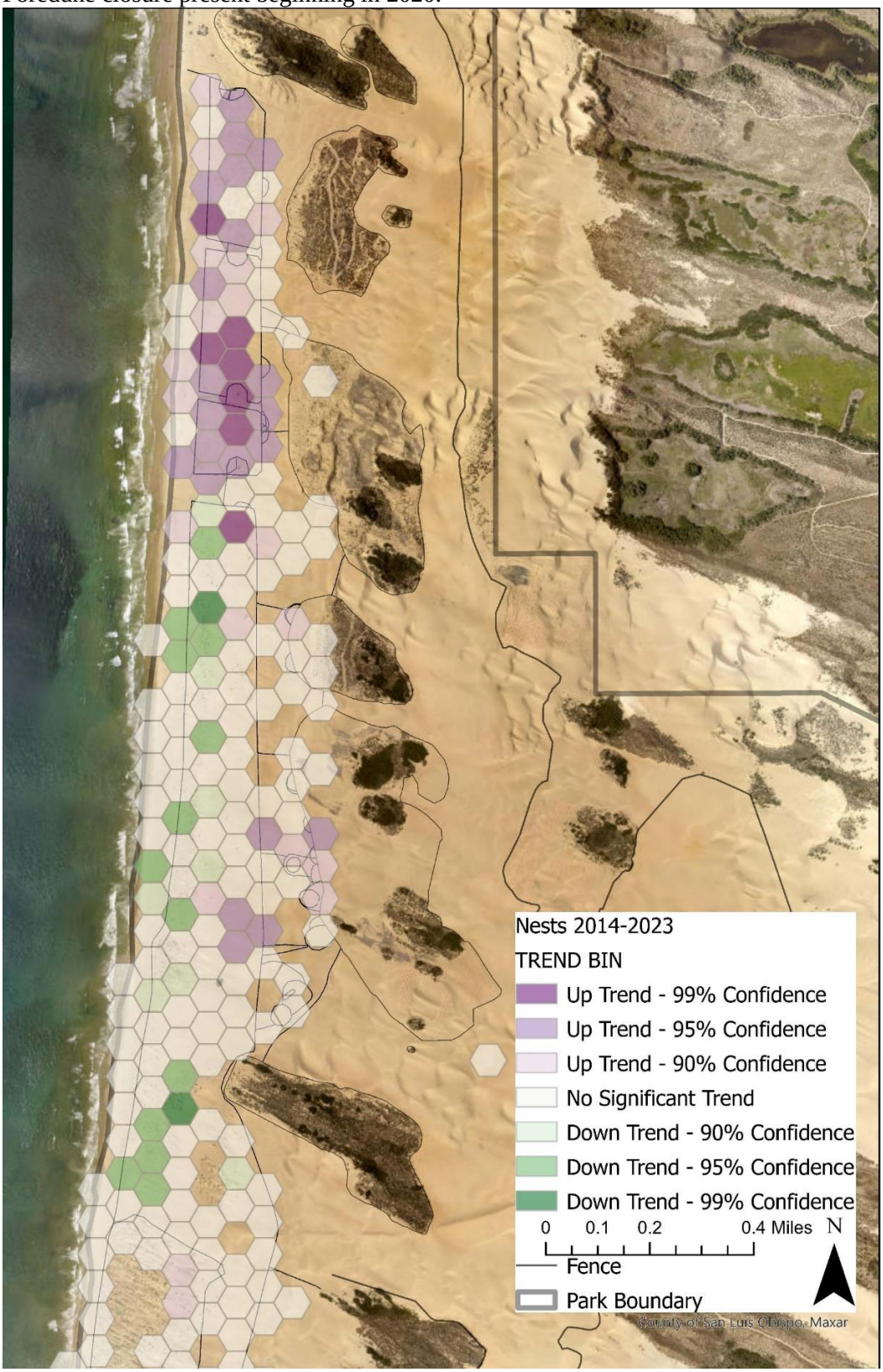
2016-20 Nests (5-year period) 2021-23 Nests (3-year period)



**Appendix C. Maps of all California least tern and snowy plover nest locations at ODSVRA in 2023 (continued).**

**Figure C.15. Trends of California least tern and snowy plover nest locations at ODSVRA 6, 7, and 8 exclosures, Foredune closure, and outside these areas 2014-23.**

Foredune closure present beginning in 2020.



## APPENDIX D. BANDED CALIFORNIA LEAST TERNS AND SNOWY PLOVERS.

### Table D.1. Banded California least terns recorded at ODSVRA in 2023.

Juveniles fledged from ODSVRA in 2023 are not included. All birds from ODSVRA were banded as chicks. Additional color-banded birds were recorded but combinations not confirmed. A number of birds had a band on only one leg, these birds may have been banded on only one leg or have lost a band. All possible band combinations of birds known fledging from ODSVRA are listed for incomplete band combinations or for band combinations that were used multiple years. (For a description of color band letter codes see Appendix A.)

ODSVRA = Oceano Dunes SVRA, VSFB = Vandenberg Space Force Base

| Band | Origin and Year Banded | Dates Seen | Notes |
|---|---|---|---|
| -:a/b | ODSVRA unknown | 5/26 | Multiple birds banded at ODSVRA with a/b on the right leg. |
| -:o/y | ODSVRA unknown | 5/31, 6/10 | Multiple birds banded at ODSVRA with o/y on right leg. |
| b/a:g/y | ODSVRA 2014 | 6/21, 6/23, 7/21, 7/28 | LT12 breeding adult. |
| b/o:- | ODSVRA unknown | 7/25, 7/29, 8/7, 8/9, 8/10, 8/11 | LT34 breeding adult. Multiple birds banded at ODSVRA with b/o on the left leg. |
| b/w:b/y | ODSVRA 2011 | 7/1 | LT21 breeding adult. |
| b/w:o/y | ODSVRA 2011 | 7/1 | LT9 breeding adult. |
| g/o:y/g | ODSVRA 2015 | 7/1 | |
| g/w:w/o | ODSVRA 2021 | 7/25 | |
| g/w:y/g | ODSVRA 2015 | 6/8 | |
| g/y:g | ODSVRA 2008 | 6/7 | LT26 breeding adult. |
| g/y:k | ODSVRA 2017 or 2018 | 7/25 | |
| g/y:r/y | ODSVRA 2008 | 7/28 | |
| g/y:w/a | ODSVRA 2008 or 2018 | 6/29, 7/2, 7/3, 7/4, 7/29 | LT23 breeding adult. |
| g/y:y | ODSVRA 2008 or 2018 | 7/4, 7/5, 7/6 | LT33 breeding adult. |
| g/y:y/b | ODSVRA 2018 | 8/9 | |
| g/y:y/o | ODSVRA 2008 or 2018 | 8/8, 8/10, 8/11 | |
| o/r:y/g | ODSVRA 2015 | 8/10 | |
| o/w:o/y | ODSVRA 2019 | 7/4 | LT19 breeding adult. |
| o/w:w | ODSVRA 2019 | 7/28 | |
| o/w:w/o | ODSVRA 2019 or 2021 | 7/4 | LT35 breeding adult. |
| r/w:w/b | ODSVRA 2009 or 2013 | 7/21 | |
| s:b | VSFB 2018 | 6/28, 7/25 | LT27 breeding adult. In 2018 VSFB banded all chicks with s:b. Observation in past years at ODSVRA of s:b suggest bird could have lost tape on either leg. Multiple birds banded at ODSVRA with blue on right leg. |
| w/b:w | ODSVRA 2010 | 6/29, 7/1 | LT9 breeding adult. |
| w/b:w/g | ODSVRA 2010 | 7/28 | |
| w/b:w/o | ODSVRA 2010 or 2021 | 7/7 | |
| w/g:w/o | ODSVRA 2021 | 7/26 | |
| w/o:g/w | ODSVRA 2020 | 6/17, 6/18, 7/10, 7/13, 7/31 | LT40 breeding adult. |

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

### Table D.1. Banded California least terns recorded at ODSVRA in 2023 (continued).

| Band | Origin and Year Banded | Dates Seen | Notes |
|---|---|---|---|
| w/o:r | ODSVRA 2020 | 5/30, 7/3, 7/25 | LT28 breeding adult. |
| w/o:r/w | ODSVRA 2020 | 8/1 | |
| y/g:b/w | ODSVRA 2006, 2012, or 2016 | 6/3, 6/14 | LT10 breeding adult. |
| y/g:y/a | ODSVRA 2016 | 7/25, 8/1, 8/2 | |
| y/o:w/b | ODSVRA 2009 | 5/22, 5/24 | Most of yellow tape has worn from left leg band with mostly orange tape remaining. |
| y/w:y/g | ODSVRA 2015 | 6/6, 6/7, 6/30, 7/1, 7/5, 7/8 | LT25 breeding adult. |

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

### Table D.2. California least terns banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023.

This is a partial list based on information received from monitors and managers.
VSFB = Vandenberg Space Force Base

| Band Combination | Year Banded | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|
| r/a:b | 2023 | Santa Ynez River Mouth | Santa Barbara | 8/7 | Juvenile. |
| g/a:y/g | 2015 | VSFB | Santa Barbara | 5/30 | VSFB breeding adult. |
| g/y:r/b | 2008 or 2018 | VSFB | Santa Barbara | 6/2 | VSFB breeding adult. |
| r/y:y/g | 2015 | VSFB | Santa Barbara | 6/2, 6/23, 6/24, 6/25 | VSFB breeding adult. |
| w:y/g | 2005 or 2015 | VSFB | Santa Barbara | 7/3, 7/4, 7/5, 7/6, 7/11 | VSFB breeding adult. |
| y/a:y/g | 2005 or 2015 | VSFB | Santa Barbara | 6/21, 6/22, 6/25 | VSFB breeding adult. |
| w:w/b | 2009 or 2013 | Coal Oil Point Reserve/Devereux Slough | Santa Barbara | 8/4 | |
| -:o/y | unknown | Camp Pendleton | San Diego | 8/17 | Multiple birds banded at ODSVRA with o/y on right leg. |
| r/a:b/y | 2023 | Camp Pendleton | San Diego | 8/17 | Juvenile. |
| r/a:o/b | 2023 | Tijuana River Mouth | San Diego | 8/24 | Juvenile. |

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

## Table D.3. Banded snowy plovers recorded at ODSVRA 1 October 2022 to 28 February 2023.

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

Eden Landing = Eden Landing Ecological Reserve, NWR = National Wildlife Refuge, ODSVRA = Oceano Dunes SVRA, SLO = San Luis Obispo, VSFB = Vandenberg Space Force Base

| Band Combination | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|
| y/a:v | Siltcoos Beach 2020 | Lane, OR | 10/6, 10/7, 10/13, 10/14, 10/22, 10/23, 10/29, 11/5, 11/9, 11/11, 11/18, 11/24, 11/26, 11/29, 12/8, 1/18, 1/24, 2/6 | |
| g/r:b | Tenmile Creek 2019 | Douglas, OR | 10/5, 10/14 | |
| av:va | Point Reyes National Seashore 2021 | Marin, CA | 10/2, 10/4, 10/5, 10/8, 10/14, 10/22, 10/23, 10/29, 11/5, 11/9, 11/11, 11/18, 11/24, 11/26, 11/29, 12/1 | |
| na:ay | Don Edwards NWR 2022 | San Francisco | 10/5, 10/19, 10/21, 10/23, 10/28, 11/4, 11/5, 11/30, 12/23, 12/30 | |
| wn:pb | Eden Landing 2021 | Alameda | 12/1, 12/24 | |
| yg:wl | Reservation Road 2016 | Monterey | 10/1, 10/2, 10/6, 10/14, 10/15, 10/22, 10/23, 10/28, 10/29, 11/10, 11/19, 11/24, 12/2, 12/3, 12/8, 12/16, 12/22, 12/24, 1/3, 2/4, 2/6 | |
| bb:ba | ODSVRA 2019 | SLO | 10/1, 10/4, 10/6, 10/7 | |
| bb:pg | ODSVRA 2022 | SLO | 10/5, 10/13, 11/9, 11/16, 11/19, 11/26, 12/30, 1/7, 2/1, 2/7, 2/8, 2/12 | |
| bb:rv | ODSVRA 2021 | SLO | 10/6, 10/22, 10/28, 10/29, 11/4, 11/17, 11/18, 11/19, 11/24, 11/26, 12/1, 12/16, 12/17, 12/18, 12/24, 12/30, 1/7 | |
| bb:wv | ODSVRA 2020 | SLO | 10/4, 10/5, 10/6, 10/13, 10/14, 11/18, 11/26, 12/9, 12/18, 12/30, 2/6, 2/7 | |
| ga:av | ODSVRA 2020 | SLO | 10/14, 12/30 | |
| ga:ba | ODSVRA 2020 | SLO | 10/5, 10/6, 10/14, 10/22, 10/28, 10/29, 11/2, 11/4, 11/9, 11/17, 11/22, 11/28, 12/1, 12/8, 2/1, 2/4 | |
| ga:bg | ODSVRA 2020 | SLO | 10/6, 10/7, 10/14, 10/22, 10/23, 10/29, 11/19, 11/20, 11/24, 12/1, 12/2, 12/3, 12/8, 12/16, 12/18, 12/29, 1/3, 1/29, 2/6, 2/8, 2/25 | |
| ga:bo | ODSVRA 2021 | SLO | 10/5, 10/14, 11/23, 11/28, 12/21, 1/18, 2/11 | |
| ga:oa | ODSVRA 2021 | SLO | 10/2, 10/4, 10/6, 10/23, 10/29, 11/4, 11/11, 11/18, 11/20, 11/24, 12/8, 12/18, 12/22, 12/30, 12/31, 1/2, 1/3, 1/7, 1/29, 2/1, 2/25 | |
| ga:pr | ODSVRA 2016 or 2017 | SLO | 10/5, 10/6, 10/7, 10/8, 10/14, 11/16, 11/30, 12/21, 1/8, 1/18 | |
| ga:pv | ODSVRA 2020 | SLO | 10/5, 10/7, 10/23, 11/26, 11/30, 12/23, 12/30, 1/18, 2/7, 2/14 | |
| ga:py | ODSVRA 2011 | SLO | 10/4, 10/5, 10/6, 10/7, 10/14, 10/21, 10/22, 10/23, 10/28, 11/11, 11/18, 11/19, 11/20, 11/24, 12/2, 12/3, 12/12, 12/17, 12/18, 12/22, 12/30, 1/21, 2/1, 2/6, 2/14 | |
| ga:ry | ODSVRA 2017 | SLO | 10/5, 10/15, 10/23, 10/29, 11/5, 11/18, 12/21 | |
| ga:wo | ODSVRA 2021 | SLO | 10/5, 10/14, 10/21, 10/23, 10/29, 11/4, 11/16, 11/23, 12/23, 12/30, 12/31, 1/18, 2/1, 2/6, 2/7, 2/8, 2/14 | |

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

**Table D.3 Banded snowy plovers recorded at ODSVRA 1 October 2022 to 28 February 2023 (continued).**

| Band Combination | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|
| ga:wy | ODSVRA 2018 | SLO | 10/1, 10/8, 10/13, 10/14, 10/23, 10/29, 11/4, 11/18, 11/19, 11/24, 12/22, 12/24, 2/13, 2/14, 2/15 | |
| ga:yo | ODSVRA 2022 | SLO | 10/13, 10/29, 11/16, 11/24, 11/26, 12/8, 12/30, 2/7, 2/8, 2/13, 2/14 | |
| gg:av | ODSVRA 2019 | SLO | 10/29, 1/29 | |
| gg:oa | ODSVRA 2019 | SLO | 10/23 | |
| gg:ob | ODSVRA 2019 | SLO | 10/6, 10/7, 10/14, 10/21, 10/22, 10/28, 10/29, 11/11, 11/26, 12/1 | |
| gg:pa | ODSVRA 2022 | SLO | 10/1, 10/4, 10/5, 10/6, 10/7, 10/13, 10/14, 10/23, 10/29, 11/16, 11/26, 12/9 | |
| gg:wo | ODSVRA 2022 | SLO | 10/14, 10/19, 10/26, 11/4, 11/17, 11/28, 12/21, 2/15, 2/21 | |
| pg:ar | ODSVRA 2014 | SLO | 10/6, 10/14, 10/15, 10/20, 10/22, 11/4, 11/5, 11/14, 11/18, 11/22, 11/24, 11/29, 12/1, 12/22, 12/24, 12/29, 12/30 | |
| pg:ay | ODSVRA 2022 | SLO | 11/16, 11/19, 11/20 | |
| pg:ba | ODSVRA 2021 | SLO | 10/5, 10/7, 10/14, 10/19, 10/22, 10/23, 10/28, 11/4, 11/30, 12/8, 12/23, 12/24, 12/30, 1/18, 2/6, 2/11, 2/14, 2/15, 2/25 | |
| pg:br | ODSVRA 2021 | SLO | 10/5, 10/13, 10/21, 10/22, 10/23, 10/28, 11/25, 11/30, 12/17, 12/23, 12/29, 2/6, 2/11, 2/13, 2/14 | |
| pg:by | ODSVRA 2017 or 2018 | SLO | 10/5, 10/13, 10/14, 10/19, 2/12, 2/21 | |
| pg:go | ODSVRA 2022 | SLO | 10/5, 10/6, 10/14, 11/4, 11/5, 11/11 | |
| pg:gw | ODSVRA 2022 | SLO | 10/5, 10/19, 1/7, 1/18, 2/12, 2/14, 2/22 | |
| pg:or | ODSVRA 2022 | SLO | 10/6, 10/15, 10/20, 10/22, 10/29, 11/4, 11/9, 11/29, 12/8, 12/24, 12/29, 1/18, 2/1, 2/7, 2/8, 2/14 | |
| pg:ow | ODSVRA 2015 or 2016 | SLO | 10/5, 10/6, 10/14, 10/22, 10/26, 11/23, 2/7 | |
| pg:ro | ODSVRA 2022 | SLO | 10/5, 10/19, 10/23, 10/28, 11/16, 11/26, 11/30, 12/30, 2/1, 2/6, 2/12, 2/13, 2/14, 2/21 | |
| pg:ya | ODSVRA 2022 | SLO | 10/14, 10/22, 10/23, 10/29, 11/18, 11/29, 12/1, 12/2, 12/3, 12/8, 12/24, 1/1, 1/18, 2/1, 2/6 | |
| pg:yb | ODSVRA 2015 or 2017 | SLO | 10/21 | |
| pg:yr | ODSVRA 2022 | SLO | 10/5, 10/8, 10/13, 10/14, 10/19, 10/22, 10/23, 10/28, 11/16, 11/20, 12/2, 12/9, 12/16, 12/24, 12/30, 2/14, 2/25 | |
| pv:aa | ODSVRA 2021 | SLO | 10/15, 10/21, 11/5, 11/23, 11/24 | |
| pv:by | ODSVRA 2015 | SLO | 2/21 | |
| pv:pb | ODSVRA 2022 | SLO | 10/1, 10/7, 10/13, 10/14, 10/22, 10/23, 11/18, 11/20, 11/24, 11/26, 12/3, 12/9, 12/16, 12/22, 12/29, 12/30, 1/21, 2/7, 2/25 | |
| pv:pv | ODSVRA 2021 | SLO | 10/5, 10/14, 11/5, 11/16, 11/19, 11/28, 12/30, 1/7, 1/18, 2/15, 2/21 | |
| pv:rb | ODSVRA 2016 | SLO | 10/23, 10/26, 10/29, 11/19, 11/25, 11/30, 12/22, 12/23 | |
| pv:wy | ODSVRA 2014 or 2015 | SLO | 10/23, 2/11 | |
| rr:aw | ODSVRA 2017 | SLO | 2/11, 2/12 | |

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

**Table D.3 Banded snowy plovers recorded at ODSVRA 1 October 2022 to 28 February 2023 (continued).**

| Band Combination | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|
| rr:ay | ODSVRA 2022 | SLO | 10/4, 10/14, 10/22, 10/23, 10/29, 11/14, 11/28, 12/1, 12/3, 12/8, 12/10, 12/16, 12/17, 12/24, 12/30, 1/2, 1/3, 2/4, 2/6 | |
| rr:bb | ODSVRA 2016 or 2017 | SLO | 10/1, 10/7, 10/8, 10/19, 10/23, 11/17, 11/18, 11/19, 1/2, 2/4, 2/6, 2/14 | |
| rr:bo | ODSVRA 2022 | SLO | 10/14, 10/21, 10/22, 11/16, 11/23, 11/24, 12/1, 12/8, 12/10, 12/16, 12/24, 12/29, 12/30, 12/31, 1/1, 1/2, 2/1, 2/6, 2/7 | |
| rr:ga | ODSVRA 2022 | SLO | 10/5, 10/13, 10/14, 10/20, 10/21, 10/23, 10/29, 11/9, 11/24, 12/18, 2/1, 2/7, 2/8, 2/13, 2/14, 2/15, 2/21 | |
| rr:og | ODSVRA 2022 | SLO | 10/2, 10/6, 10/13, 10/14, 10/22, 10/23, 10/29, 11/9, 11/20, 11/23 | |
| rr:oy | ODSVRA 2022 | SLO | 10/5 | |
| rr:pr | ODSVRA 2022 | SLO | 10/7 | |
| rr:pv | ODSVRA 2022 | SLO | 10/22, 10/23, 10/28, 11/4 | |
| rr:ro | ODSVRA 2022 | SLO | 10/5, 10/14 | |
| rr:wr | ODSVRA 2022 | SLO | 10/5, 10/11, 10/14, 11/5, 11/11, 11/18, 11/30, 1/18 | |
| rr:ya | ODSVRA 2022 | SLO | 10/2, 10/4, 10/13, 10/15, 10/21, 10/22, 10/28, 10/29, 11/2, 11/11, 11/18, 11/29, 12/2, 12/16, 12/18, 12/22, 1/3, 1/18, 1/29, 2/1, 2/6, 2/8, 2/11, 2/14 | |
| rr:yr | ODSVRA 2022 | SLO | 10/5, 10/6, 10/8, 10/19, 10/21, 10/22, 10/23, 10/28, 11/4, 11/17, 11/18, 11/19, 11/20, 11/24, 11/26, 12/1, 12/18, 12/29, 12/30, 1/2, 1/3, 1/7, 1/18, 2/4, 2/6 | |
| vg:aa | ODSVRA 2021 | SLO | 10/5, 10/23, 11/5, 11/16, 12/21, 12/29, 2/1 | |
| vg:ab | ODSVRA 2021 | SLO | 10/5, 10/21, 10/29, 11/19, 11/24, 12/8, 12/18, 12/22, 12/30, 1/8, 2/7, 2/8, 2/13, 2/21 | |
| vg:rv | ODSVRA 2020 | SLO | 12/30 | |
| vg:rw | ODSVRA 2018 | SLO | 2/12, 2/13 | |
| vv:ar | ODSVRA 2021 | SLO | 10/5, 10/28, 11/4, 11/24, 11/30, 12/23, 12/24, 1/18, 2/7, 2/13, 2/14 | |
| vv:ra | ODSVRA 2020 | SLO | 10/14, 10/15, 10/19, 10/23, 1/7 | |
| vv:rv | ODSVRA 2020 | SLO | 10/1, 10/7, 10/14, 10/29, 11/19, 11/22, 11/24, 11/26, 12/17, 12/22, 12/24, 1/18, 2/1, 2/8, 2/13 | |
| a:g/o/g | VSFB 2017 | Santa Barbara | 10/5, 10/14, 10/19, 11/16, 11/30, 12/21 | On federal service band on left leg there is exposed metal above blue tape. |
| l:a/v | VSFB 2022 | Santa Barbara | 2/6 | |
| l:y/g | VSFB 2016 | Santa Barbara | 10/5, 10/6, 10/7, 10/19, 11/11, 11/28, 11/30 | |
| nb:rr | VSFB 2020 | Santa Barbara | 10/2, 10/6, 10/13, 10/22, 10/23, 10/29, 11/18, 11/20, 11/22, 11/24, 11/26, 12/2, 12/3, 12/16, 12/30, 2/1, 2/6 | |
| ns:ba | VSFB Unknown | Santa Barbara | 10/5, 10/14, 10/28, 10/29, 11/16, 11/18, 11/24, 11/29, 12/2, 12/8, 12/24, 1/3, 2/6, 2/8, 2/13, 2/14 | |
| nw:yw | VSFB 2022 | Santa Barbara | 10/5, 10/26, 11/16, 11/23, 1/18, 2/1, 2/15, 2/19, 2/21 | |

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

**Table D.3 Banded snowy plovers recorded at ODSVRA 1 October 2022 to 28 February 2023 (continued).**

| Band Combination | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|
| ny:gv | VSFB 2021 | Santa Barbara | 10/1, 10/7, 10/8, 10/11, 10/14, 10/22, 10/23, 10/28, 10/29, 11/5, 11/18, 11/20, 11/24, 11/25, 12/1, 12/9, 12/10, 12/16, 12/22, 1/1, 1/3 | |
| ny:pr | VSFB 2021 | Santa Barbara | 10/14 | |
| ny:wg | VSFB 2017 | Santa Barbara | 10/14, 10/15, 10/19, 10/21, 11/24, 11/30, 2/11 | |
| ny:wl | VSFB 2020 | Santa Barbara | 10/21 | |
| o:a/y/a | VSFB 2022 | Santa Barbara | 11/30, 12/8, 12/16, 1/18, 2/6, 2/7, 2/8, 2/13, 2/14, 2/15, 2/22 | |
| w-:s- | Unknown | Unknown | 1/18 | |

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

### Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023.

Juveniles fledged from ODSVRA in 2023 are not included. All birds were banded as chicks unless otherwise noted. Chicks banded outside of San Luis Obispo County are noted in order north to south. Some sites band to brood and can have more than one bird with the same combination. (For a description of color band letter codes see Appendix A.)

ODSVRA = Oceano Dunes SVRA, SLO = San Luis Obispo, SP = State Park, NAS = Naval Air Station, NB = Naval Base, VSFB = Vandenberg Space Force Base

F = Female, M = Male

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| a/w/a:y | | Dunes Overlook 2020 | Douglas-Lane boundary, OR | 7/26, 8/5, 8/11, 9/8 | |
| wb:ry | | Marina Beach 2023 | Monterey, CA | 8/19, 8/21, 8/22, 8/25 | Juvenile. |
| yg:wl | | Reservation Road 2016 | Monterey | 3/12, 7/19, 7/21, 7/22, 8/3, 8/31, 9/3, 9/15, 9/18 | |
| ow:wr | F | Fort Ord SP 2015 | Monterey | 5/11, 5/12, 5/22, 5/24, 5/26, 5/29, 6/2, 6/24 | ODSVRA breeding female. |
| ab:wb | | Fort Ord SP 2022 | Monterey | 5/16, 7/30 | |
| bb:ar | F | ODSVRA 2017 or 2018 | SLO | 4/19, 5/17, 7/12, 7/13, 7/19, 7/21, 7/22 | ODSVRA breeding female. |
| bb:ba | | ODSVRA 2019 | SLO | 4/27 | |
| bb:bb | F | ODSVRA 2018 | SLO | 4/18, 4/27, 5/20, 5/27, 5/30, 6/3, 6/15, 7/12, 7/16 | ODSVRA breeding female. |
| bb:bv | | ODSVRA 2020 | SLO | 5/15 | |
| bb:bw | M | ODSVRA 2018 | SLO | 4/9, 4/12, 4/26, 5/6, 6/5, 6/7, 6/12, 6/16, 6/20, 6/28, 7/2, 7/3, 7/4, 7/7, 7/8, 7/10, 7/11, 7/12, 7/13, 7/21, 7/22 | ODSVRA breeding male. |
| bb:go | F | ODSVRA 2019 | SLO | 4/10, 4/13, 4/16, 4/19, 4/28, 6/3, 6/4, 6/5, 6/8, 6/15, 6/16, 6/18, 6/24, 6/25 | ODSVRA breeding female. |
| bb:gr | | ODSVRA 2012 or 2015 | SLO | 4/18 | |
| bb:or | M | ODSVRA 2016 or 2017 | SLO | 5/17, 5/18, 5/20, 5/21, 5/22, 5/24, 5/25, 5/26, 5/27, 5/31, 6/1, 6/6, 6/7, 6/9, 8/3, 8/4, 8/5, 8/8, 8/9, 8/11 | ODSVRA breeding male. |
| bb:pg | M | ODSVRA 2022 | SLO | 3/2, 3/8, 3/13, 3/17, 4/10, 4/12, 5/15, 5/19, 5/30, 6/4, 6/6, 6/7, 6/8, 6/22, 7/5, 7/6, 8/1, 8/2, 8/4, 8/9, 8/11, 8/16, 8/27, 8/31, 9/16, 9/20, 9/21 | ODSVRA breeding male. |
| bb:wv | F | ODSVRA 2020 | SLO | 3/21, 4/9, 4/27, 5/23, 5/24, 6/6, 8/17, 8/29, 9/15, 9/18 | ODSVRA breeding female. |
| bb:ww | F | ODSVRA 2020 | SLO | 3/6, 4/20, 4/26, 5/10, 5/18, 6/16, 7/11, 7/24, 7/28 | ODSVRA breeding female. |
| bb:yy | F | ODSVRA 2022 | SLO | 5/3, 5/6, 6/9, 6/12, 6/16, 7/6, 7/22, 8/22 | ODSVRA breeding female. |
| ga:av | F | ODSVRA 2020 | SLO | 5/24, 6/26, 6/27, 6/30, 8/6, 8/31 | ODSVRA breeding female. |
| ga:ba | M | ODSVRA 2020 | SLO | 3/8, 3/18, 3/19, 3/23, 4/8, 4/9, 4/22, 5/12, 5/18, 5/20, 5/24, 5/27, 6/8, 6/14, 6/29, 6/30, 7/2, 7/3, 7/6, 7/11, 7/24, 8/14, 9/2, 9/15 | ODSVRA breeding male. |
| ga:bb | | ODSVRA 2017 or 2018 | SLO | 4/26, 4/27 | |
| ga:bg | M | ODSVRA 2020 | SLO | 3/12, 3/24, 4/4, 4/5, 4/23, 5/1, 5/11, 5/14, 5/15, 5/16, 5/19, 5/20, 5/21, 5/22, 5/25, 5/26, 5/27, 5/29, 6/1, 6/2, 6/3, 6/4, 6/8, 6/14, 6/21, 6/23, 6/29, 6/30, 7/4, 7/9, 7/15, 7/21, 7/22, 7/25, 8/8, 8/15, 8/17, 8/30, 8/31, 9/1, 9/3, 9/4, 9/5 | ODSVRA breeding male. |

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

**Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).**

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| ga:bo | F | ODSVRA 2021 | SLO | 5/4, 5/19, 5/22, 6/7, 6/9, 6/30, 7/6, 7/13, 7/24, 8/8, 8/9, 8/12 | ODSVRA breeding female. |
| ga:br | M | ODSVRA 2021 | SLO | 4/24, 4/25, 4/28, 5/27, 5/28, 6/6, 6/8, 7/6, 7/13, 7/21 | ODSVRA breeding male. |
| ga:ga | M | ODSVRA 2022 | SLO | 5/26, 5/31, 6/14, 7/4, 7/5, 7/9, 7/31, 8/2, 8/4, 8/6, 8/7, 8/9, 8/14 | ODSVRA breeding male. |
| ga:ob | M | ODSVRA 2021 | SLO | 3/8, 3/19, 3/20, 3/24, 4/10, 4/22, 4/28, 5/6, 5/12, 5/16, 5/25, 5/27, 5/28, 5/31, 6/4, 6/9, 6/11, 6/13, 6/14, 6/15, 6/16, 6/18, 6/24, 7/22, 7/26, 7/28, 7/29, 7/30, 8/1, 8/3, 8/4, 8/5, 8/7, 8/8, 8/9, 8/10, 8/11, 8/13, 8/14, 8/16, 8/17, 8/18, 8/20, 8/22, 8/23, 8/24, 8/25, 8/26, 8/28, 8/29, 8/31, 9/3, 9/4, 9/5, 9/6 | ODSVRA breeding male. |
| ga:or | | ODSVRA 2016 or 2017 | SLO | 7/13 | |
| ga:pr | M | ODSVRA 2016 or 2017 | SLO | 5/1, 5/2, 5/3, 5/7, 5/9, 6/21, 6/26, 7/29 | ODSVRA breeding male. |
| ga:pv | M | ODSVRA 2020 | SLO | 3/15, 3/29, 4/29, 5/6, 5/31, 6/13, 6/24, 7/1, 7/7, 8/1, 8/7, 8/8, 8/10, 8/11, 8/12, 8/13, 8/15, 8/16, 8/17, 8/20, 8/23, 8/25, 8/26, 8/27, 8/28, 8/29, 8/31, 9/1, 9/3, 9/5 | ODSVRA breeding male. |
| ga:py | F | ODSVRA 2011 | SLO | 4/26, 5/4, 5/29, 5/30, 6/15, 7/5, 7/6, 7/7, 7/8, 7/9, 7/24, 8/15, 8/30, 9/1, 9/2, 9/3, 9/4, 9/5, 9/6, 9/14, 9/15, 9/20 | ODSVRA breeding female. |
| ga:ra | | ODSVRA 2022 | SLO | 9/2 | |
| ga:rb | | ODSVRA 2010 | SLO | 7/3 | |
| ga:rr | | ODSVRA 2022 | SLO | 6/22 | |
| ga:ry | F | ODSVRA 2017 | SLO | 4/10, 5/13, 5/24, 5/30, 6/23, 7/2, 7/3, 7/4, 8/1, 8/2, 8/15, 8/19, 8/31, 9/2, 9/14 | ODSVRA breeding female. |
| ga:vb | M | ODSVRA 2021 | SLO | 4/25 | ODSVRA breeding male. |
| ga:vw | | ODSVRA 2020 | SLO | 3/23, 4/14, 9/21 | |
| ga:wb | M | ODSVRA 2021 | SLO | 4/12, 4/17, 4/26, 4/27, 4/29, 5/12, 5/15, 5/17, 5/24, 5/28, 6/1, 6/2, 6/3, 6/4, 6/9, 6/10, 6/17, 6/18, 6/20, 6/22, 6/23, 7/1, 7/3, 7/4, 7/5, 7/6, 7/7, 7/8, 7/13, 7/15, 7/16, 7/17, 7/18, 7/21, 7/22 | ODSVRA breeding male. |
| ga:wo | M | ODSVRA 2021 | SLO | 3/8, 6/8, 6/9, 7/1, 7/2, 7/6, 7/9, 7/10, 7/11, 7/12, 7/13, 7/15, 7/16, 7/17, 7/19, 7/20, 7/21, 7/25, 7/27, 8/1, 8/2 | ODSVRA breeding male. |
| ga:wr | M | ODSVRA 2015 or 2016 | SLO | 4/29, 5/3, 5/4, 5/10, 5/24, 5/29, 6/2, 6/9, 6/21, 6/30, 7/7 | ODSVRA breeding male. |
| ga:wy | F | ODSVRA 2018 | SLO | 3/6, 3/7, 3/13, 3/21, 3/29, 4/2, 4/6, 4/21, 5/6, 5/29, 6/4, 6/12, 7/25, 7/26, 7/27, 7/28, 7/29, 8/1, 8/2, 8/3, 8/5, 8/8, 8/15, 8/29, 9/15, 9/16 | ODSVRA breeding female. |
| ga:yo | M | ODSVRA 2022 | SLO | 3/8, 5/13, 6/8, 6/17, 6/25, 6/27, 6/29, 7/11, 8/27, 8/30 | ODSVRA breeding male. |
| ga:yr | | ODSVRA 2014 | SLO | 4/25, 5/30, 7/12 | |
| gg:ag | F | ODSVRA 2022 | SLO | 4/17, 4/18, 5/18, 6/2, 6/8, 6/16 | ODSVRA breeding female. |

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

**Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).**

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| gg:av | | ODSVRA 2019 | SLO | 4/25 | |
| gg:ba | | ODSVRA 2019 | SLO | 4/26, 5/3, 5/21 | |
| gg:bg | | ODSVRA 2021 | SLO | 5/20 | |
| gg:by | | ODSVRA 2021 | SLO | 5/24, 5/31 | |
| gg:gg | M | ODSVRA 2021 | SLO | 4/5, 4/6, 4/10, 4/13, 4/14, 4/15, 4/16, 4/17, 4/18, 4/19, 4/27, 4/28, 5/3, 5/13, 5/24, 5/29, 6/2, 6/4, 6/5, 6/8, 6/17, 6/18, 6/19, 6/21, 6/30, 7/2, 7/3, 7/4, 7/5, 7/10, 7/11, 7/13, 7/15, 7/18, 7/19, 7/21, 7/22, 7/23, 7/27, 7/28, 7/29, 8/1 | ODSVRA breeding male. |
| gg:go | | ODSVRA 2019 | SLO | 4/16 | |
| gg:oa | F | ODSVRA 2019 | SLO | 4/25, 4/26, 7/20, 7/21, 7/24, 7/28 | ODSVRA breeding female. |
| gg:ob | | ODSVRA 2019 | SLO | 6/15, 8/24 | |
| gg:ol | | ODSVRA 2019 | SLO | 4/14 | |
| gg:rb | M | ODSVRA 2016 or 2018 | SLO | 5/4, 5/6, 5/16, 5/24, 6/29, 7/5, 7/6, 7/7, 7/8, 7/9, 7/11, 7/12, 7/14, 7/16, 7/18, 7/20, 7/21, 7/23, 7/24, 7/25 | ODSVRA breeding male. |
| gg:wa | | ODSVRA 2021 | SLO | 4/28, 4/29, 4/30, 5/23, 5/26, 6/4, 6/6, 6/9, 6/11, 6/29, 6/30 | |
| gg:wb | | ODSVRA 2011 or 2013 | SLO | 7/16 | |
| gg:wo | M (2) | ODSVRA 2022 | SLO | 5/16, 5/27, 5/30, 6/2, 6/3, 6/9, 7/13, 7/20, 7/25, 7/28, 7/29, 8/4, 8/5, 8/23, 8/25, 9/2, 9/14 | ODSVRA breeding males (2). |
| gg:wr | | ODSVRA 2014 or 2016 | SLO | 5/7 | |
| pg:b- | M | ODSVRA unknown | SLO | 3/9, 5/26, 6/2, 7/17, 7/20, 7/22, 7/23, 7/25, 7/28, 8/1, 8/2, 8/3, 8/4, 8/8 | ODSVRA breeding male. |
| pg:ba | M (2) | ODSVRA 2021 | SLO | 3/6, 4/13, 4/14, 4/26, 5/12, 5/15, 5/16, 5/23, 5/29, 5/30, 5/31, 6/2, 6/5, 6/6, 6/7, 6/8, 6/9, 6/10, 6/12, 6/13, 6/14, 6/15, 6/16, 6/22, 6/24, 6/25, 6/26, 6/27, 6/29, 6/30, 7/1, 7/4, 7/8, 7/11, 7/12, 7/14, 7/19, 7/25, 7/26, 7/31, 8/2, 8/3, 8/7, 8/8, 8/9, 8/10, 8/13, 8/14, 8/16, 8/17, 8/22, 8/23, 8/28, 9/2, 9/3, 9/10, 9/20 | ODSVRA breeding males (2). |
| pg:bg | | ODSVRA 2015 or 2016 | SLO | 8/15 | |
| pg:br | M | ODSVRA 2021 | SLO | 4/10, 4/11, 4/25, 5/13, 5/14, 5/16, 5/19, 5/24, 5/29, 6/3, 6/4, 6/5, 6/6, 6/8, 6/18, 6/19, 6/20, 6/21, 6/24, 6/25, 6/26, 6/28, 6/29, 6/30, 7/2, 7/3, 7/4, 7/9, 7/10, 7/11, 7/13, 8/3, 8/15, 8/26, 9/2 | ODSVRA breeding male. |
| pg:by | M (2) | ODSVRA 2017 or 2018 | SLO | 4/18, 4/21, 4/22, 4/23, 4/26, 5/16, 5/18, 5/21, 5/22, 5/24, 5/25, 5/26, 5/27, 5/29, 5/30, 5/31, 6/3, 6/6, 6/11, 6/12, 6/14, 6/15, 6/26, 7/11, 7/14, 7/25, 7/26, 7/27, 7/28, 7/29, 8/1, 8/3, 8/4, 8/6, 8/7, 8/8, 8/9, 8/10, 8/11, 8/13, 8/14, 8/16, 8/18, 8/19 | ODSVRA breeding males (2). |
| pg:gw | F | ODSVRA 2022 | SLO | 4/15, 4/25, 5/17, 5/31, 7/1, 7/12, 7/13, 7/16, 8/12, 8/15, 8/20, 8/21, 8/31, 9/3 | ODSVRA breeding female. |

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

### Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| pg:or | M | ODSVRA 2022 | SLO | 3/2, 3/12, 3/13, 4/17, 4/23, 4/27, 5/3, 5/18, 5/28, 6/2, 6/8, 7/1, 7/2, 7/3, 7/5, 7/6, 7/7, 7/9, 7/10, 7/11, 7/12, 7/13, 7/14, 7/16, 7/17, 7/18, 7/19, 7/20, 7/22, 7/25, 7/27, 8/6, 8/8, 8/15, 8/30, 8/31, 9/3, 9/5, 9/18 | ODSVRA breeding male. |
| pg:ow | M | ODSVRA 2015 or 2016 | SLO | 5/16, 5/17, 5/27, 6/1, 6/3, 6/30, 7/6, 7/12, 7/13, 7/14, 7/26, 7/31, 8/16 | ODSVRA breeding male. |
| pg:pb | | ODSVRA 2014 or 2015 | SLO | 5/6, 5/10 | |
| pg:rr | | ODSVRA 2022 | SLO | 6/20 | |
| pg:wy | | ODSVRA 2022 | SLO | 5/29 | |
| pg:ya | | ODSVRA 2022 | SLO | 3/10, 3/12, 3/20, 3/24, 3/31, 7/19, 7/27, 8/29, 8/30, 9/4, 9/14, 9/15, 9/18 | |
| pg:yb | | ODSVRA 2015 or 2017 | SLO | 9/3 | |
| pg:yr | M | ODSVRA 2022 | SLO | 3/20, 3/31, 4/13, 4/15, 4/16, 4/17, 4/24, 4/25, 5/2, 5/14, 5/26, 5/28, 5/30, 6/3, 6/9, 6/12, 6/13, 6/23, 7/6, 7/11, 7/13, 7/15, 7/18, 7/19, 7/20, 7/25, 7/28, 7/30, 8/2, 8/3, 8/10, 8/14, 8/15, 8/18, 8/29, 9/1, 9/3, 9/6, 9/8, 9/11 | ODSVRA breeding male. On 25 April, bird banded pg:yr seen with possible right leg injury (see Table H.2 in Appendix H). |
| pg:yw | M | ODSVRA 2022 | SLO | 4/26, 4/28, 5/3, 5/14, 6/6, 6/7, 7/21, 7/22, 8/12, 8/13 | ODSVRA breeding male. |
| pv:bb | | ODSVRA 2022 | SLO | 5/16 | |
| pv:by | F | ODSVRA 2015 | SLO | 4/7, 5/24, 7/26, 7/28, 8/8, 8/9, 8/11, 8/12, 8/13, 8/14, 8/16, 8/19, 8/20, 8/21, 8/22, 8/23, 8/25, 8/31, 9/2, 9/14 | ODSVRA breeding female. |
| pv:gb | M | ODSVRA 2020 | SLO | 4/8, 5/3, 5/6, 5/22, 5/26, 5/29, 6/5, 6/7, 6/8, 6/10, 6/12, 6/13, 6/14, 6/18, 6/19, 6/28, 7/6, 7/7, 7/12, 7/13 | ODSVRA breeding male. |
| pv:pb | M | ODSVRA 2022 | SLO | 3/12, 3/26, 4/19, 4/27, 5/3, 5/6, 5/12, 5/16, 5/27, 5/28, 6/2, 6/6, 6/9, 6/12, 6/13, 6/14, 6/17, 6/22, 6/23, 6/30, 7/1, 7/2, 7/3, 7/9, 7/15, 7/16, 7/19, 7/29, 7/30, 8/1, 8/2, 8/7, 8/11, 8/15, 8/16 | ODSVRA breeding male. |
| pv:pv | F | ODSVRA 2021 | SLO | 3/30, 4/11, 4/26, 5/4, 6/12, 7/1, 7/2, 7/6, 7/12, 7/19, 7/23, 7/28, 8/3, 8/11, 8/30, 8/31, 9/1, 9/3 | ODSVRA breeding female. |
| pv:vb | M | ODSVRA 2022 | SLO | 6/1, 6/7, 6/8, 6/14, 6/22, 7/5, 7/8, 7/9, 7/10, 7/13, 7/14, 7/22, 7/24, 7/25, 7/26, 7/29, 7/30, 8/1, 8/8 | ODSVRA breeding male. |
| pv:wy | | ODSVRA 2014 or 2015 | SLO | 6/8, 6/23 | |
| rr:aa | | ODSVRA 2021 | SLO | 6/10 | |
| rr:ao | F | ODSVRA 2022 | SLO | 5/4, 5/25 | ODSVRA breeding female. On 8 June, kestrel observed depredating rr:ao female from SP99 nest (Table H.4 in Appendix H). |
| rr:ar | | ODSVRA 2022 | SLO | 4/19 | |

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

### Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| rr:aw | M (2) | ODSVRA 2017 | SLO | 3/25, 4/10, 4/11, 4/25, 5/2, 5/3, 5/24, 5/31, 6/1, 6/3, 6/15, 6/18, 6/23, 7/3, 7/4, 7/5, 7/8, 7/12, 7/16, 7/20, 7/26, 7/28, 8/3, 8/5, 8/9, 8/11, 8/12, 8/13, 8/14, 8/15, 8/16, 8/19, 8/21, 8/25, 8/26, 8/29, 8/30, 8/31, 9/1, 9/3, 9/4, 9/5, 9/6, 9/8 | ODSVRA breeding males (2). |
| rr:ay | F | ODSVRA 2022 | SLO | 3/5, 3/13, 3/29, 3/31, 4/4, 4/10, 4/14, 4/28, 5/5, 6/4, 6/8, 6/14, 7/15, 7/19, 7/20, 7/21, 8/30, 9/4, 9/5, 9/16, 9/20 | ODSVRA breeding female. |
| rr:bb | F | ODSVRA 2016 or 2017 | SLO | 3/9, 3/31, 4/3, 5/23, 5/26, 6/15, 7/6, 7/7, 8/5, 8/6, 8/31, 9/1, 9/2, 9/5, 9/16 | ODSVRA breeding female. |
| rr:bo | | ODSVRA 2022 | SLO | 3/10, 3/12, 8/31, 9/4, 9/16 | |
| rr:bw | M | ODSVRA 2016 or 2017 | SLO | 4/10, 4/26, 5/6, 5/17, 5/24, 6/6, 6/8, 6/9, 7/1, 7/2, 7/3, 7/4, 7/5, 7/6, 7/8, 7/10, 7/11, 7/15, 7/23, 7/24, 7/25, 7/27 | ODSVRA breeding male. |
| rr:ga | M | ODSVRA 2022 | SLO | 3/15, 3/31, 4/26, 5/6, 5/28, 5/31, 6/4, 6/8, 6/11, 6/12, 6/13, 6/14, 6/16, 6/18, 6/19, 6/20, 6/25, 6/27, 7/3, 7/7, 7/10, 7/15, 7/16, 7/18, 7/21, 8/15, 8/16, 9/1 | ODSVRA breeding male. |
| rr:oo | | ODSVRA 2022 | SLO | 5/16, 5/24, 5/26, 6/8, 6/14, 6/15, 7/4, 7/8, 7/21, 9/16 | |
| rr:oy | F | ODSVRA 2022 | SLO | 4/23, 5/11, 5/25, 6/12, 6/15, 6/16, 6/19, 7/6, 7/12, 7/25, 8/13 | ODSVRA breeding female. |
| rr:pa | M | ODSVRA 2022 | SLO | 5/31, 6/9, 6/16, 6/18, 6/19, 6/22, 7/26, 8/1, 8/3, 8/5, 8/6, 8/7, 8/8, 8/9, 8/10, 8/13, 8/14, 8/19, 8/20, 8/24, 8/25, 8/27, 8/29 | ODSVRA breeding male. |
| rr:pw | F | ODSVRA 2014 | SLO | 4/18, 4/29, 5/23, 5/24, 5/27, 5/30, 6/2, 7/8, 7/20 | ODSVRA breeding female. |
| rr:ra | M & F | ODSVRA 2022 | SLO | 4/26, 5/24, 6/1, 6/18, 7/2, 7/6, 7/10, 7/11, 7/13, 7/16, 7/19, 7/20, 7/21, 8/1, 8/2, 8/3, 8/8 | ODSVRA breeding male and female. |
| rr:ry | F | ODSVRA 2022 | SLO | 4/25, 5/22, 6/20, 6/22, 7/31, 8/11, 8/19, 8/25, 8/31, 9/2, 9/6 | ODSVRA breeding female. On 18 June, bird banded rr:ry seen with a left leg injury (see Table H.2 in Appendix H). |
| rr:wo | F | ODSVRA 2022 | SLO | 5/24, 5/25 | ODSVRA breeding female. |
| rr:wr | M | ODSVRA 2022 | SLO | 4/6, 4/25, 4/29, 5/13, 5/17, 6/12, 6/15, 6/22, 6/23, 7/2, 7/9, 7/13, 7/24, 7/25, 7/26, 7/27, 7/28, 8/1, 8/2, 8/3, 8/4, 8/6, 8/9, 8/10, 8/13, 8/14, 8/15, 8/16, 8/17, 8/18, 8/19, 8/20, 8/21, 8/22, 8/31, 9/2 | ODSVRA breeding male. |
| rr:ya | M | ODSVRA 2022 | SLO | 3/23, 4/17, 4/18, 4/19, 5/23, 5/24, 5/28, 5/29, 6/5, 6/8, 6/11, 6/12, 6/14, 6/16, 6/18, 6/19, 6/21, 7/11, 7/12, 7/20, 7/22, 7/25, 7/26, 8/15, 9/15 | ODSVRA breeding male. |
| rr:yo | M | ODSVRA 2022 | SLO | 4/25, 5/2, 5/4, 5/16, 6/16, 6/21, 7/3, 7/4, 7/6, 7/7, 7/8, 7/13, 7/19, 7/22, 7/28, 7/29 | ODSVRA breeding male. |

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

**Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).**

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| rr:yr | M | ODSVRA 2022 | SLO | 3/11, 3/24, 3/31, 4/7, 4/13, 4/14, 4/15, 4/17, 4/18, 4/19, 4/25, 4/26, 4/27, 4/28, 5/2, 5/3, 5/4, 5/11, 5/13, 5/18, 5/22, 5/24, 5/25, 6/1, 6/2, 6/5, 6/7, 6/14, 6/16, 6/17, 6/20, 6/21, 6/22, 6/30, 7/1, 7/2, 7/4, 7/7, 7/11, 7/19, 7/20, 7/21, 8/3, 8/8, 8/14, 8/19, 8/22, 8/30, 8/31, 9/3, 9/5, 9/15 | ODSVRA breeding male. |
| vg:ab | | ODSVRA 2021 | SLO | 3/20 | |
| vg:ba | | ODSVRA 2019 | SLO | 3/31, 4/5, 4/25, 4/26, 5/26, 5/27, 6/4, 6/5, 6/8, 6/12 | |
| vg:bw | | ODSVRA 2016 or 2017 | SLO | 4/6 | |
| vg:ob | M | ODSVRA 2021 | SLO | 5/12, 5/18, 5/29, 6/3, 6/6, 6/28, 6/30, 7/1, 7/3, 7/4, 7/5, 7/6, 7/11, 7/13, 7/14, 7/15, 7/19, 7/21, 7/22, 7/23, 7/29 | ODSVRA breeding male. |
| vg:ra | F | ODSVRA 2022 | SLO | 4/25, 5/16, 5/27, 5/29, 6/1, 6/14, 6/23, 7/13, 8/9, 8/11, 8/12, 8/18, 8/20, 8/31, 9/1, 9/2, 9/5 | ODSVRA breeding female. |
| vg:rw | M | ODSVRA 2018 | SLO | 4/8, 4/11, 5/24, 5/28, 5/31, 6/6, 6/8, 6/10, 6/15, 6/17, 6/18, 6/23, 6/27, 7/11, 7/14, 7/19, 7/23, 7/26, 7/27, 7/29, 7/30, 8/1, 8/2, 8/5, 8/7, 8/9, 8/11, 8/12, 8/13, 8/15, 8/16, 8/17, 8/18, 8/21 | ODSVRA breeding male. |
| vg:wo | M | ODSVRA 2022 | SLO | 5/6 | ODSVRA breeding male. |
| vg:yg | M | ODSVRA 2018 | SLO | 4/10, 5/16, 5/24, 5/30, 6/2, 6/3, 6/8, 6/9, 6/15, 6/19, 6/30, 7/10, 7/25, 8/1, 8/5, 8/10, 8/13, 8/14, 8/15, 8/24 | ODSVRA breeding male. |
| vg:yr | M | ODSVRA 2022 | SLO | 4/18, 4/19, 4/30, 5/23, 5/24, 6/8, 6/21, 7/31, 8/11, 9/4, 9/5, 9/10, 9/16 | ODSVRA breeding male. |
| vg:yy | | ODSVRA 2016 or 2018 | SLO | 3/9, 4/26, 5/17 | |
| vv:ar | F | ODSVRA 2021 | SLO | 3/6, 4/23, 4/26, 5/24, 6/26, 7/4, 8/15, 9/2 | ODSVRA breeding female. |
| vv:bw | | ODSVRA 2014 or 2015 | SLO | 3/9, 3/13, 3/26, 5/16, 5/17 | |
| vv:ga | M | ODSVRA 2022 | SLO | 4/10, 4/25, 5/6, 5/19, 5/24, 5/30, 6/4, 6/8, 6/11, 6/12, 6/14, 6/17, 6/18, 6/21, 6/22, 6/28, 6/30, 7/28, 7/29, 8/6, 9/21 | ODSVRA breeding male. |
| vv:ra | M | ODSVRA 2020 | SLO | 3/30, 4/10, 4/27, 5/6, 5/7, 5/13, 5/24, 5/28, 6/6, 6/13, 6/14, 6/15, 6/16, 6/21, 7/2, 7/6, 7/9, 7/12, 7/13, 7/18, 7/20, 7/21, 7/22, 7/23, 7/28, 8/26, 9/3, 9/6, 9/11, 9/15 | ODSVRA breeding male. |
| vv:rv | F | ODSVRA 2020 | SLO | 7/10, 7/12, 7/13, 7/15, 7/17, 7/19, 7/21, 8/8, 8/30, 8/31, 9/2, 9/10 | ODSVRA breeding female. |
| vv:wr | M | ODSVRA 2015 or 2016 | SLO | 5/16, 5/27, 6/2, 6/3, 6/6, 6/15, 7/6, 7/7, 7/8, 7/21, 7/29, 7/31, 8/3 | ODSVRA breeding male. |
| a:g/o/g | M | VSFB 2017 | Santa Barbara | 6/1, 6/7, 6/19, 6/20, 7/3, 7/5, 7/8, 7/12, 7/13, 7/19, 7/22, 7/25 | ODSVRA breeding male. On federal service band on left leg there is exposed metal above blue tape. |
| a:y/v | | VSFB 2023 | Santa Barbara | 9/2 | Juvenile. |
| an:ng | | VSFB 2020 | Santa Barbara | 4/9 | |
| an:ra | | VSFB 2022 | Santa Barbara | 7/28 | |

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

**Table D.4. Banded snowy plovers with known origins recorded at ODSVRA 1 March to 30 September 2023 (continued).**

| Band Combination | Sex (No.) | Origin and Year Banded | County Banded | Dates Seen | Notes |
|---|---|---|---|---|---|
| g:v/g | | VSFB 2023 | Santa Barbara | 8/31, 9/2 | Juvenile. |
| gn:ya | M | VSFB 2022 | Santa Barbara | 5/18, 5/27, 5/30, 6/14, 6/28, 7/12, 7/14, 7/15, 7/16, 7/18, 7/23, 7/25, 7/26, 7/27, 7/28, 7/29, 8/1, 8/2, 8/3, 8/7, 8/9, 8/12, 8/13, 8/14, 8/15, 8/17, 8/23, 8/31, 9/1, 9/2 | ODSVRA breeding male. |
| l:a/v | | VSFB 2022 | Santa Barbara | 3/26, 4/14, 4/19, 4/20, 4/24, 4/25, 4/26, 4/27, 5/1 | |
| l:y/g | M | VSFB 2016 | Santa Barbara | 4/11, 5/5, 5/16, 5/22, 5/24, 6/3, 6/12, 7/22 | ODSVRA breeding male. |
| n-:oy | M | VSFB Unknown | Santa Barbara | 6/6, 7/10, 7/12, 7/13, 7/15, 7/16, 7/19, 7/21, 7/22, 7/26, 7/29, 8/8, 8/9 | ODSVRA breeding male. |
| nb:al | | VSFB 2020 | Santa Barbara | 5/17 | |
| nb:oy | | VSFB 2016 | Santa Barbara | 8/7 | |
| nb:rr | M | VSFB 2020 | Santa Barbara | 5/12, 5/15, 5/22, 5/23, 5/25, 5/26, 5/27, 5/30, 5/31, 6/1, 6/3, 6/4, 6/5, 6/8, 6/11, 6/14, 6/16, 6/24, 7/20, 8/3, 8/5, 8/30, 9/3, 9/5, 9/11, 9/16, 9/18, 9/20 | ODSVRA breeding male. |
| no:bo | | VSFB 2023 | Santa Barbara | 7/28 | Juvenile. |
| no:oo | | VSFB 2023 | Santa Barbara | 8/30 | Juvenile. |
| ns:ba | | VSFB Unknown | Santa Barbara | 7/21, 8/29, 9/5 | |
| nw:ra | | VSFB 2022 | Santa Barbara | 9/2 | |
| nw:yw | M | VSFB 2022 | Santa Barbara | 4/10, 5/15, 5/16, 5/31, 6/6, 6/28, 7/12, 7/13, 7/14, 7/16, 7/17, 7/18, 7/23, 7/24, 7/26, 7/27 | ODSVRA breeding male. |
| ny:bw | | VSFB 2020 | Santa Barbara | 5/17 | |
| ny:gv | F | VSFB 2021 | Santa Barbara | 5/11, 5/22, 5/23, 5/24, 7/9, 7/20, 7/21, 8/3, 8/5, 8/6, 8/8, 8/14, 8/31, 9/1, 9/2, 9/15, 9/16 | ODSVRA breeding female. |
| ny:ow | | VSFB 2023 | Santa Barbara | 7/15 | Juvenile. |
| ny:wg | M | VSFB 2017 | Santa Barbara | 5/16, 5/31, 6/29, 7/4, 7/5, 7/7, 7/8, 7/10, 7/11, 7/12, 7/13, 7/18, 7/20, 7/22, 7/25, 8/15, 8/19 | ODSVRA breeding male. |
| ny:yw | | VSFB 2021 | Santa Barbara | 7/25 | |
| o:a/b/a | F | VSFB 2021 | Santa Barbara | 5/6, 5/10, 5/13, 5/24, 5/27, 6/1, 6/29, 7/2, 7/3, 7/4, 7/5, 7/6, 7/9, 7/10, 7/11 | ODSVRA breeding female. |
| w:a/r/a | | VSFB 2023 | Santa Barbara | 8/1 | Juvenile. |
| y:a/r | F | VSFB 2022 | Santa Barbara | 5/27, 6/23, 6/30, 7/5, 7/7, 7/19 | ODSVRA breeding female. |
| y:y/b/y | | VSFB 2023 | Santa Barbara | 8/30, 8/31, 9/2 | Juvenile. |
| yp:ga | F | North Island NAS 2022 | San Diego | 4/24, 5/4, 7/5, 7/6 | ODSVRA breeding female. |
| w-:o- | | Unknown | Unknown | 8/31, 9/1, 9/2 | |
| w-:s- | M | Unknown | Unknown | 6/27, 7/3, 7/4, 7/5, 7/9, 7/10, 7/11, 7/13, 8/19, 9/1, 9/3 | ODSVRA breeding male. |

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

### Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2022 to 28 February 2023.

This is a partial list based on information received from a coordinated effort throughout the range of monitors and managers to share band sightings. ODSVRA bands chicks to brood and some bands have been used multiple years and it is possible to have more than one bird with the same combination. (For a description of color band letter codes see Appendix A.)

COPR = Coal Oil Point Reserve, Guadalupe RP = Guadalupe Restoration Project, SB = State Beach, SLO = San Luis Obispo, SP = State Park, VSFB = Vandenberg Space Force Base

| Band Combination | Year Banded | Location Seen | County | Dates Seen |
|---|---|---|---|---|
| vv:ga | 2022 | Manchester Beach | Mendocino, CA | 10/20 |
| pv:ag | 2015 or 2016 | Dillon Beach | Marin | 10/12, 11/9, 12/8, 1/3, 1/19, 2/25 |
| vg:wo | 2022 | Dillon Beach | Marin | 10/12, 12/7, 12/8 |
| pv:by | 2015 | Point Reyes National Seashore | Marin | 11/14 |
| vg:ya | 2020 | Point Reyes National Seashore | Marin | 1/20, 2/10 |
| vv:ga | 2022 | Point Reyes National Seashore | Marin | 11/14, 1/20 |
| ga:av | 2020 | Ano Nuevo SP | San Mateo | 12/18 |
| pg:bg | 2015 or 2016 | Laguna Creek Beach | Santa Cruz | 11/4, 11/21, 11/22, 12/5, 12/23 |
| vg:rw | 2018 | Laguna Creek Beach | Santa Cruz | 11/4, 11/14, 12/19, 12/23, 1/30 |
| gg:wb | 2011 or 2013 | Seabright SB | Santa Cruz | 12/15 |
| gg:by | 2021 | Del Monte Beach | Monterey | 12/20, 1/28 |
| pg:ay | 2022 | Del Monte Beach | Monterey | 1/28, 1/31 |
| pg:pb | 2014 or 2015 | Del Monte Beach | Monterey | 11/15, 1/31 |
| rr:br | 2022 | Del Monte Beach | Monterey | 12/20 |
| pg:pb | 2014 or 2015 | Carmel River Mouth | Monterey | 12/21, 12/28 |
| ga:yo | 2022 | Arroyo Laguna | SLO | 10/3, 10/4, 10/5, 10/6, 10/10, 10/17, 10/24, 10/31, 11/7, 11/15, 11/21, 12/19 |
| pg:ay | 2022 | Arroyo Laguna | SLO | 10/3 |
| pv:wr | 2022 | Arroyo Laguna | SLO | 10/17, 10/24, 10/31 |
| rr:ay | 2022 | Arroyo Laguna | SLO | 11/21 |
| rr:vw | 2021 | Arroyo Laguna | SLO | 10/10, 10/17, 10/24, 10/31 |
| vv:pa | 2020 | Arroyo Laguna | SLO | 11/21, 12/19 |
| ga:yo | 2022 | San Simeon SP | SLO | 1/31 |
| vv:pa | 2020 | San Simeon SP | SLO | 1/31 |
| ga:yo | 2022 | Santa Rosa Creek | SLO | 1/28, 1/31 |
| gg:pr | 2022 | Santa Rosa Creek | SLO | 1/31 |
| rr:vw | 2021 | Santa Rosa Creek | SLO | 11/7 |
| vv:pa | 2020 | Santa Rosa Creek | SLO | 1/31 |
| bb:ar | 2017 or 2018 | Villa Creek | SLO | 10/3, 10/10, 10/19, 10/31, 11/21, 11/30, 12/5, 12/9, 12/12, 12/16, 12/19, 1/19, 1/26, 2/6, 2/13, 2/20, 2/21 |

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

**Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2022 to 28 February 2023 (continued).**

| Band Combination | Year Banded | Location Seen | County | Dates Seen |
|---|---|---|---|---|
| bb:yy | 2022 | Villa Creek | SLO | 10/19 |
| gg:oa | 2019 | Villa Creek | SLO | 10/3, 10/9, 10/10, 10/19, 10/24, 10/28, 10/31, 11/4, 11/7, 11/14, 11/21, 11/26, 12/12, 12/16, 12/19, 1/26, 1/30, 2/13, 2/16 |
| bb:yy | 2022 | Morro Strand SB | SLO | 10/17, 10/24, 11/14, 11/18, 11/28, 12/2 |
| ga:yo | 2022 | Morro Strand SB | SLO | 10/10 |
| gg:oa | 2019 | Morro Strand SB | SLO | 11/28 |
| gg:oo | 2022 | Morro Strand SB | SLO | 11/28 |
| pv:rr | 2022 | Morro Strand SB | SLO | 10/3, 10/31, 11/14, 11/21, 12/6 |
| rr:bo | 2022 | Morro Strand SB | SLO | 10/17, 11/7, 11/14, 11/21, 11/28, 12/2, 12/12 |
| rr:ob | 2022 | Morro Strand SB | SLO | 10/24 |
| rr:pr | 2022 | Morro Strand SB | SLO | 10/3, 10/10, 10/17, 10/24, 10/31, 11/7, 11/21, 11/28, 12/6, 12/12 |
| rr:rw | 2022 | Morro Strand SB | SLO | 11/14 |
| vg:rv | 2020 | Morro Strand SB | SLO | 10/3, 10/10, 10/17, 10/24, 10/31, 11/7, 11/14, 11/21, 11/28 |
| vv:ra | 2020 | Morro Strand SB | SLO | 11/28 |
| gg:yo | 2022 | Morro Bay Spit | SLO | 10/24 |
| rr:pr | 2022 | Morro Bay Spit | SLO | 10/10 |
| rr:rw | 2022 | Morro Bay Spit | SLO | 10/3, 10/10, 10/17 |
| vv:ra | 2020 | Morro Bay Spit | SLO | 10/10, 11/14 |
| gg:wo | 2022 | Guadalupe RP | SLO | 2/1 |
| gg:yr | 2017 or 2018 | Guadalupe RP | SLO | 2/1 |
| pv:by | 2015 | Guadalupe RP | SLO | 2/1 |
| gg:aw | 2017 or 2018 | VSFB | Santa Barbara | 10/18 |
| gg:rb | 2016 or 2018 | VSFB | Santa Barbara | 10/18 |
| rr:ar | 2022 | VSFB | Santa Barbara | 10/18 |
| pg:gw | 2022 | Jalama Beach | Santa Barbara | 11/9 |
| vg:yr | 2022 | Jalama Beach | Santa Barbara | 11/10 |
| gg:ag | 2022 | COPR | Santa Barbara | 1/6, 2/18 |
| gg:wo | 2022 | COPR | Santa Barbara | 10/8, 10/22, 10/28, 11/3, 1/25, 2/4, 2/18, 2/21 |
| pv:gy | 2018 | COPR | Santa Barbara | 10/16 |
| vv:ab | 2017 or 2018 | COPR | Santa Barbara | 1/13 |
| bb:go | 2019 | San Buenaventura SB | Ventura | 11/22, 11/30, 12/7, 12/13, 12/19, 1/3, 2/2, 2/8, 2/15, 2/21 |
| vg:gg | 2022 | San Buenaventura SB | Ventura | 11/9, 12/7, 2/2, 2/15, 2/28 |
| ga:gy | 2020 | Zuma Beach | Los Angeles | 11/30 |

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

**Table D.5. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 October 2022 to 28 February 2023 (continued).**

| Band Combination | Year Banded | Location Seen | County | Dates Seen |
|---|---|---|---|---|
| bb:ag | 2020 | Santa Monica | Los Angeles | 11/1 |
| vg:ba | 2019 | Santa Monica | Los Angeles | 1/9, 2/3, 2/19 |

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

### Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023.

This is a partial list based on information received from a coordinated effort throughout the range of monitors and managers to share band sightings.
ODSVRA is banding chicks to brood and some combinations have been used multiple years so it is possible to have more than one bird with the same combination.
COPR = Coal Oil Point Reserve, Guadalupe NWR = Guadalupe-Nipomo Dunes National Wildlife Refuge, NAS = Naval Air Station, NBVC = Naval Base Ventura County, NWR = National Wildlife Refuge, RP = Restoration Project, SB = State Beach, SLO = San Luis Obispo, VSFB = Vandenberg Space Force Base
F = female, M = male

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| gg:ao | 2022 | | New River | Coos, OR | 6/19 | |
| vg:pb | 2022 | | Mackerricher SB | Mendocino, CA | 5/18 | |
| pv:ab | 2023 | | Dillon Beach | Marin | 9/19 | Juvenile. |
| pv:ag | 2015 or 2016 | | Dillon Beach | Marin | 3/8, 3/16, 8/9, 8/22, 8/30, 9/6, 9/19 | |
| vg:wo | 2022 | | Dillon Beach | Marin | 8/22, 9/6, 9/19, 9/26 | |
| vg:rw | 2018 | | Laguna Creek Beach | Santa Cruz | 9/11 | |
| bb:ay | 2023 | | Pajaro Spit | Santa Cruz | 9/6 | Juvenile. |
| gg:yo | 2022 | | Pajaro Spit | Santa Cruz | 7/28 | |
| pg:bg | 2015 or 2016 | | Pajaro Spit | Santa Cruz | 7/31, 8/4, 8/17, 8/25, 9/6, 9/21 | |
| pv:ab | 2023 | | Pajaro Spit | Santa Cruz | 9/6 | Juvenile. |
| pv:gb | 2020 | | Pajaro Spit | Santa Cruz | 8/15 | |
| vg:bg | 2023 | | Pajaro Spit | Santa Cruz | 9/6 | Juvenile. |
| vg:rw | 2018 | | Pajaro Spit | Santa Cruz | 8/25 | |
| vg:ya | 2020 | | Pajaro Spit | Santa Cruz | 9/6 | |
| pv:ag | 2015 or 2016 | M | Moss Landing Salt Ponds | Monterey | 3/31, 4/3, 4/4, 4/12, 4/14, 4/19, 4/21, 5/1, 5/9, 5/17, 5/24, 5/31, 6/5, 6/6, 6/21, 8/2 | Moss Landing Salt Ponds breeding male. |
| pg:bg | 2015 or 2016 | F | Salinas River SB | Monterey | 4/5, 4/13, 4/27, 6/12, 6/22, 7/12, 7/17 | Salinas River SB breeding female. |
| rr:ra | 2022 | M | Salinas River SB | Monterey | 4/19, 4/25, 5/4, 5/10, 5/17, 5/24, 6/1, 6/8, 7/19 | Salinas River SB breeding male. |
| pg:bg | 2015 or 2016 | | Salinas North Spit | Monterey | 3/17, 7/20 | |
| pg:vo | | | Salinas North Spit | Monterey | 8/15 | |
| rr:ra | 2022 | | Salinas North Spit | Monterey | 7/25 | |
| pg:bg | 2015 or 2016 | | Salinas River NWR | Monterey | 3/27, 4/10 | |
| rr:ab | 2016 or 2017 | | Salinas River NWR | Monterey | 5/12 | |
| rr:bo | 2022 | | Salinas River NWR | Monterey | 5/14, 5/19, 5/22, 6/8, 6/9, 6/13, 6/16, 6/20, 6/21, 6/28, 6/30, 7/3, 7/6, 7/11, 7/24, 7/26, 7/28, 7/31, 8/2, 8/4, 8/8 | |
| vg:ya | 2020 | M | Salinas River NWR | Monterey | 3/24, 4/3, 4/21, 4/27, 5/18, 6/2, 6/26, 6/28, 6/29, 6/30, 7/3, 7/6, 7/21, 7/31, 8/2 | Salinas River NWR breeding male. |
| pg:ay | 2022 | | Del Monte Beach | Monterey | 3/20 | |

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

**Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023 (continued).**

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| pg:pb | 2014 or 2015 | | Del Monte Beach | Monterey | 3/13 | |
| vv:gg | 2023 | | Del Monte Beach | Monterey | 9/28 | Juvenile. |
| gg:by | 2021 | | Marina Dunes | Monterey | 3/7 | |
| rr:bo | 2022 | | Marina Dunes | Monterey | 5/11 | |
| bb:wb | 2023 | | Marina SB | Monterey | 8/16 | Juvenile. |
| ga:po | 2023 | | Marina SB | Monterey | 8/30 | Juvenile. |
| pg:gw | 2022 | | Marina SB | Monterey | 5/30, 6/5, 6/11, 6/13, 6/27, 7/5 | |
| pg:yw | 2022 | | Marina SB | Monterey | 5/15, 5/17, 6/13, 6/16 | |
| vg:ya | 2020 | | Marina SB | Monterey | 7/14 | |
| rr:bo | 2022 | | Fort Ord SP | Monterey | 8/17 | |
| ga:ya | 2023 | | Arroyo Laguna | SLO | 9/18 | Juvenile. |
| pg:oo | 2023 | | Arroyo Laguna | SLO | 9/18 | Juvenile. |
| bb:ar | 2017 or 2018 | | Villa Creek | SLO | 8/7, 8/11, 8/12, 8/14, 8/16, 8/18, 8/21, 8/24, 8/25, 8/28, 9/1, 9/6, 9/8, 9/11, 9/15, 9/21, 9/26 | |
| bb:wb | 2023 | | Villa Creek | SLO | 8/28, 9/1, 9/26 | Juvenile. |
| ga:rw | 2023 | | Villa Creek | SLO | 9/25 | Juvenile. |
| gg:oa | 2019 | | Villa Creek | SLO | 3/27, 6/12, 7/31, 8/2, 8/4, 8/14, 8/21, 8/25, 8/28, 9/6, 9/8, 9/11, 9/18, 9/22, 9/26 | |
| bb:aw | 2023 | | Morro Strand SB | SLO | 9/6 | Juvenile. |
| bb:pg | 2022 | | Morro Strand SB | SLO | 9/6, 9/8 | |
| bb:wg | 2020 | | Morro Strand SB | SLO | 8/21 | |
| bb:wy | 2023 | | Morro Strand SB | SLO | 9/1 | Juvenile. |
| ga:bv | 2023 | | Morro Strand SB | SLO | 9/1 | Juvenile. |
| ga:go | 2023 | | Morro Strand SB | SLO | 9/15 | Juvenile. |
| ga:po | 2023 | | Morro Strand SB | SLO | 8/4, 8/7, 8/14, 8/18, 8/21, 9/11 | Juvenile. |
| ga:rw | 2023 | | Morro Strand SB | SLO | 9/6, 9/8 | Juvenile. |
| ga:vv | 2023 | | Morro Strand SB | SLO | 9/6 | Juvenile. |
| gg:rw | 2023 | | Morro Strand SB | SLO | 9/6 | Juvenile. |
| gg:vb | 2023 | | Morro Strand SB | SLO | 9/6 | Juvenile. |
| gg:wo | 2022 | | Morro Strand SB | SLO | 8/7, 8/8, 8/11, 8/16 | |
| pg:gw | 2022 | | Morro Strand SB | SLO | 8/4, 8/9, 8/11, 8/21, 9/1 | |
| pv:rr | 2022 | | Morro Strand SB | SLO | 3/29, 4/5, 7/14, 7/21, 7/28, 7/31, 8/4, 8/11, 8/14 | |
| rr:bo | 2022 | | Morro Strand SB | SLO | 3/23, 3/27, 3/29, 4/3, 4/10, 4/12, 4/14, 4/24, 4/26 | |

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

**Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023 (continued).**

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| rr:yr | 2022 | | Morro Strand SB | SLO | 7/31 | |
| vg:bg | 2023 | | Morro Strand SB | SLO | 9/1, 9/6 | Juvenile. |
| vg:vv | 2023 | | Morro Strand SB | SLO | 9/8, 9/11 | Juvenile. |
| bb:av | 2023 | | Morro Bay Spit | SLO | 9/26 | Juvenile. |
| bb:aw | 2023 | | Morro Bay Spit | SLO | 9/15, 9/22, 9/26 | Juvenile. |
| bb:gv | 2023 | | Morro Bay Spit | SLO | 9/18 | Juvenile. |
| bb:wy | 2023 | | Morro Bay Spit | SLO | 9/18, 9/22, 9/26 | Juvenile. |
| bb:ya | 2023 | | Morro Bay Spit | SLO | 9/6 | Juvenile. |
| ga:go | 2023 | | Morro Bay Spit | SLO | 9/11, 9/18, 9/22, 9/26 | Juvenile. |
| ga:po | 2023 | | Morro Bay Spit | SLO | 7/31, 8/2, 8/14, 8/23, 8/29, 8/30, 9/1, 9/11, 9/15, 9/18, 9/22 | Juvenile. |
| ga:rw | 2023 | | Morro Bay Spit | SLO | 9/18, 9/22 | Juvenile. |
| ga:vv | 2023 | | Morro Bay Spit | SLO | 9/15, 9/18, 9/22 | Juvenile. |
| gg:wo | 2022 | | Morro Bay Spit | SLO | 8/21, 8/22, 8/28, 8/29, 9/1, 9/6, 9/11, 9/15, 9/18, 9/22, 9/25 | |
| pv:rr | 2022 | | Morro Bay Spit | SLO | 7/19 | |
| rr:bo | 2022 | | Morro Bay Spit | SLO | 4/19, 4/21 | |
| vg:vv | 2023 | | Morro Bay Spit | SLO | 9/15, 9/18, 9/22, 9/26 | Juvenile. Two birds observed on 22 September. |
| vg:ww | 2023 | | Morro Bay Spit | SLO | 8/19, 8/22 | Juvenile. |
| vv:gg | 2023 | | Morro Bay Spit | SLO | 9/22 | Juvenile. |
| bb:vw | 2018 | | Guadalupe NWR | SLO | 5/23 | |
| bb:wy | 2023 | | Guadalupe NWR | SLO | 8/14 | Juvenile. |
| ga:bb | 2017 or 2018 | | Guadalupe NWR | SLO | 7/13 | |
| ga:vb | 2021 | | Guadalupe NWR | SLO | 5/23, 5/26 | |
| ga:vw | 2020 | | Guadalupe NWR | SLO | 6/29, 7/18 | |
| ga:wo | 2021 | | Guadalupe NWR | SLO | 8/14 | |
| gg:ab | 2023 | | Guadalupe NWR | SLO | 8/14 | Juvenile. |
| gg:ol | 2019 | | Guadalupe NWR | SLO | 5/24 | |
| gg:wr | 2014 or 2016 | | Guadalupe NWR | SLO | 7/13 | |
| gg:yr | 2017 or 2018 | | Guadalupe NWR | SLO | 7/25 | |
| pg:by | 2017 or 2018 | | Guadalupe NWR | SLO | 6/29 | |
| pv:bb | 2022 | | Guadalupe NWR | SLO | 6/29 | |
| pv:yr | 2017 or 2018 | | Guadalupe NWR | SLO | 7/13, 7/18, 7/25 | |

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

**Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023 (continued).**

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| rr:pv | 2022 | | Guadalupe NWR | SLO | 8/14 | |
| rr:wr | 2022 | | Guadalupe NWR | SLO | 7/18 | |
| bb:av | 2023 | | Guadalupe RP | SLO | 8/8 | Juvenile. |
| bb:gv | 2023 | | Guadalupe RP | SLO | 8/8 | Juvenile. |
| bb:yb | 2011, 2013 or 2015 | | Guadalupe RP | SLO | 6/2 | |
| bb:yg | 2022 | | Guadalupe RP | SLO | 5/18, 6/2, 6/9, 6/12, 7/19 | |
| ga:ya | 2023 | | Guadalupe RP | SLO | 8/8 | Juvenile. |
| gg:by | 2021 | | Guadalupe RP | SLO | 3/24 | |
| gg:yr | 2017 or 2018 | | Guadalupe RP | SLO | 3/20, 4/20, 5/5, 5/18, 5/26, 8/8 | |
| pv:bw | 2022 | | Guadalupe RP | SLO | 4/26 | |
| pv:yr | 2017 or 2018 | | Guadalupe RP | SLO | 6/15, 6/22, 6/27, 7/10 | |
| rr:oy | 2022 | | Guadalupe RP | SLO | 6/9, 6/15, 6/22, 6/27, 7/5 | |
| rr:pv | 2022 | | Guadalupe RP | SLO | 4/20, 4/26, 6/2, 7/10 | |
| vg:wo | 2022 | | Guadalupe RP | SLO | 4/15, 4/20, 4/26, 5/3, 5/5, 6/2 | |
| bb:av | 2023 | | VSFB | Santa Barbara | 8/9, 8/17, 8/24 | Juvenile. |
| bb:aw | 2023 | | VSFB | Santa Barbara | 8/17 | Juvenile. |
| bb:pw | 2023 | | VSFB | Santa Barbara | 8/7, 8/31, 9/6 | Juvenile. |
| bb:rg | 2023 | | VSFB | Santa Barbara | 8/9 | Juvenile. |
| bb:ro | 2021 | | VSFB | Santa Barbara | 7/4 | |
| bb:wb | 2023 | | VSFB | Santa Barbara | 9/20 | Juvenile. |
| bb:wy | 2023 | | VSFB | Santa Barbara | 8/22, 8/24, 8/30, 9/12 | Juvenile. |
| bb:yr | 2021 | M | VSFB | Santa Barbara | 3/16, 3/30, 4/4, 4/6, 4/11, 4/18, 4/25, 4/27, 5/18, 5/25, 6/15, 6/21, 6/23, 6/30, 7/10, 7/11, 7/13 | VSFB breeding male. |
| ga:av | 2020 | | VSFB | Santa Barbara | 5/9 | |
| ga:ba | 2020 | | VSFB | Santa Barbara | 6/22 | |
| ga:go | 2023 | | VSFB | Santa Barbara | 9/12 | Juvenile. |
| ga:gv | 2020 | M | VSFB | Santa Barbara | 3/2, 3/7, 3/16, 3/22, 4/11, 4/13, 4/18, 4/27, 5/2, 5/11, 5/18, 5/31, 6/2, 6/14, 6/15, 7/6, 7/13, 7/17, 7/20, 7/24, 7/25, 8/1, 8/9, 8/17, 8/30, 9/28 | VSFB breeding male. |
| ga:ya | 2023 | | VSFB | Santa Barbara | 8/23 | Juvenile. |
| gg:av | 2019 | F | VSFB | Santa Barbara | 3/2, 3/7, 3/16, 3/22, 3/28, 3/30, 4/4, 4/6, 4/11, 4/13, 5/4, 5/9, 5/18, 5/25, 6/6, 6/8, 6/12, 6/13, 6/15, 7/17, 7/20, 7/27, 8/24, 9/12, 9/28 | VSFB breeding female. |

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

**Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023 (continued).**

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| gg:aw | 2017 or 2018 | F | VSFB | Santa Barbara | 3/2, 3/30, 4/24, 5/18, 7/11, 7/13, 8/1, 8/9 | VSFB breeding female. |
| gg:bv | 2023 | | VSFB | Santa Barbara | 8/17 | Juvenile. |
| gg:ga | 2023 | | VSFB | Santa Barbara | 8/9 | Juvenile. |
| gg:pr | 2022 | | VSFB | Santa Barbara | 4/13, 4/25, 5/4, 5/16, 5/18, 5/25, 6/6, 6/23, 7/11, 7/13, 7/17, 7/24, 7/27, 8/30, 9/1, 9/12 | |
| gg:rb | 2016 or 2018 | F | VSFB | Santa Barbara | 3/16, 3/22, 3/28, 4/4, 4/11, 4/25, 4/27, 5/9, 5/23, 6/8, 6/14, 6/23, 7/11, 7/13, 7/17, 7/20, 9/12, 9/28 | VSFB breeding female. |
| gg:ry | 2023 | | VSFB | Santa Barbara | 8/9, 8/17, 8/22, 8/24 | Juvenile. |
| gg:vw | 2023 | | VSFB | Santa Barbara | 9/12 | Juvenile. |
| gg:wo | 2022 | | VSFB | Santa Barbara | 4/10, 4/14, 4/17, 7/6, 7/17, 8/30, 9/12 | |
| gg:yw | 2022 | | VSFB | Santa Barbara | 7/6, 7/17, 8/30 | |
| gg:yy | 2023 | | VSFB | Santa Barbara | 9/12 | Juvenile. |
| pg:gw | 2022 | | VSFB | Santa Barbara | 5/22 | |
| pv:wr | 2022 | | VSFB | Santa Barbara | 7/19, 8/10, 9/6 | |
| rr:bo | 2022 | M | VSFB | Santa Barbara | 5/9, 5/25, 6/6, 6/8, 6/30, 7/4, 7/6, 7/13, 7/20, 7/25, 8/1, 8/9, 8/17, 9/1, 9/12 | VSFB breeding male. |
| rr:pg | 2023 | | VSFB | Santa Barbara | 9/6, 9/10, 9/20 | Juvenile. |
| vv:ba | 2023 | | VSFB | Santa Barbara | 8/24, 8/28 | Juvenile. |
| vv:bg | 2022 | F | VSFB | Santa Barbara | 6/21, 6/23, 6/30 | VSFB breeding female. |
| vv:gb | 2023 | | VSFB | Santa Barbara | 9/12 | Juvenile. |
| vv:gg | 2023 | | VSFB | Santa Barbara | 8/29, 8/30, 9/6, 9/20 | Juvenile. |
| bb:rg | 2023 | | COPR | Santa Barbara | 8/29 | Juvenile. |
| bb:vb | 2011, 2013 or 2014 | | COPR | Santa Barbara | 8/24 | |
| ga:go | 2023 | | COPR | Santa Barbara | 9/13 | Juvenile. |
| ga:pb | 2016 or 2017 | | COPR | Santa Barbara | 4/22, 4/26, 5/13, 6/2, 6/5 | |
| ga:po | 2016 or 2017 | | COPR | Santa Barbara | 8/24 | |
| gg:ag | 2022 | | COPR | Santa Barbara | 8/7, 8/23 | |
| gg:br | 2023 | | COPR | Santa Barbara | 9/13 | Juvenile. |
| gg:pv | 2021 | | COPR | Santa Barbara | 6/9 | |
| gg:wo | 2022 | | COPR | Santa Barbara | 3/8, 3/18 | |
| vg:gg | 2022 | | San Buenaventura SB | Ventura | 3/6, 3/16, 3/20, 3/30, 4/4 | |
| ga:pb | 2016 or 2017 | | McGrath SB | Ventura | 6/13, 7/3, 7/5 | |
| ga:yo | 2022 | | McGrath SB | Ventura | 7/31 | |

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

**Table D.6. Snowy plovers banded as chicks at ODSVRA seen at other sites from 1 March to 30 September 2023 (continued).**

| Band Combination | Year Banded | Sex | Location Seen | County | Dates Seen | Notes |
|---|---|---|---|---|---|---|
| rr:ra | 2022 | | McGrath SB | Ventura | 7/31 | |
| vg:gg | 2022 | | McGrath SB | Ventura | 7/31 | |
| bb:aa | 2020 | | NBVC Point Mugu | Ventura | 6/28 | |
| bb:ag | 2020 | | NBVC Point Mugu | Ventura | 5/11, 5/22 | |
| rr:aa | 2021 | | NBVC Point Mugu | Ventura | 6/28 | |
| bb:gv | 2023 | | Hermosa Beach | Los Angeles | 8/24 | Juvenile. |
| pv:ay | 2022 | | Huntington Beach | Orange | 5/13 | |
| vv:ba | 2023 | | Camp Pendleton | San Diego | 8/29 | Juvenile. |
| ga:vb | 2021 | | North Island NAS | San Diego | 8/4 | |
| ga:ya | 2023 | | North Island NAS | San Diego | 8/10 | Juvenile. |
| gg:rw | 2023 | | North Island NAS | San Diego | 9/20 | Juvenile. |
| pv:yr | 2017 or 2018 | | North Island NAS | San Diego | 4/21 | |
| vg:yy | 2016 or 2018 | | Tijuana Estuary | San Diego | 8/3 | |

## APPENDIX E. CALIFORNIA LEAST TERN REPRODUCTIVE SUCCESS REPORTED FOR CURRENT, RECENT, OR INFREQUENT BREEDING SITES IN SAN LUIS OBISPO AND SANTA BARBARA COUNTIES FROM 2004-23.

Note that chicks are not banded at Rancho Guadalupe Dunes Preserve (RGDP) or Coal Oil Point Reserve (COPR) and other methods are used to estimate number of juveniles produced. In 2019, the number of juveniles at RGDP was unknown, therefore number of juveniles per nest and per pair are also unknown. In 2018, Vandenberg Space Force Base (VSFB) began banding chicks to site and year. Sources: RGDP (pers. comm. Tom Applegate), VSFB (pers. comm. Samantha Kaisersatt and Emily Rice), and COPR (pers. comm. Jessica Nielson).
unk = number not available due to insufficient information

| 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 |
| | RGDP | 8 | 8 | 3 | 7 | 0 | 0.00 | 0.00 |
| | VSFB[1] | 1 | 1 | 0 | 0 | 0 | 0.00 | 0.00 |
| | COPR | 6 | 6 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2005** | ODSVRA | 47-53 | 59 | 39 | 66 | 20 | 0.34 | 0.38-0.43 |
| | RGDP | 4 | 4 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 44 | 44 | 18 | 32 | 1 | 0.02 | 0.02 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2006** | ODSVRA | 31-35 | 38 | 28 | 45 | 36 | 0.95 | 1.03-1.16 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB[2] | 2 | 2 | 0 | 0 | 0 | 0.00 | 0.00 |
| | COPR | 5 | 5 | 4 | 7 | 7 | 1.40 | 1.40 |
| **2007** | ODSVRA | 54-60 | 66 | 51 | 90 | 70 | 1.06 | 1.17-1.3 |
| | RGDP | 1 | 1 | 1 | 1 | 1 | 1.00 | 1.00 |
| | VSFB | 18 | 18 | 13 | 20 | 16 | 0.89 | 0.89 |
| | COPR | 4 | 6 | 2 | 4 | 0 | 0.00 | 0.00 |
| **2008** | ODSVRA | 55-56 | 56 | 50 | 99 | 71 | 1.27 | 1.27-1.29 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 18 | 18 | 17 | 32-33 | 19 | 1.06 | 1.06 |
| | COPR | 1 | 1 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2009** | ODSVRA | 25-26 | 26 | 23 | 43 | 33 | 1.27 | 1.29-1.32 |
| | RGDP | 2-3 | 3 | 2 | 3 | 3 | 1.00 | 1.00-1.50 |
| | VSFB | 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 |
| | RGDP | 1 | 1 | 1 | 2 | 2 | 2.00 | 2.00 |
| | VSFB | 33 | 34 | 29 | 57 | 29 | 0.85 | 0.88 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2011** | ODSVRA | 33-34 | 35 | 31 | 55 | 50 | 1.43 | 1.47-1.52 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 32 | 32 | 19 | 36 | 4 | 0.13 | 0.13 |
| | COPR | 1 | 1 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2012** | ODSVRA | 41-44 | 46 | 33 | 52 | 42 | 0.91 | 0.97-1.02 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 18 | 18 | 12 | 21 | 10 | 0.56 | 0.56 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2013** | ODSVRA | 48-53 | 57 | 45 | 85 | 56 | 0.98 | 1.06-1.17 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 15 | 15 | 15 | 25 | 19 | 1.27 | 1.27 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |

**Appendix E. California least tern reproductive success reported for current, recent, or infrequent breeding sites in San Luis Obispo and Santa Barbara counties from 2004-23 (continued).**

| Year | Site | No. pairs | No. nests | No. nests hatching | No. chicks | No. juveniles | No. juveniles per total no. nest | No. juveniles per pair |
|---|---|---|---|---|---|---|---|---|
| **2014** | ODSVRA | 47-48 | 49 | 42 | 76 | 58 | 1.18 | 1.21-1.23 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 17 | 21 | 15 | 30 | 20 | 0.95 | 1.18 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2015** | ODSVRA | 44-49 | 54 | 48 | 84 | 69 | 1.28 | 1.41-1.57 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 22 | 22 | 22 | 45 | 29 | 1.32 | 1.32 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2016** | ODSVRA | 47-48 | 49 | 46 | 78 | 59 | 1.20 | 1.23-1.26 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 25 | 27 | 21 | 38 | 18 | 0.67 | 0.72 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2017** | ODSVRA | 42-47 | 52 | 22 | 39 | 7 | 0.13 | 0.15-0.17 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 27 | 28 | 23 | 41 | 8 | 0.29 | 0.30 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2018** | ODSVRA | 30-33 | 35 | 28 | 42 | 35 | 1.00 | 1.06-1.17 |
| | RGDP | 10-11 | 11 | 5 | 10 | 4 | 0.36 | 0.36-0.40 |
| | VSFB | 60 | 83 | 33 | 57 | 35 | 0.42 | 0.58 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2019** | ODSVRA | 31-33 | 34 | 31 | 52 | 38 | 1.12 | 1.15-1.23 |
| | RGDP | 17 | 17 | 8 | 15 | unk | unk | unk |
| | VSFB | 42 | 47 | 36 | 63 | 21 | 0.44 | 0.50 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2020** | ODSVRA | 35-42 | 48 | 36 | 63 | 38 | 0.79 | 0.90-1.09 |
| | RGDP | 50 | 56 | 10 | 18 | 5-10 | 0.09-0.18 | 0.10-0.20 |
| | VSFB | 10 | 12 | 7 | 11 | 6 | 0.50 | 0.60 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2021** | ODSVRA | 50-52 | 53 | 49 | 81 | 48 | 0.91 | 0.92-0.96 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 27 | 34 | 17 | 29 | 8 | 0.24 | 0.30 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2022** | ODSVRA | 43-44 | 45 | 42 | 69 | 37 | 0.82 | 0.84-0.86 |
| | RGDP | 1 | 1 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 42 | 45 | 39 | 78 | 23 | 0.51 | 0.55 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| **2023** | ODSVRA | 41-42 | 42 | 37 | 66 | 35 | 0.83 | 0.83-0.85 |
| | RGDP | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |
| | VSFB | 39 | 42 | 37 | 62 | 17 | 0.40 | 0.44 |
| | COPR | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 |

[1,2] Minimum counts of adult terns at the VSFB colony site were 60 and 40 in 2004 and 2006, respectively, but nesting was limited.

## APPENDIX F. ADDENDUMS TO SNOWY PLOVER NESTING SUCCESS.

### Table F.1. Nesting success of snowy plovers in identifiable areas at ODSVRA, 2001-23.

Nests from unknown locations (identified only by presence of broods) are not included in table. Percent nests hatching is calculated using number of hatching nests from known location divided by number of known location and fate nests. Those chicks whose nest location could not be identified are not included in table. Beginning in 2006, an additional 0.4 miles of shoreline at the southern end of the park has been monitored by ODSVRA (a survey conducted by the Guadalupe-Nipomo Dunes NWR in 2005 determined this area was part of the ODSVRA and not the refuge, as was previously thought). Between 1998-2003, increases occurred in the size of the Southern Exclosure; size has remained consistent since 2004. Beginning in 2021, closed buffer area became a new nesting location. Area information is provided in the report Site Description section.

BY = Boneyard, Euc. = Eucalyptus, reveg. = revegetation

| Year | Area | No. known location nests | No. nests with known location and known fate | No. nests with known location hatching | % nests hatching | No. chicks from known location | No. chicks from known location fledged | % chicks from known location nests fledged |
|---|---|---|---|---|---|---|---|---|
| | Southern Exclosure | 25 | 25 | 22 | 88 | 57 | 2 | 4 |
| | Oso Flaco | 4 | 2 | 2 | 100 | 6 | 1 | 17 |
| | Open riding area | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| | Arroyo Grande Exclosure [1, 3] | 3 | 2 | 3 | 100 | 9 | 0 | 0 |
| **2001** | **Total** | **33** | **30** | **27** | **87** | **72** | **3** | **4** |
| | Southern Exclosure | 33 | 33 | 25 | 76 | 62 | 35 | 56 |
| | Oso Flaco | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| **2002** | **Total** | **35** | **35** | **25** | **71** | **62** | **35** | **56** |
| | Southern Exclosure | 74 | 73 | 53 | 73 | 136 | 91 | 67 |
| | Oso Flaco | 13 | 13 | 4 | 31 | 11 | 7 | 64 |
| | Open riding area | 1 | 1 | 1 | 100 | 3 | 3 | 100 |
| | Dunes Preserve | 1 | 1 | 1 | 100 | 3 | 0 | 0 |
| | Pipeline reveg. area | 3 | 3 | 2 | 67 | 4 | 2 | 50 |
| | East of BY exclosure [2] | 2 | 2 | 1 | 50 | 3 | 2 | 67 |
| **2003** | **Total** | **94** | **93** | **62** | **67** | **160** | **105** | **66** |
| | Southern Exclosure | 113 | 111 | 87 | 78 | 208 | 59 | 28 |
| | Oso Flaco | 27 | 27 | 17 | 63 | 40 | 7 | 18 |
| | Open riding area | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| | Pipeline reveg. area | 1 | 1 | 1 | 100 | 3 | 0 | 0 |
| **2004** | **Total** | **142** | **140** | **105** | **75** | **251** | **66** | **26** |
| | Southern Exclosure | 79 | 79 | 60 | 76 | 142 | 57 | 40 |
| | Oso Flaco | 22 | 22 | 18 | 82 | 49 | 23 | 47 |
| | East of BY exclosure [2] | 2 | 2 | 2 | 100 | 6 | 2 | 33 |
| **2005** | **Total** | **103** | **103** | **80** | **78** | **197** | **82** | **42** |
| | Southern Exclosure | 87 | 84 | 65 | 77 | 173 | 8 | 5 |
| | Oso Flaco | 29 | 29 | 22 | 76 | 57 | 9 | 16 |
| | Open riding area | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **2006** | **Total** | **117** | **114** | **87** | **76** | **230** | **17** | **7** |
| | Southern Exclosure | 76 | 76 | 61 | 80 | 159 | 58 | 36 |
| | Oso Flaco | 15 | 15 | 9 | 60 | 20 | 4 | 20 |
| **2007** | **Total** | **91** | **91** | **70** | **77** | **179** | **62** | **35** |
| | Southern Exclosure | 100 | 100 | 73 | 73 | 172 | 64 | 37 |
| | Oso Flaco | 19 | 19 | 8 | 42 | 19 | 5 | 26 |
| **2008** | **Total** | **119** | **119** | **81** | **68** | **191** | **69** | **36** |
| | Southern Exclosure | 125 | 124 | 86 | 69 | 220 | 79 | 36 |
| | Oso Flaco | 23 | 22 | 8 | 36 | 22 | 2 | 9 |
| | Pismo Lagoon | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **2009** | **Total** | **149** | **147** | **94** | **64** | **242** | **81** | **33** |

**Table F.1. Nesting success of snowy plovers in identifiable areas at ODSVRA, 2001-23 (continued).**

| Year | Area | No. known location nests | No. nests with known location and known fate | No. nests with known location hatching | % nests hatching | No. chicks from known location | No. chicks from known location fledged | % chicks from known location nests fledged |
|---|---|---|---|---|---|---|---|---|
| | Southern Exclosure | 126 | 123 | 95 | 77 | 234 | 86 | 37 |
| | Oso Flaco | 22 | 22 | 13 | 59 | 33 | 15 | 45 |
| | Open riding area | 1 | 1 | 1 | 100 | 2 | 2 | 100 |
| | Carpenter Creek | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| | Arroyo Grande Creek | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| **2010** | **Total** | **153** | **150** | **109** | **73** | **269** | **103** | **38** |
| | Southern Exclosure | 140 | 135 | 113 | 84 | 300 | 129 | 43 |
| | Oso Flaco | 23 | 23 | 16 | 70 | 40 | 18 | 45 |
| | Open riding area | 2 | 2 | 2 | 100 | 5 | 1 | 20 |
| **2011** | **Total** | **165** | **160** | **131** | **82** | **345** | **148** | **43** |
| | Southern Exclosure | 194 | 186 | 143 | 77 | 353 | 85 | 24 |
| | Oso Flaco | 14 | 14 | 9 | 64 | 21 | 4 | 19 |
| | Open riding area | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| **2012** | **Total** | **211** | **203** | **152** | **75** | **374** | **89** | **24** |
| | Southern Exclosure | 147 | 144 | 115 | 80 | 286 | 123 | 43 |
| | Oso Flaco | 23 | 23 | 15 | 65 | 38 | 25 | 66 |
| **2013** | **Total** | **170** | **167** | **130** | **78** | **324** | **148** | **46** |
| | Southern Exclosure | 201 | 194 | 173 | 89 | 428 | 142 | 33 |
| | Oso Flaco | 44 | 44 | 33 | 75 | 86 | 35 | 41 |
| | Open riding area | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **2014** | **Total** | **246** | **239** | **206** | **86** | **514** | **177** | **34** |
| | Southern Exclosure | 182 | 175 | 153 | 87 | 401 | 215 | 54 |
| | Oso Flaco | 20 | 20 | 14 | 70 | 39 | 24 | 62 |
| | Arroyo Grande Creek[3] | 1 | - | 1 | - | 2 | 0 | 0 |
| **2015** | **Total** | **203** | **195** | **168** | **86** | **442** | **239** | **54** |
| | Southern Exclosure | 169 | 156 | 136 | 87 | 326 | 94 | 29 |
| | Oso Flaco | 40 | 37 | 29 | 78 | 82 | 36 | 44 |
| | Arroyo Grande Creek[3] | 1 | - | 1 | - | 2 | 1 | 50 |
| **2016** | **Total** | **210** | **193** | **166** | **85** | **410** | **131** | **32** |
| | Southern Exclosure | 195 | 165 | 107 | 65 | 252 | 105 | 42 |
| | Oso Flaco | 77 | 72 | 38 | 53 | 96 | 55 | 57 |
| | Arroyo Grande Creek | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **2017** | **Total** | **273** | **238** | **145** | **61** | **348** | **160** | **46** |
| | Southern Exclosure | 145 | 139 | 111 | 80 | 274 | 131 | 48 |
| | Oso Flaco | 61 | 61 | 33 | 54 | 84 | 43 | 51 |
| **2018** | **Total** | **206** | **200** | **144** | **72** | **358** | **174** | **49** |
| | Southern Exclosure | 172 | 163 | 118 | 72 | 299 | 81 | 27 |
| | Oso Flaco | 57 | 56 | 30 | 54 | 75 | 13 | 17 |
| | Euc. North reveg. area | 1 | 1 | 1 | 100 | 3 | 1 | 33 |
| **2019** | **Total** | **230** | **220** | **149** | **68** | **377** | **96** | **25** |
| | Southern Exclosure | 128 | 117 | 85 | 73 | 206 | 56 | 27 |
| | Oso Flaco | 39 | 35 | 21 | 60 | 55 | 4 | 7 |
| | Foredune closure[4] | 25 | 23 | 17 | 74 | 47 | 14 | 30 |
| | Open riding area[4,5] | 21 | 21 | 18 | 86 | 49 | 21 | 43 |
| | Bigfoot reveg. area | 1 | 1 | 1 | 100 | 3 | 0 | 0 |
| **2020** | **Total** | **214** | **197** | **142** | **72** | **360** | **95** | **27** |

**Table F.1. Nesting success of snowy plovers in identifiable areas at ODSVRA, 2001-23 (continued).**

| Year | Area | No. known location nests | No. nests with known location and known fate | No. nests with known location hatching | % nests hatching | No. chicks from known location | No. chicks from known location fledged | % chicks from known location nests fledged |
|---|---|---|---|---|---|---|---|---|
| | Southern Exclosure | 132 | 128 | 74 | 58 | 182 | 61 | 34 |
| | Oso Flaco | 29 | 29 | 11 | 38 | 23 | 9 | 39 |
| | Foredune closure | 48 | 48 | 36 | 75 | 90 | 29 | 32 |
| | Closed buffer area | 7 | 7 | 4 | 57 | 8 | 2 | 25 |
| | Open riding area | 4 | 4 | 2 | 50 | 6 | 2 | 33 |
| | Dunes Preserve | 1 | 1 | 1 | 100 | 1 | 0 | 0 |
| | Bigfoot reveg. area | 1 | 1 | 1 | 100 | 2 | 0 | 0 |
| | Euc. Tree reveg. area | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **2021** | **Total** | **223** | **219** | **129** | **59** | **312** | **103** | **33** |
| | Southern Exclosure | 153 | 145 | 122 | 84 | 298 | 95 | 32 |
| | Oso Flaco | 20 | 20 | 4 | 20 | 8 | 2 | 25 |
| | Foredune closure | 55 | 53 | 38 | 72 | 86 | 39 | 45 |
| | Closed buffer area | 4 | 4 | 4 | 100 | 12 | 1 | 8 |
| | Open riding area | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | Euc. Tree reveg. area | 1 | 1 | 1 | 100 | 3 | 3 | 100 |
| **2022** | **Total** | **235** | **225** | **169** | **75** | **407** | **140** | **35** |
| | Southern Exclosure | 118 | 112 | 65 | 58 | 161 | 92 | 57 |
| | Oso Flaco | 18 | 17 | 10 | 59 | 21 | 15 | 71 |
| | Foredune closure | 64 | 62 | 36 | 58 | 81 | 41 | 51 |
| | Closed buffer area | 2 | 2 | 2 | 100 | 5 | 4 | 80 |
| | Open riding area | 8 | 8 | 2 | 25 | 4 | 1 | 25 |
| | Euc. North reveg. area | 3 | 3 | 2 | 67 | 6 | 2 | 33 |
| | Euc. Tree reveg. area | 4 | 4 | 1 | 25 | 3 | 2 | 67 |
| **2023** | **Total** | **217** | **208** | **118** | **57** | **281** | **157** | **56** |

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

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

[3]In 2001, 2015 and 2016, brood with approximately one- to three-day-old chicks found in Arroyo Grande Creek area, assumed to be from an unknown nest nearby, and included in this table, but excluded from the percent hatch rate.

[4]In 2020, 1 nest found on the Foredune closure shoreline was designated as an open riding area location nest in the 2020 report and was changed to the location of Foredune closure beginning in the 2021 report in order to conform with current location designations.

[5]In 2020, 21 nests located outside closed areas such as Southern Exclosure, Foredune closure, Oso Flaco, and revegetation areas included in the open riding area category even though the area was closed to public vehicle and camping access (but open to other public recreation use) for most of the 2020 season (see 2020 annual report for more details).

**Table F.2. Attributed causes of snowy plover nest loss in Southern Exclosure and Oso Flaco at ODSVRA from 2002-23.**

Flooded nests include nests overwashed by tide and nests flooded by creek. The percentage of total loss for each cause is shown for the 22-year period 2002-23. Beginning with the 2020 report, all nests from 2002 onward likely lost to wind were placed in the fate category of "Wind," to avoid use of earlier terminology such as "Abandoned, suspected due to wind."

So. Excl. = Southern Exclosure, Aband. = Abandoned, Corvid = crow or raven

| Year | Area | Aband. pre-term | Aband. post-term | Aband., unk. pre- or post-term | Wind | Failed, cause unk. | Unid. predator | Avian predator | Gull | Corvid | Raven | Harrier | Peregrine | Coyote | Raccoon | Skunk | Opossum | Flooded | Vandalism | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | So. Excl. | | | 3 | 3 | 1 | | | | | | | | 1 | | | | | | 8 |
| 2002 | Oso Flaco | | | | 2 | | | | | | | | | | | | | | | 2 |
| | So. Excl. | 5 | 2 | 3 | 8 | | 3 | | | | 1 | | | | | | | | | 22 |
| 2003 | Oso Flaco | 2 | | 1 | | 1 | 1 | | | | 4 | | | | | | | | | 9 |
| | So. Excl. | 11 | | 1 | | 7 | 1 | | | | 2 | | | 2 | | | | | | 24 |
| 2004 | Oso Flaco | 4 | | | | 2 | 3 | | | | | | | | | | | 1 | | 10 |
| | So. Excl. | 9 | 3 | | | 7 | | | | | | | | | | | | | | 19 |
| 2005 | Oso Flaco | 2 | 1 | | | | 1 | | | | | | | | | | | | | 4 |
| | So. Excl. | 5 | 4 | | | 3 | 1 | | 3 | | | | | 4 | | | | | | 20 |
| 2006 | Oso Flaco | | | 1 | | | 1 | | 3 | | | | | | | | | 2 | | 7 |
| | So. Excl. | 4 | 1 | | | 9 | | | | | 1 | | | | | | | | | 15 |
| 2007 | Oso Flaco | 2 | | | | 2 | | | | | 1 | | | 1 | | | | | | 6 |
| | So. Excl. | 10 | | 3 | | 3 | 2 | 5 | 1 | | | 2 | | | | | | 1 | | 27 |
| 2008 | Oso Flaco | 3 | | 1 | | | | 4 | | | | 1 | | | | | | 2 | | 11 |
| | So. Excl. | 7 | 1 | | 2 | 1 | 7 | 14 | 2 | | | 1 | | | | | | 1 | | 36 |
| 2009[1] | Oso Flaco | 3 | | | 1 | 2 | 2 | 4 | | | | | | | | 1 | | 1 | | 14 |
| | So. Excl. | 5 | 2 | | 9 | | 4 | 6 | | | | | | | | | | 2 | | 28 |
| 2010 | Oso Flaco | 1 | | | 2 | | | 2 | | | | | | | 1 | 2 | | 1 | | 9 |
| | So. Excl. | 6 | 3 | 1 | 1 | 2 | 1 | 5 | | 3 | | | | | | | | | | 22 |
| 2011 | Oso Flaco | | | | | | 2 | | | 2 | | | | | 1 | 2 | | | | 7 |
| | So. Excl. | 11 | 1 | 3 | 6 | 3 | 3 | 5 | | 3 | | 5 | 1 | 1 | | | | 1 | | 43 |
| 2012 | Oso Flaco | 3 | 1 | | 1 | | | | | | | | | | | | | | | 5 |
| | So. Excl. | 5 | 5 | | 15 | 3 | 1 | | | | | | | | | | | | | 29 |
| 2013 | Oso Flaco | 3 | 2 | | 2 | | | | 1 | | | | | | | | | | | 8 |
| | So. Excl. | 13 | 1 | 4 | | 2 | | | | | | | | | | | | 1 | | 21 |
| 2014 | Oso Flaco | 6 | | 1 | 1 | | 1 | | | | | | | 1 | | | | 1 | | 11 |

**Table F.2. Attributed causes of snowy plover nest loss in Southern Exclosure and Oso Flaco at ODSVRA from 2002-23 (continued).**

| Year | Area | Aband. pre-term | Aband. post-term | Aband., unk. pre- or post-term | Wind | Failed, cause unk. | Unid. predator | Avian predator | Gull | Corvid | Raven | Harrier | Peregrine | Coyote | Raccoon | Skunk | Opossum | Flooded | Vandalism | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | So. Excl. | 11 | 1 | 4 | 1 | 2 | | 2 | | | 1 | | | | | | | | | **22** |
| **2015** | Oso Flaco | 1 | | | | 1 | 1 | | | | 3 | | | | | | | | | **6** |
| | So. Excl. | 5 | 7 | 2 | 2 | 3 | | | | | | | | | | 1 | | | | **20** |
| **2016** | Oso Flaco | 4 | | | | 1 | 1 | | 1 | | | | | | | | | | | **7** |
| | So. Excl. | 5 | 3 | 3 | 1 | 11 | 9 | 2 | 2 | | 6 | | | 1 | | 15 | | | | **58** |
| **2017** | Oso Flaco | 5 | | 2 | 2 | 15 | | | | | 4 | | | 1 | | 3 | | 2 | | **34** |
| | So. Excl. | 9 | 3 | 5 | | 2 | | 3 | | | 5 | | | | | | | 1 | | **28** |
| **2018** | Oso Flaco | 2 | | 2 | 3 | | 2 | 10 | 5 | | | | | 4 | | | | | | **28** |
| | So. Excl. | 3 | | 2 | 3 | 3 | | 6 | 10 | 1 | 12 | 1 | | | | 1 | | 3 | | **45** |
| **2019** | Oso Flaco | 3 | | 1 | | 2 | 4 | 2 | 4 | | 1 | | | 4 | | | | 5 | | **26** |
| | So. Excl. | 3 | 1 | | 4 | 1 | 7 | 8 | | | 2 | 3 | | 1 | | | | 2 | | **32** |
| **2020** | Oso Flaco | | | 2 | 5 | 3 | | 2 | | | 1 | | | | | | | 1 | | **14** |
| | So. Excl. | 9 | | 2 | 4 | | 5 | 16 | | | 4 | 11 | | 1 | | | 2 | | | **54** |
| **2021** | Oso Flaco | 4 | | 1 | 1 | 2 | 2 | 3 | | | 5 | | | | | | | | | **18** |
| | So. Excl. | 7 | 3 | 2 | 4 | 2 | 1 | 2 | | | 1 | | | | | | | 1 | | **23** |
| **2022** | Oso Flaco | 2 | | | | 2 | 5 | 3 | | | 1 | | | 1 | | | | 2 | | **16** |
| | So. Excl. | 4 | | 1 | | | 5 | 6 | | | 24 | 3 | | 2 | | | | 2 | | **47** |
| **2023**[1] | Oso Flaco | | | | 1 | 1 | 1 | | | | 2 | | | | | | | 1 | 1 | **6** |
| | | | | | | | | | | | | | | | | | | | | |
| **2002-23 Total nest loss** | So. Excl. | **147** 22.9% | **41** 6.4% | **39** 6.1% | **63** 9.8% | **65** 10.1% | **50** 7.8% | **80** 12.4% | **18** 2.8% | **7** 1.1% | **59** 9.2% | **26** 4.0% | **1** 0.2% | **13** 2.0% | **0** 0.0% | **17** 2.6% | **2** 0.3% | **15** 2.3% | **0** 0.0% | **643** |
| | Oso Flaco | **50** 19.4% | **4** 1.6% | **12** 4.7% | **21** 8.1% | **34** 13.2% | **27** 10.5% | **30** 11.6% | **14** 5.4% | **2** 0.8% | **22** 8.5% | **1** 0.4% | **0** 0.0% | **12** 4.7% | **2** 0.8% | **8** 3.1% | **0** 0.0% | **19** 7.4% | **1** 0.4% | **258** |
| | | | | | | | | | | | | | | | | | | | | |
| **2002-23 Grand Total So. Excl. and Oso Flaco** | | **197** 21.9% | **45** 5.0% | **51** 5.7% | **84** 9.3% | **99** 11.0% | **77** 8.5% | **110** 12.2% | **32** 3.6% | **9** 1.0% | **81** 9.0% | **27** 3.0% | **1** 0.1% | **25** 2.8% | **2** 0.2% | **25** 2.8% | **2** 0.2% | **34** 3.8% | **1** 0.1% | **901** |

[1]In 2009 and 2023, two nests from each year had the assigned fate of failed, eggs removed by staff (eggs were nonviable and removed by staff in consultation with USFWS) and are not represented in this table.

**Appendix F. Addendums to snowy plover nesting success (continued).**

**Table F.3 Nest protection used in the Southern Exclosure and Oso Flaco at ODSVRA in 2023.**

Included in table are 129 nests with both known location and known fate. See Closures and fencing under Management Actions in this report on page 16 for definition of fencing types. Percent in parentheses is percent nests hatched. rav = raven; ha = harrier; cr = crow; av = avian; un = unknown predator; coy = coyote; pre = abandoned pre-term; ukp = abandoned, unknown pre- or post-term; w = wind; fld = flooded; unk = failed, cause unknown; v = vandalism

| Area | Exclosure predator fence | | | Shoreline symbolic fence | |
|---|---|---|---|---|---|
| | No additional fencing | Bumpout | Mini | No additional fencing | Circular |
| **Southern Exclosure** | | | | | |
| **6 exclosure** | **28** | **1** | **5** | **12** | **4** |
| Nests hatched | 18 (64%) | 0 (0%) | 5 (100%) | 8 (67%) | 4 (100%) |
| Nests depredated | 9 (6 rav, 1 ha, 2 av) | 1 (1 un) | | 3 (1 rav, 2 av) | |
| Nests failed other causes | 1 (1 pre) | | | 1 (1 pre) | |
| **7 exclosure** | **21** | | **1** | **12** | |
| Nests hatched | 11 (52%) | | 1 (100%) | 5 (42%) | |
| Nests depredated | 10 (6 rav, 1 av, 3 un) | | | 5 (2 rav, 2 ha, 1 av) | |
| Nests failed other causes | | | | 2 (1 ukp, 1 fld) | |
| **8 exclosure** | **9** | | **1** | **7** | **2** |
| Nests hatched | 0 (0%) | | 1 (100%) | 5 (71%) | 1 (50%) |
| Nests depredated | 9 (7 rav, 1 un, 1 coy) | | | 1 (1 rav) | |
| Nests failed other causes | | | | 1 (1 pre) | 1 (1 fld) |
| **Boneyard** | **6** | | **3** | | |
| Nests hatched | 3 (50%) | | 3 (100%) | | |
| Nests depredated | 2 (1 rav, 1 coy) | | | | |
| Nests failed other causes | 1 (1 pre ) | | | | |
| **SOUTHERN EXCLOSURE TOTALS** | **64** | **1** | **10** | **31** | **6** |
| Nests hatched | 32 (50%) | 0 (0%) | 10 (100%) | 18 (58%) | 5 (83%) |
| Nests depredated | 30 (20 rav, 1 ha, 3 av, 4 un, 2 coy) | 1 (1 un) | | 9 (4 rav, 2 ha, 3 av) | |
| Nests failed other causes | 2 (2 pre) | | | 4 (2 pre, 1 ukp,1 fld) | 1 (1 fld) |
| **Oso Flaco** | | | | | |
| **North Oso Flaco** | **1** | | **2** | **2** | **1** |
| Nests hatched | 1 (100%) | | 2 (100%) | 0 (0%) | 1 (100%) |
| Nests depredated | | | | 2 (1 rav, 1 un) | |
| Nests failed other causes | | | | | |
| **South Oso Flaco** | | | | **8** | **3** |
| Nests hatched | | | | 4 (50%) | 2 (67%) |
| Nests depredated | | | | 1 (1 rav) | |
| Nests failed other causes | | | | 3 (1 w , 1 fld, 1 unk) | 1 (v) |
| **OSO FLACO TOTALS** | **1** | | **2** | **10** | **4** |
| Nests hatched | 1 (100%) | | 2 (100%) | 4 (40%) | 3 (75%) |
| Nests depredated | | | | 3 (2 rav, 1 un) | |
| Nests failed other causes | | | | 3 (1 w , 1 fld, 1 unk) | 1 (v) |
| | | | | | |
| **GRAND TOTAL** | **65** | **1** | **12** | **41** | **10** |
| Nests hatched | 33 (51%) | 0 (0%) | 12 (100%) | 22 (54%) | 8 (80%) |
| Nests depredated | 30 (20 rav, 1 ha, 3 av, 4 un, 2 coy) | 1 (1 un) | | 12 (6 rav, 2 ha, 3 av, 1 un) | |
| Nests failed other causes | 2 (2 pre) | | | 7 (2 pre, 1 ukp, 1 w , 2 fl, 1 unk) | 2 (1 fld, 1 v) |

**Appendix F. Addendums to snowy plover nesting success (continued).**

### Table F.4 Nest protection used in the Foredune closure, Closed buffer area, and revegetation areas at ODSVRA in 2023.

Included in table are 71 nests with both known location and known fate. See Closures and fencing under Management Actions in this report on page 16 for definition of fencing types. Percent in parentheses is percent nests hatched.
rav = raven; ha = harrier; av = avian; un = unknown predator; pre = abandoned pre-term; ukp = abandoned, unknown pre- or post-term; w = wind; fld = flooded; unk = failed, cause unknown; rem = failed, eggs removed by staff.

| | Nonpredator fencing | | | | Shoreline symbolic fence | |
|---|---|---|---|---|---|---|
| **Area** | **No additional fencing** | **Bumpout** | **Mini** | **Bumpout and Mini** | **No additional fencing** | **Circular** |
| **Foredune closure** | **27** | **8** | **2** | **1** | **20** | **4** |
| Nests hatched | 15 (56%) | 2 (25%) | 2 (100%) | 1 (100%) | 12 (60%) | 4 (100%) |
| Nests depredated | 8 (5 ha, 2 av, 1 un) | 2 (1 rav, 1 ha) | | | 5 (4 rav, 1 av) | |
| Nests failed other causes | 4 (1 pre, 2 w , 1 rem) | 4 (1 pre, 2 unk, 1 rem) | | | 3 (1 ukp, 2 fl) | |
| **Revegetation areas** | | **4** | **1** | **2** | | |
| Nests hatched | | 0 (0%) | 1 (100%) | 2 (100%) | | |
| Nests depredated | | 4 (3 rav, 1 av) | | | | |
| Nests failed other causes | | | | | | |
| **Closed buffer area** | | | **2** | | | |
| Nests hatched | | | 2 (100%) | | | |
| Nests depredated | | | | | | |
| Nests failed other causes | | | | | | |
| **OTHER TOTALS** | **27** | **12** | **5** | **3** | **20** | **4** |
| Nests hatched | 15 (56%) | 2 (17%) | 5 (100%) | 3 (100%) | 12 (60%) | 4 (100%) |
| Nests depredated | 8 (5 ha, 2 av, 1 un) | 6 (4 rav, 1 ha, 1 av) | | | 5 (4 rav, 1 av) | |
| Nests failed other causes | 4 (1 pre, 2 w , 1 rem) | 4 (1 pre, 2 unk, 1 rem) | | | 3 (1 ukp, 2 fl) | |

### Table F.5 Nest protection used in the Open riding area at ODSVRA in 2023.

Included in table are 8 nests found in the open riding area (initiated in areas with no protective fencing) with known fate. See Closures and fencing under Management Actions in this report on page 16 for definition of fencing types. Percent in parentheses is percent nests hatched.
rav = raven; ha = harrier; cr = crow; pre = abandoned pre-term;

| | Nonpredator fencing | | |
|---|---|---|---|
| **Area** | **No additional fencing** | **Circular** | **Mini** |
| **Open riding area** | **6** | **1** | **1** |
| Nests hatched | 0 (0%) | 1 (100%) | 1 (100%) |
| Nests depredated | 5 (2 rav, 1 ha, 2 cr) | | |
| Nests failed other causes | 1 (1 pre) | | |

**Appendix F. Addendums to snowy plover nesting success (continued).**

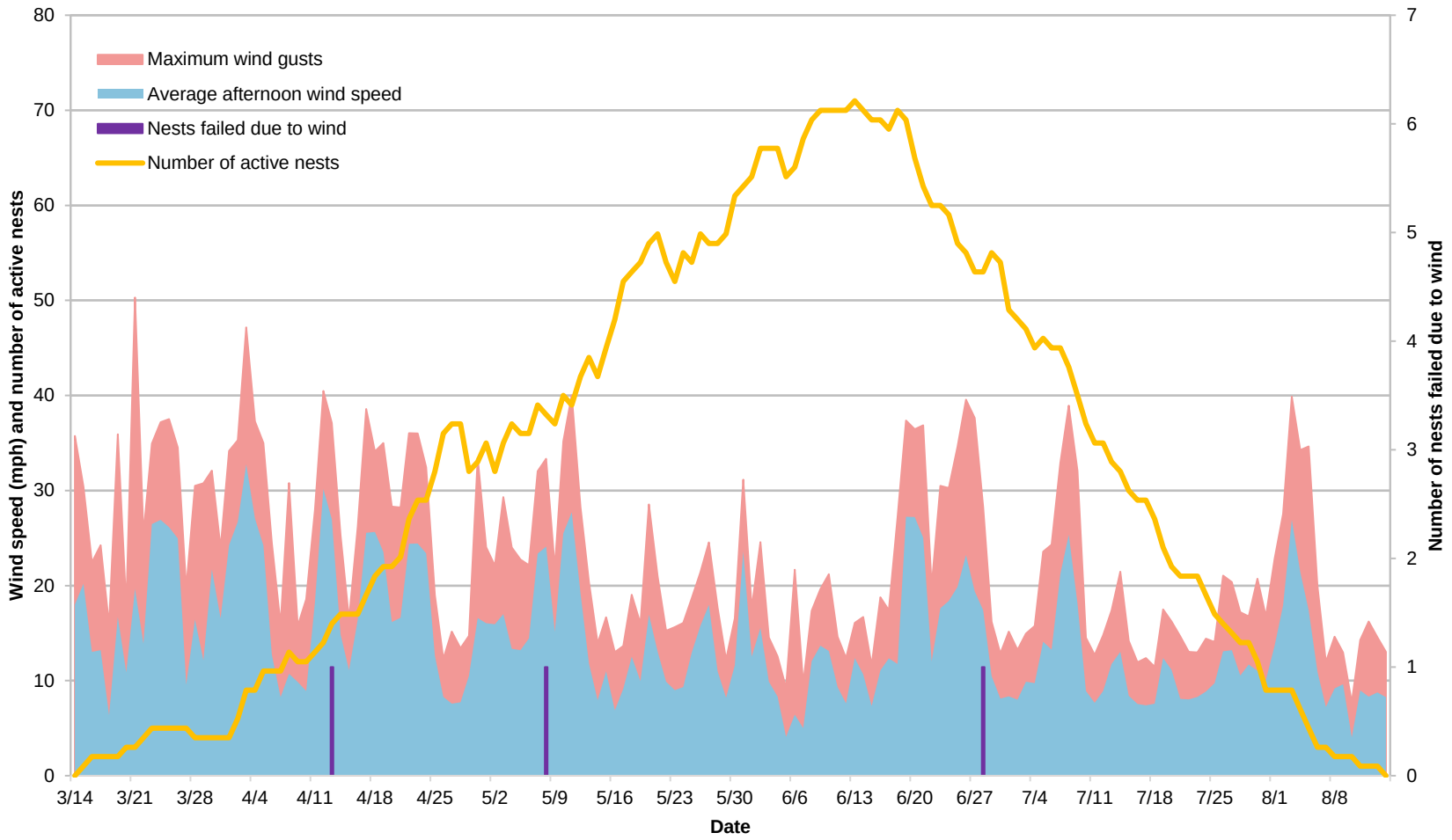



**Figure F.1. Daily wind speed data (daily afternoon average and daily maximum wind gust) and snowy plover nest loss attributed to wind at ODSVRA from 14 March to 14 August 2023.**

The left y-axis corresponds to wind speed in miles per hour (mph) and total number of active nests. The right y-axis corresponds to number of nests lost with fate wind (only nests with entire clutch lost, whether partial or complete, are included and not eggs lost from a nest that remained active.) Wind speed was collected at the S1 wind tower, located approximately 375 feet east of 6 exclosure since 2011, from an anemometer at 10 meters height. The daily afternoon average wind speed is calculated from the average of the hours 1:00 pm–5:00 pm. The maximum wind gust represents the maximum wind speed for the entire day. The date provided for nest loss to wind may, in several cases, be a day after the actual event.

**Appendix F. Addendums to snowy plover nesting success (continued).**

### Table F.6. Selective transfer of abandoned snowy plover chick and abandoned potentially viable eggs to Santa Barbara Zoo, Santa Barbara County, in 2023.

The chick and all eggs were transferred to Santa Barbara Zoo on same day collected. All resulting fledglings were unbanded and released at Coal Oil Point Reserve (COPR) in Santa Barbara County.

| Nest no. | No. collected | Date collected | No. eggs hatched | No. fledglings | Release date (age) | Notes |
|---|---|---|---|---|---|---|
| 60 | 1 egg | 11 May | 1 | 1 | 19 July (43 days) | On 4 May, nest found with 1 egg in the open riding area 340 feet east of 7 exclosure. Nest was immediately protected with symbolic fencing and nonpredator fencing installed the following day resulting in a minimum 126-foot buffer from the nest to the open riding area. Nest never observed incubated, remained with 1 egg, and was partially buried by sand on 9 May. On 10 May, a camera was installed and nest was confirmed abandoned. The egg hatched 6 June, chick fledged, and was released. |
| 105 | 3 eggs | 3 June | 0 | 0 | na | On 20 May, nest found with 3 eggs in the Foredune closure. Egg float data indicated nest initiated approximately 12 May. Camera installed 23 May and shows nest was inconsistently incubated 23-27 May, after which the nest was no longer in camera view and not visible from a distance. Camera was adjusted 30 May and nest was not incubated subsequently. All 3 eggs were fertile but stopped developing by 10 June in the late stages. |
| 79 | 1 chick | 4 June | na | 0 | na | On 30 May, 1 chick hatched from nest on the 6 exclosure shoreline and the other egg in this 2 egg nest did not hatch. The following morning the chick, banded pg:og, observed aggressively attacked by an adult plover from a nearby brood, and later in the morning was slightly limping on right leg and attended by 2 adults. The chick was checked daily 1-3 June and appeared to walk normally. On 4 June, the chick was found immobile and not attended by an adult on the 6 exclosure shoreline. The 5-day-old chick was collected, placed in a warmed brooder, and it quickly became more active. On arrival at the Santa Barbara Zoo, it was reported to be in stable condition. While in rehabilitation, chick developed left leg issues, with lameness noted and radiographs showing decreased bone density. Chick died 18 June and histologic findings are consistent with sepsis as the cause of death. |
| 231 | 1 chick | 22 June | na | 1 | 14 August (53 days) | On 22 June, a small, unbanded chick was found immobile in northern 6 exclosure unattended by adult. The recently hatched chick (still with egg tooth present) was placed in a brooder and transferred to Santa Barbara Zoo. The chick fledged and was released. A brood of 2 small, unbanded chicks from unknown nest location, attended by 2 adults, was found earlier the same morning on 22 June in southern 6 exclosure. Origins of the immobile chick was unknown at the time it was found, but assumed after review to be associated with this 2-chick brood based on chick size and timing of sightings. The 2 chicks fledged. |

## APPENDIX G. PREDATOR SUMMARY TABLES AND FIGURES.

### Table G.1. Summary of predators detected in the Southern Exclosure and Oso Flaco at ODSVRA in 2023.

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 by September (very few remaining chicks). Min. no. individ. = minimum number of different individuals identified during season. This number was not determined for mammals or owls as these species are primarily nocturnal with occurrences detected by tracks. For a summary of depredated plover nests, see Table F.2 in Appendix F. Refer to Tables H.3 and H.5 in Appendix H for a summary of documented predation of terns and plovers, other than eggs.

| Species | First date observed | Last date observed | No. days detected | Min. no. individ. | Notes |
|---|---|---|---|---|---|
| **Mammalian** | | | | | |
| Coyote | 4 Mar | 6 Sep | 108 | - | Most common on the Southern Exclosure and Oso Flaco shoreline. Noted inside the Exclosure predator fencing on 32 days (61 occurrences). Two plover nests documented depredated by coyote. Four coyotes were removed this season. |
| Opossum | 13 Apr | 26 Aug | 5 | - | Activity noted in 6, 8, and Boneyard exclosures irregularly April to August. |
| Raccoon | 11 Mar | 7 May | 3 | - | Activity only noted in Boneyard exclosure. |
| Skunk | 27 July | 27 Jul | 1 | - | One occurrence of a live skunk on 8 exclosure shoreline observed using a thermal scope for nighttime predator surveillance on 27 July. |
| **Avian** | | | | | |
| Crow | 16 Mar | 28 Jul | 31 | 7 | Primarily observed in March and April over South Oso Flaco and 8 exclosure. Seven crows seen at the same time on 22 March. Two plover nests documented depredated by crow. One crow removed this season. |
| Kestrel | 18 Mar | 15 Aug | 27 | 3 | Frequent sightings in late March and again in early June. Observed hunting in all areas of the Southern Exclosure and Oso Flaco. A male kestrel was observed hunting 6, 7, and 8 shore and taking at least 5 plover chicks over an 11-day period (one additional plover chick lost to a kestrel of unknown sex on 8 June) from 30 May to 9 June. Attempts to trap this male kestrel were unsuccessful. Minimum of 3 individuals (based on number seen simultaneously): three kestrels seen at the same time on 25 March. |
| Raven | 4 Mar | 22 Jun | 41 | 10 | Primarily observed flying over the Southern Exclosure and Oso Flaco from early April to late May. Ten plover nests were documented loss to raven. A total of 8 ravens were lethally removed, on or prior to 12 June. Sightings were reduced after 12 June through 22 June (4 sightings over 10 days). No sightings after 22 June. Minimum of 10 individuals (based on number seen simultaneously, and trapped individuals) observed during season: 8 removed prior to 13 June and two ravens seen at the same time on 22 June. |
| Gull spp. | Present daily throughout season | | | | Gulls were present the length of the shoreline of the Southern Exclosure and Oso Flaco. One subadult California gull lethally removed on 26 July after plover adults seen getting off nest and displaying at gull. One subadult western gull lethally removed on 30 July after observing it catch and eat one 1 plover juvenile or adult. |

**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 2023 (continued).**

| Species | First date observed | Last date observed | No. days detected | Min. no. individ. | Notes |
|---|---|---|---|---|---|
| Harrier | 5 Mar | 5 Sep | 51 | 5 | Harrier sightings increased through March and peaked in April when a male harrier was observed hunting over all areas of the Southern Exclosure and Oso Flaco. Ten plover nests documented depredated by harrier. Male harrier depredating nests was trapped on 1 May and harrier sightings remained low May through September. No additional plover or tern losses were attributed to harrier. Minimum of 5 individuals (based on age and sex characteristics, number seen simultaneously, and trapped individuals) observed during the season: 2 adult males, 1 adult female, 2 juveniles seen at same time on 30 July. |
| Osprey | Common throughout season | | | | Although not documented as a predator of plovers or terns, ospreys (*Pandion haliaetus*) are included in this table due to the disturbance they can cause when perched for long periods of time in sensitive areas. Primarily observed flying over the Southern Exclosure shoreline and occasionally perched and eating fish. Hazed as appropriate. |
| Large owl spp. | 13 Mar | 15 Aug | 17 | | Great horned owl and barn owl documented on-site, but observations and tracks indicate great horned owl make up the majority of owl presence. Activity noted in all areas of the Southern Exclosure and Oso Flaco. Most sightings were of a great horned owl pair roosting in South Oso Flaco and of a great horned owl caught on camera investigating a trap set for owls inside 8 exclosure. Attempts to trap owls were unsuccessful. |
| Loggerhead shrike | 20 Mar | 8 Apr | 3 | 1 | All observations in 7 and 8 exclosures, and South Oso Flaco. |
| Peregrine | 12 Apr | 8 Sep | 41 | 3 | Most observations between mid-June and end of July of an unbanded juvenile hunting all areas of the Southern Exclosure and Oso Flaco. A minimum of 3 tern fledglings, 1 plover chick and 2 plover juveniles were documented taken by a juvenile peregrine from July to September. Attempts to trap a juvenile peregrine were unsuccessful. One non-target adult female trapped on 31 July and banded with black VID band “94AK” on left leg and silver on right. Minimum of 3 individuals (based on bands and/or age and sex characteristics) observed during season. |
| Red-tailed hawk | 8 Mar | 5 Sep | 32 | 3 | Observed throughout the Southern Exclosure and Oso Flaco. Three individuals seen at same time on 15 April. |

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

**Table G.2. Documented predation of California least tern and western snowy plover, other than eggs, in Southern Exclosure and Oso Flaco at ODSVRA from 2002-23.**

Documented predation of chicks, juveniles, and adults of terns and plovers at ODSVRA likely represents a small percentage of actual occurrences because most predations are not witnessed or leave little to no evidence behind, unlike eggs at a nest. Predation management that included options for selective relocation or lethal removal of avian and mammalian predators began in 2002. Documented predation represented in this table occurred from 1 March to 10 September (a 194-day period) from 2002-23. Unk pred = Unknown predator, T = California least tern, P = Western snowy plover.

| Year | Coyote | | Skunk | | Kestrel | | Merlin | | Peregrine | | Harrier | | Red-tailed hawk | | Great horned owl | | Owl spp. | | Western gull | | California gull | | Ring-billed gull | | Gull spp. | | Brewer's Blackbird | | Shrike | | Avian spp. | | Unk pred | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | T | P | |
| **2002** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0** |
| **2003** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | 1 | | **4** |
| **2004** | | | | | | | | 1 | | | 5 | 1 | | | | | 1 | | | | | 2 | | | | | | | | | 1 | 3 | | | **14** |
| **2005** | | | | 2 | | | | 1 | | | | | | | | | | | | | | 1 | | | | | | | 1 | 2 | | | 1 | | **8** |
| **2006**[1] | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | **3** |
| **2007**[2] | | 4 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | **9** |
| **2008**[2] | | | | | | | | | | | | | | | | | | | | 2 | | | | 1 | | | | | | | | | | 1 | **4** |
| **2009** | | | | | | | | | | 2 | | | | | | | | | | | | 1 | | | | | | | | | | | | | **3** |
| **2010** | | | | | | | | | | 2 | | | | | | | | | | 2 | | | | | | | | | | | 2 | | | | **6** |
| **2011**[3] | | | | | | | | | | 2 | | | | | | | | | | 2 | | 15 | | | | | | | | | 1 | 2 | | | **22** |
| **2012** | 1 | 3 | | | | | | | 1 | 3 | | 1 | | | | | | | | | | | | | | 3 | | | | | 1 | 3 | | 2 | **18** |
| **2013** | | | | | | | | | 1 | 2 | | | | | | | | | | | | | | | | | | | | | | 2 | | | **5** |
| **2014** | | | | | | | | | 2 | 3 | | | | | | | | | | | | 4 | | | | | | | | | | | | 1 | **10** |
| **2015** | | | | | | | | 1 | | 3 | | | | | | | | | | 1 | | | | | | | | | | | | | | | **5** |
| **2016** | | | | | | | | | 1 | 2 | | | | | | | | | | | | 9 | | | | | | | | 3 | | | | | **15** |
| **2017**[4] | | | | | | | | | | 2 | | | | 1 | | | | | | | | | | | | | | | | | | | | | **3** |
| **2018** | | | | | | | | | | 5 | | | | | | | | | | 9 | | 2 | | | | | | | | | 1 | | | | **17** |
| **2019** | | | | | | | | | | 9 | 1 | | | | | | | | | 4 | | | | | | | | 1 | | | | | | 1 | **16** |
| **2020** | | 4 | | | | | | | | 7 | | 1 | | | | | | | | 3 | | | | | | | | | | | | | 2 | 4 | **21** |
| **2021**[5] | | | | | | 4 | | | 3 | 5 | 2 | 8 | | | 2 | | 1 | 1 | | | | | | | | | | | | | 1 | | 1 | | **28** |
| **2022** | | | | | | 7 | | | | 3 | | | | | | 2 | | | | 1 | | | | | | | | | | | | | | 1 | **14** |
| **2023** | | | | | | 7 | | | 3 | 3 | | | | | | | | | | 1 | | | | | | | | | | | | | | | **14** |
| **Total** | 1 | 11 | 0 | 2 | 1 | 18 | 0 | 4 | 11 | 53 | 8 | 11 | 0 | 1 | 2 | 2 | 2 | 1 | 0 | 25 | 0 | 34 | 0 | 1 | 0 | 3 | 0 | 1 | 1 | 8 | 5 | 12 | 9 | 12 | |
| **Total T and P** | **12** | | **2** | | **19** | | **4** | | **64** | | **19** | | **1** | | **4** | | **3** | | **25** | | **34** | | **1** | | **3** | | **1** | | **9** | | **17** | | **21** | | **239** |

[1]Two terns depredated by unknown predator suspected to be owl.
[2] Unknown predations in 2007 and 2008 suspected to be avian.
[3]One plover depredated by unknown avian species suspected to be owl.
[4]A number of recently hatching tern chicks suspected loss to skunk, but no remains found to confirm.
[5]Two additional tern carcasses were found and predation was suspected, but not confirmed.

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

**Table G.3. Mammalian and avian predators removed or trapped and relocated under predator management actions for least terns and snowy plovers at ODSVRA in 2023.**

Eight ravens, four coyotes, one crow, one California gull, and one western gull were lethally removed. One northern harrier, one Cooper's hawk, and one peregrine falcon were live-trapped and relocated (release date in parentheses). All animals trapped or removed were within ODSVRA boundaries. The Cooper's hawk and adult peregrine falcon were inadvertently caught in traps intended for other targeted individuals.

| Date | Species | Age/Sex | Location |
|---|---|---|---|
| **Lethally removed** | | | |
| 19 Apr | crow | adult | Foredune closure shoreline |
| 4 May | raven | adult | Open riding area east of Eucalyptus Tree revegetation area |
| 9 May | raven | adult | Boneyard exclosure |
| 9 May | raven | adult | Pavilion Hill |
| 16 May | raven | adult | 7 exclosure |
| 16 May | raven | adult | 7 exclosure |
| 26 May | raven | adult | Boneyard exclosure |
| 5 Jun | raven | adult | Open riding area east of Pipeline revegetation area |
| 12 Jun | raven | adult | Boneyard exclosure |
| 30 Jun | coyote | adult | Closed buffer area east of Foredune closure |
| 5 Jul | coyote | adult | Open riding area east of Maidenform revegetation area |
| 12 Jul | coyote | juvenile | Bigfoot revegetation area |
| 26 Jul | California gull | subadult | 8 exclosure shoreline |
| 28 Jul | coyote | adult | Eucalyptus Tree revegetation area |
| 30 Jul | western gull | subadult | 6 exclosure shoreline |
| **Live-trapped and relocated** | | | |
| 1 May (2 May) | harrier | adult male | Foredune closure shoreline near marker post 6 |
| 24 Jul (24 Jul) | Cooper's hawk | subadult female | 8 exclosure |
| 31 Jul (3 Aug) | peregrine | adult female | 6 exclosure shoreline |

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

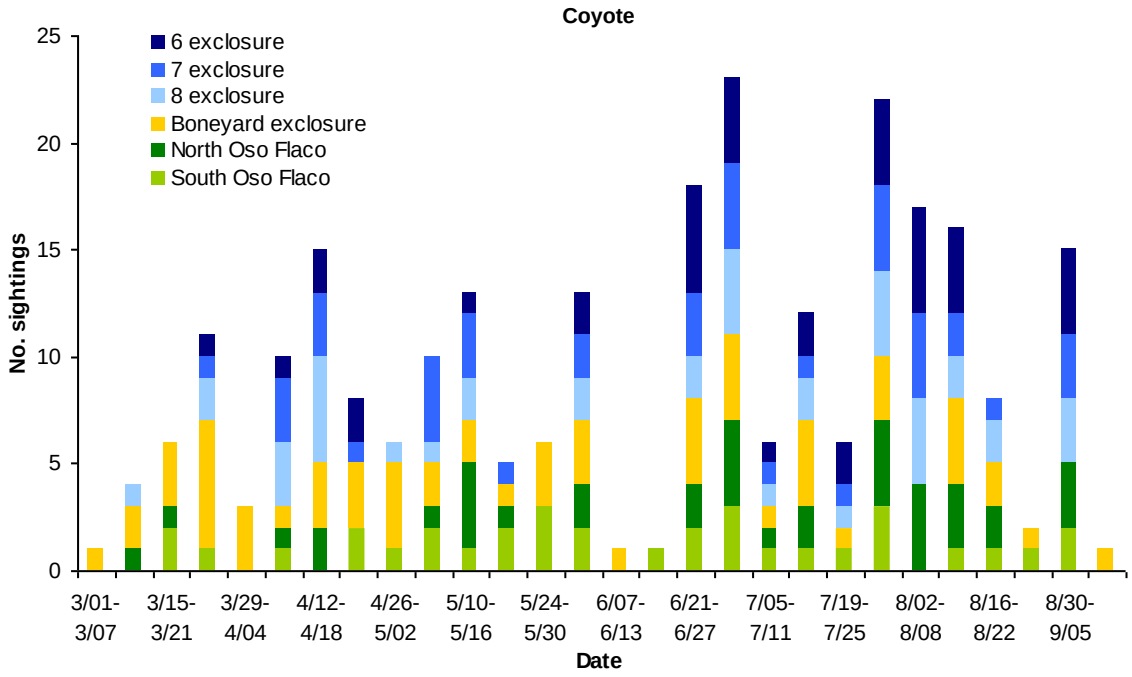



**Figure G.1. Coyote occurrences documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2023.**

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

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

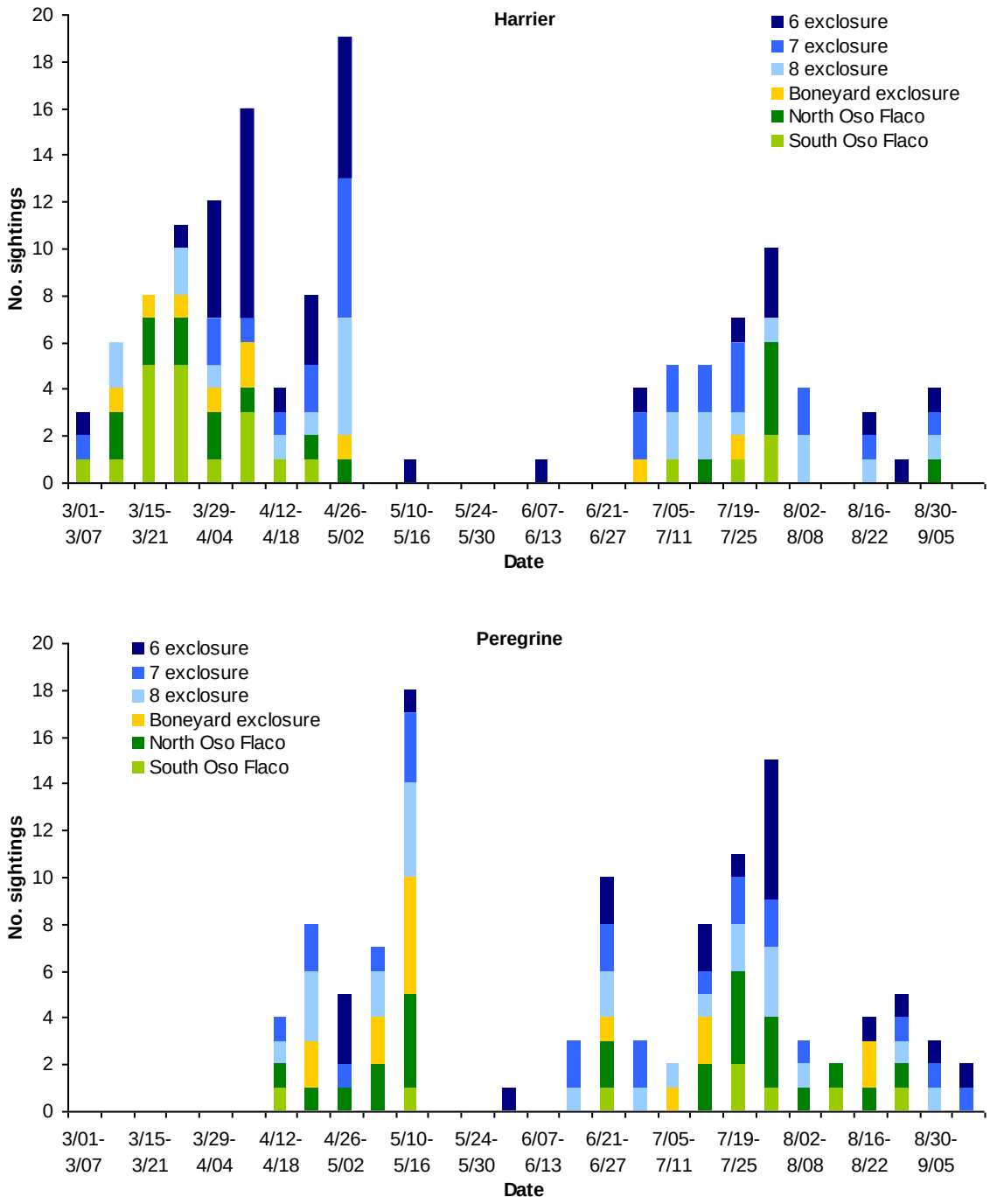



**Figure G.2. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2023.**

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

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

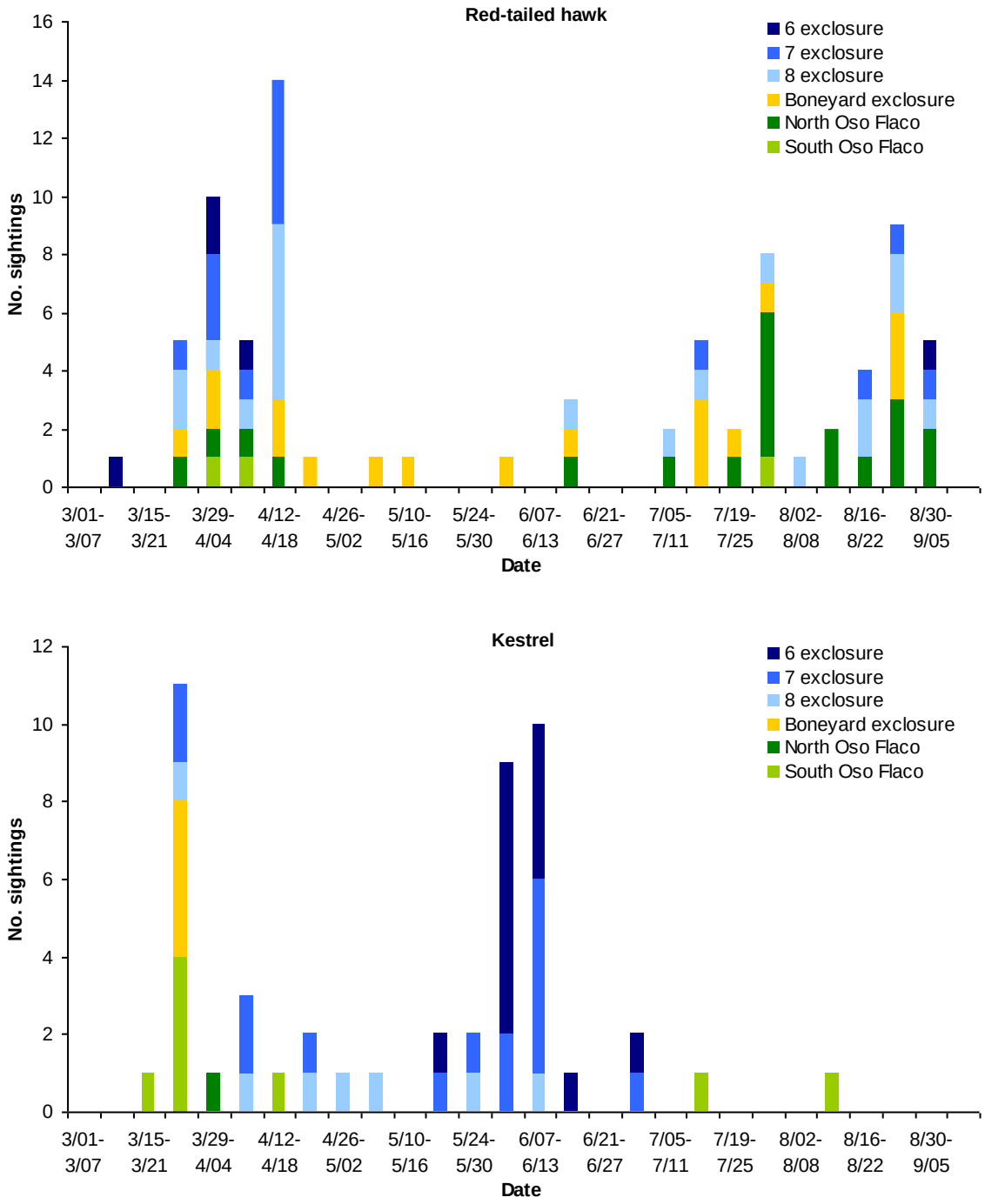
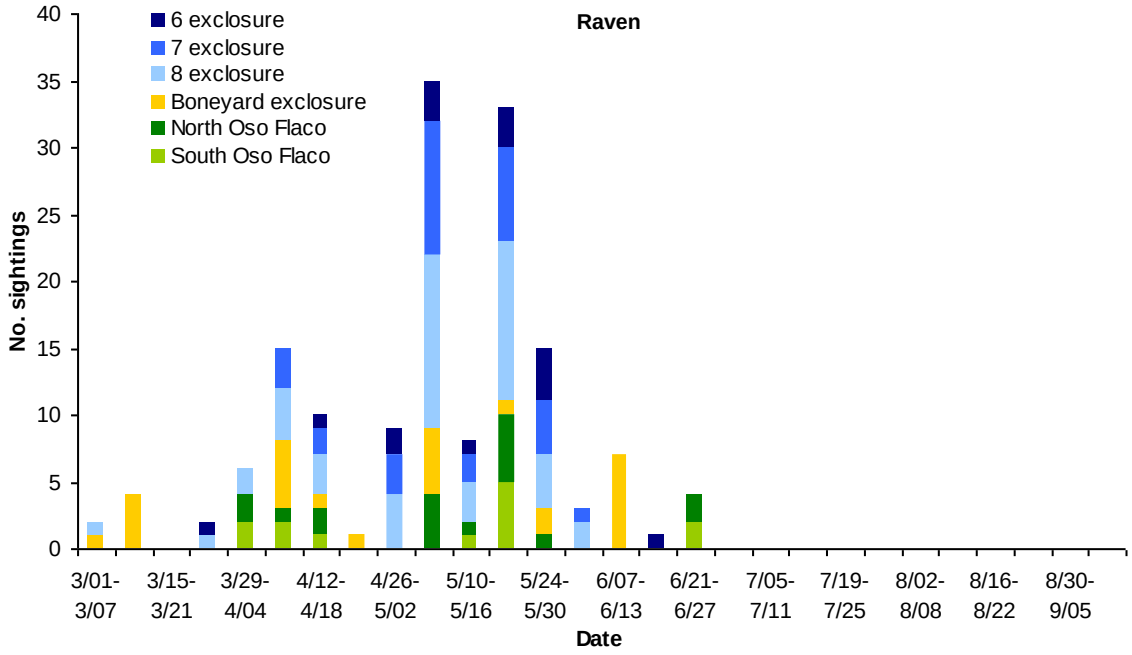



**Figure G.2. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2023 (continued).**

Observations from 1 March–10 September (a 194-day period). One kestrel trapped and relocated 6 August.

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



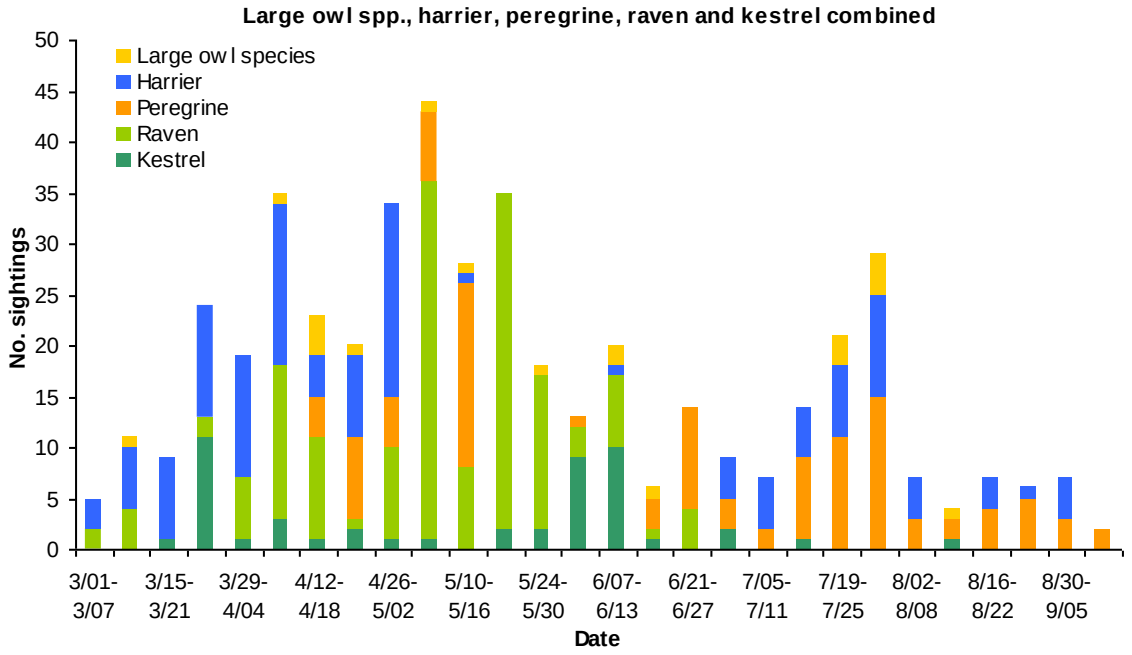




**Figure G.2. Avian predator sightings documented in the Southern Exclosure and Oso Flaco at ODSVRA in 2023 (continued).**

Observations from 1 March to 10 September (a 194-day period). Seven ravens lethally removed over 16-day period 29 April–14 May.

## APPENDIX H. SIGHTINGS OF INJURIES AND DOCUMENTED MORTALITY OF CALIFORNIA LEAST TERN AND SNOWY PLOVER ADULTS, JUVENILES, AND CHICKS AT ODSVRA.

### Table H.1. Sightings of injured least terns in 2023.

| No. (age) | Location | Notes |
|---|---|---|
| 1 (chick) | 7 exclosure | On 27 June, the LT11 nest in 7 exclosure hatched 1 chick. Later that day a snowy plover adult associated with a nearby nest was seen on two occasions aggressively attacking the tern adult attending chick at the LT11 nest, the chick was not observed to be harmed, and appeared and behaved normally when inspected in hand after the incident. On 30 June, the tern chick was found near the nest with a large wound on its back and had a lower than average weight for its 3-day-old age (5.9 grams). Chick was not banded. The chick was last seen 1 July at 4 days old. |

### Table H.2. Sightings of injured snowy plovers from December 2022 to 11 September 2023.

No injured plovers were seen December 2022, subsequent to the 2022 annual report.

| No. (age) | Location | Notes |
|---|---|---|
| 1 (adult) | Open riding area | On 25 April, a plover adult banded pg:yr was south of marker post 3 with a possible right leg injury, putting less weight on the leg while running, and not seen subsequently. The bird was banded as a chick at ODSVRA in 2022 (2 fledged). An adult was overwintering at ODSVRA 2022-23, and a breeding male at ODSVRA was seen subsequent to 25 April 2023 without injury. |
| 1 (adult) | 6 exclosure | On 1 June, an unbanded female plover associated with the SP102 nest observed with blood on underside of body and there were spots of blood in nest bowl and on 1 of the 3 eggs. The bird was seen subsequently incubating the nest with no sign of injury. The nest hatched 19 June, the 3 chicks were seen attended by both adults, and all 3 fledged. |
| 1 (adult) | 7 exclosure, 7 exclosure shoreline | On 18 June and 20 June, a female plover banded rr:ry associated with the SP124 nest observed putting no weight on the left leg. The nest hatched 17 June, the female was not seen with the brood subsequent to 20 June, and an injured bird with the band combination was not relocated elsewhere. |
| 1 (juvenile) | 6 exclosure shoreline | From 29 July to 2 August, an approximately 35-day-old unbanded plover from unknown nest location observed mostly hopping on the left leg and putting very little weight on the right leg. A juvenile matching this description not seen subsequently. |
| 1 (chick/juvenile) | Foredune Central shoreline | From 6 August to 11 September, one 18- to 54-day-old plover banded vv:wb from the SP199 nest observed limping on the left leg and with toes curled up. Chick/juvenile was moving and foraging well when observed almost daily 6-30 August. On 2 and 11 September, bird was less active, hopping on right leg and putting little to no weight on left leg. The juvenile was not seen subsequently. |
| 1 (juvenile) | Foredune South shoreline | From 9 August to 2 September, an unbanded juvenile plover observed holding the left wing low and wing appeared broken. The injury did not improve or change over time. |

### Table H.3. Documented predation of California least terns in 2023.

| No. (age) | Predator | Location | Notes |
|---|---|---|---|
| 1 (juvenile) | Peregrine (juvenile) | 7 exclosure | On 21 July, a peregrine observed eating prey in 7 exclosure. Prey confirmed to be the 21-day-old tern banded r/a:o/y from the LT28 nest. |
| 1 (juvenile) | Peregrine (juvenile) | 6 exclosure shoreline | On 27 July, a peregrine caught a juvenile tern over the 6 exclosure shoreline and consumed it on the shoreline. It is unknown if tern was banded. |
| 1 (juvenile) | Peregrine (juvenile) | 6 exclosure shoreline | On 28 July, a peregrine caught a juvenile tern over the 6 exclosure shoreline and consumed it on the shoreline. Prey confirmed to be the 33-day-old tern banded r/a:a/o from the LT19 nest. |

**Appendix H. Sightings of injuries and documented mortality of California least tern and snowy plover adults, juveniles, and chicks at ODSVRA (continued).**

### Table H.4. Mortality, other than documented predation, of least terns in 2023.

No carcasses were found December 2022, subsequent to the 2022 annual report.
MWVCRC=CDFW, Office of Spill Prevention and Response, Marine Wildlife Veterinary Care and Research Center, Santa Cruz, CA.
HPAI=highly pathogenic avian influenza.

| No. (age) | Location | Notes |
|---|---|---|
| 1 (chick) | 6 exclosure | On 22 June, a small, unbanded tern chick carcass was found near its LT6 nest in 6 exclosure. The chick was last seen 21 June at 3 days old at the nest. It was frozen, sent to MWVCRC, was determined to be negative for HPAI, but carcass was too decomposed for necropsy. |
| 1 (chick) | 7 exclosure | On 23 June, a small, unbanded tern chick carcass was found near its LT12 nest in 7 exclosure. The chick was last seen 21 June at 1 day old at the nest. It was frozen, sent to MWVCRC, was determined to be negative for HPAI, but carcass was too decomposed for necropsy. |

### Table H.5. Documented predation of snowy plovers from 1 March to 30 September 2023.

| No. (age) | Predator | Location | Notes |
|---|---|---|---|
| ≥1 (chick) | Kestrel (male) | 8 exclosure shoreline, Foredune North shoreline | On 30 May, a kestrel observed potentially catching a plover chick from the 8 exclosure shoreline and flew into 8 exclosure. A little over an hour later, a kestrel caught a plover chick from the Foredune North shoreline and flew away with it to the east off-site. Based on location and brood observations, the first prey was possibly a 10-day-old chick from the SP151 nest and the second prey was likely an 11-day-old chick from the SP110 nest. |
| 1 (chick) | Kestrel (male) | 6 exclosure shoreline | On 2 June, a kestrel caught a plover chick from the 6 exclosure shoreline, perched briefly with it on the shoreline, and flew with it to the east off-site. Based on location and brood observations, the prey was likely a 12-day-old chick from the SP42 nest. |
| 1 (chick) | Kestrel (male) | Foredune North shoreline | On 3 June, a kestrel observed flying over the Foredune closure shore and landing on the Foredune North shoreline where it ate a plover chick. Based on location and brood observations, the prey was likely a 15-day-old chick from the SP110 nest. |
| 1 (chick) | Kestrel (male) | Foredune North shoreline | On 5 June, a kestrel caught a plover chick from the Foredune North shoreline, begins eating it on the shoreline, and flew with the remains east off-site. Based on location and brood observations, the prey was likely a 25- to 26-day-old chick from the SP10 nest. |
| 2 (adult female and chick) | Kestrel (1 male, 1 unknown sex) | 6 and 7 exclosure shorelines | On 8 June, a kestrel (sex unknown) observed on the 7 exclosure shoreline with plover chick prey and flew with it east of 7 exclosure. Based on location and brood observations, the prey was likely a 5-day-old chick from the SP65 nest. Thirty-four minutes later, possibly the same kestrel, identified as a male, landed on a circular exclosure for SP99 nest on the 6 exclosure shoreline, plover flew away from the nest exclosure, and kestrel flew after and caught the plover. The kestrel begins eating the prey on the shoreline before flying with it into 6 exclosure to finish consuming it. The prey was the female from the SP99 nest, and subsequently only a male observed attending the nest and little to no incubation observed during the daytime. Three chicks hatched from the SP99 nest 20-21 June, and 1 chick fledged. |
| ≥1 (chick) | Kestrel (male) | Foredune Central and 7 exclosure shorelines | On 9 June, a kestrel observed hunting over the 6 exclosure and Foredune Central shorelines and later found perched on the Foredune Central west fence eating a possible plover chick. Afterwards, the kestrel caught a small plover chick from the 7 exclosure shoreline and flew with it to the east off-site. Multiple broods were present and it is unknown which nest the chick originated from. |
| 1 (adult or juvenile) | Western gull (subadult) | 7 exclosure shoreline | On 30 July, a western gull caught and consumed a large plover, juvenile or adult sized, on the 7 exclosure shoreline. Gull was lethally removed and pink and blue tape from 2 plover bands was recovered from the gut contents, indicating at least 1 plover was depredated. |
| 1 (chick) | Peregrine (juvenile) | Foredune South shoreline | On 27 August, a peregrine observed catching a 21-day-old plover chick from the SP215 nest on the Foredune South shoreline near marker post 6. Peregrine flew with the chick to the 6 exclosure shoreline and consumed the plover. |

**Appendix H. Sightings of injuries and documented mortality of California least tern and snowy plover adults, juveniles, and chicks at ODSVRA (continued).**

**Table H.5. Documented predation of snowy plovers from 1 March to 30 September 2023 (continued).**

| No. (age) | Predator | Location | Notes |
|---|---|---|---|
| ≥2 (juvenile) | Peregrine (juvenile) | Foredune South and 6 exclosure shorelines | On 12 September, a peregrine caught a plover fledgling from the Foredune South waterline, flew with it to the shoreline west of marker post 7, and consumed the plover. Afterwards, the peregrine flies south and circles over the 6 exclosure shoreline and is observed perched on the 7 exclosure shoreline with plover prey. The peregrine flew with prey and perched further south on 7 exclosure shoreline where it is seen dropping the prey before flying south. Peregrine continued to hunt over the shoreline and monitors hazed it south. The peregrine caught another bird from the air over the North Oso Flaco shoreline before flying southeast of South Oso Flaco. Leg bands found at the first prey location indicate it was a 29-day-old fledgling from the SP222 nest. The second plover prey item, found whole and intact, was an unbanded juvenile. The last prey item was an unknown avian species. |

**Table H.6. Mortality, other than documented predation, of snowy plovers in 2023.**

No carcasses were found December 2022, subsequent to the 2022 annual report.
MWVCRC=CDFW, Office of Spill Prevention and Response, Marine Wildlife Veterinary Care and Research Center, Santa Cruz, CA.
HPAI=highly pathogenic avian influenza.

| No. (age) | Location | Notes |
|---|---|---|
| 2 (adult) | Riding area, east of 7 exclosure | On 13 February, an unbanded adult plover carcass was found in the riding area, 100 feet east of the exclosure fence, and halfway between marker post 7 and 8. The following day, a second unbanded adult carcass was found approximately 100 feet to the north of the first one. Both carcasses were partially buried and appeared flattened. They were frozen, sent to MWVCRC, determined to be negative for HPAI, but were too decomposed for necropsy. |
| 1 (adult) | North Oso Flaco | On 4 May, an unbanded adult plover carcass was found 7 feet east of the west exclosure fence in North Oso Flaco, an area that is closed to all recreational activity year-round and approximately 0.3 miles from the nearest open riding area. The intact frozen carcass was sent to MWVCRC and necropsy results indicate the bird presumptively died of acute crush trauma of unknown source. The carcass had a compressed liver, displaced keel, evidence of hemorrhaging, and abrasions to multiple areas of body (see attached necropsy report). |
| 1 (juvenile) | 6 exclosure shoreline | On 28 July, a juvenile plover carcass, banded pv:ab from the SP102 nest, was found on the 6 exclosure shoreline. The carcass was intact but was too decomposed for necropsy. Three fledglings from SP102 nest, all banded pv:ab, were last seen together 25 July at 36 days old and 1 was seen 27 July. |

# Oceano Dunes State Vehicular Recreation Area

# 2023 Predator Management Report

**Submitted To:**

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

**Submitted By:**

Charlie Richards, Wildlife Biologist
&
Barry Lowry, District Supervisor
San Luis District
CA Wildlife Services Program

## Introduction

USDA-APHIS-Wildlife Services (WS) worked on the Oceano Dunes State Vehicular Recreation Area (ODSVRA) from March 27th to September 12th for the 2023 nesting season. Wildlife Biologist Charlie Richards, District Supervisor Barry Lowry, Wildlife Specialist Donnie Simms, and Assistant District Supervisor Tom Young conducted predator management activities in and around the California Least Tern (*Sternula antillarum browni*) (CLTE) and Western Snowy Plover (*Charadrius nivosus nivosus*) (SNPL) nesting areas. Charlie Richards and Donnie Simms were responsible for the day-to-day fieldwork throughout the 2023 nesting season. WS surveyed, trapped, hazed, and removed predators threatening CLTE and SNPL.

## Methods

A variety of predator management methods, including surveying, trapping, hazing, and lethal removal were utilized throughout the 2023 SNPL and CLTE nesting season.

Predator surveys were performed regularly by WS during the SNPL and CLTE nesting season. Surveys were conducted by vehicle and on foot to search for evidence of predator activity. Vortex Optics Viper HD 10x42mm binoculars and a Vortex Optics Diamondback 20-60x80 Spotting Scope were utilized during surveys to locate signs of predator activity and presence. Surveys mainly took place east of the nesting exclosures within the revegetation areas (Appendix 1), along the exclosure's shoreline, in the agricultural fields east of Oso Flaco Lake, and south to Brown Road in Santa Barbara County. Additionally, WS stayed in regular communication with State Parks staff to share information about predator sightings and activity via the communication software Zello Walkie Talkie.

Trapping was one of the primary methods of predator control used during the 2023 nesting season. The main types of traps used were the Oneida Victor #1 ½ soft catch and Soft Catch Woodstream #3, which are both padded leg hold traps. They were set primarily to capture coyotes (*Canis latrans*) and common ravens (*Corvus corax*). Padded leg-hold traps for coyotes were baited with commercially produced gland and food-based scent lures, urine, and various other food baits. Raven traps were baited by creating false SNPL nests using quail eggs.

Wildlife Services regularly assisted Thadeus Sternberg and Daniel Biteman of Wildlife Innovations with trapping and hazing of problematic raptors on the Oceano Dunes property. Wildlife Services stayed in regular communication with Thadeus or Dan about the location and habits of avian predators. Wildlife Services hazed problematic raptors by flushing the birds on foot, with a vehicle, or by firing a bird whistler.

Firearms were used to euthanize animals captured in traps. A Benelli M2 12-gauge semi-automatic shotgun with Federal Premium BlackCloud Steel 3-inch shells with #2 shot was used to euthanize common ravens, an American crow, and a California gull. Euthanasia of coyotes was conducted with a Ruger Mark IV chambered in 22 long rifle and a Ruger M77 chambered in .308 Win. Ammunition for the Ruger Mark IV was CCI® Short Range Green lead free

ammunition. The Ruger M77 chambered in .308 Win shooting 150 gr Hornady Superformance SST.

Egg platforms were used to lure in and then poison ravens during the 2023 nesting season. Chicken eggs treated with DRC-1339 were used to remove ravens. This platform was monitored by a game camera to detect the presence of ravens at the platform.

DRC-1339 has been successful in removing ravens at other SNPL nesting sites, including a neighboring property to Oceano Dunes. After the ravens visit the platforms regularly, the boiled chicken eggs are replaced with hard boiled chicken eggs dosed with two milligrams of the corvicide DRC-1339. The active chemical in DRC-1339, 3-Chloro-p-Toluidine Hydrochloride, causes renal failure in the target bird species within 24 to 72 hours of ingestion. DRC-1339 was chosen because it is a selective avicide that is highly toxic to nest-depredating corvids but would require much larger doses to be toxic to mammals and other species of non-target birds.

**Results**

The 2023 SNPL and CLTE nesting season had a variety of predators: common ravens, American crows, coyotes, gulls, owls, peregrine falcons, northern harriers, and American kestrels. Wildlife Innovations focused on trapping raptor species and WS focused on mammals, common ravens, American crows, and gulls. Common ravens were believed to be responsible for the largest number of nest predations during this nesting season. Common ravens were documented to have predated 36 SNPL nests. Coyotes were responsible for predating 2 SNPL nests. American crows predated 2 SNPL nests. Northern harriers predated 10 SNPL nests. There were an additional 10 SNPL nests taken from unknown avian predators. 7 SNPL nests were taken by unidentified predators. No CLTE nests were predated during the 2023 season. 11 SNPL individuals were lost due to predation. 6 SNPL chicks and 1 SNPL adult were predated by a male American kestrel. 1 adult or juvenile SNPL was predated by a western gull. A juvenile peregrine falcon predated 1 SNPL chick and 2 SNPL juveniles. 3 CLTE individuals, all 3 juveniles, were lost due to predation from a juvenile peregrine falcon.

During the 2023 nesting season, WS removed a total of four coyotes (*Canis latrans*) from ODSVRA. On June 30th, the first coyote was dispatched in the east of the Foredune exclosure using a Ruger M77 rifle chambered in .308 win. The second coyote was dispatched east of the Maidenform revegetation area using a Ruger M77 rifle chambered in .308 win on July 5th. On July 11th traps were set for coyotes in and around vegetation islands. Four traps were placed on July 11th and were removed August 8th. The third coyote removed from the Bigfoot vegetation area was trapped on July 12th using a Soft Catch Woodstream #3 padded foot hold trap and dispatched with a Ruger Mark IV chambered in 22 long rifle. The fourth coyote removed from the Eucalyptus Tree vegetation area was trapped on July 28th using a Soft Catch Woodstream #3 padded foot hold trap and dispatched with a Ruger Mark IV chambered in 22 long rifle.

Coyotes have predated and disturbed SNPL and CLTE nests and chicks in previous years, and they continued to be a problem during the 2023 nesting season.

Corvids such as common ravens (*Corvus corax*) and American crows (*Corvus brachyrhynchos*) are a predation threat to nesting SNPL and CLTE throughout their entire range.

WS removed the first predator of the 2023 nesting season, an American crow, on April 19th with a Benelli M2 12-gauge shotgun on the Foredune closure shoreline.

WS removed eight Common Ravens from ODSVRA during the 2023 nesting season. Monitoring for ravens was conducted on site as well as in the agricultural fields to the east of Oso Flaco Lake and south to Brown road. No ravens were seen or removed from these off-site locations. Trapping efforts for ravens started on April 25th after ravens had been seen frequenting the site. The first raven was removed east of the Eucalyptus Tree vegetation island on May 4th with a Benelli M2 12-gauge shotgun. On May 9th, both the second raven in the Boneyard area, and the third raven in Pavilion Hill were removed with a Benelli M2 12-gauge shotgun. The fourth raven was trapped on May 16th with an Oneida Victor #1 ½ soft catch foothold trap surrounding a fake nest containing quail eggs east of 7.5 Revegetation. The fifth raven was removed on May 16th with a Benelli M2 12-gauge shotgun as it was flying above the fake nest east of 7.5 Revegetation. The sixth raven was trapped at a fake nest set with raven decoys surrounding the fake nest on May 26th in east Boneyard. The seventh raven was trapped with an Oneida Victor #1 ½ soft catch foothold trap on June 5th east of the Pipeline revegetation area The last raven of the season was removed using an Oneida Victor #1 ½ soft catch foothold trap on June 12th in east Boneyard.

Gull predation was a concern throughout the latter part of the nesting season. WS staff watched groups of gulls along the shoreline to quickly respond to possible predation events. A California gull was dispatched using a Benelli M2 12 gauge on July 26th. Wildlife Services was prompted to remove this California gull after noticing SNPL adults performing broken wing displays towards the gull. The gull was dispatched, however there were no SNPL remains upon inspection of the gull's digestive tract. Additionally, a subadult western gull was removed by state park ranger staff as Wildlife Services was not on site during this predation event. This western gull was removed on July 30th. 2 SNPL bands were discovered from the contents of the digestive tract, indicating that at least 1 SNPL was depredated.

WS conducted other duties as time permitted. WS reported predator sightings to State Parks Resources Staff as they occurred and submitted reports using the Predator_Database_2023_USDA on Microsoft Access. WS also kept in communication with Thadeus Sternberg or Daniel Biteman of Wildlife Innovations to report sightings of raptors.

**Future Recommendations**

WS recommends that state parks continue to check the exclosure fencing regularly for changes in the sand that may cause gaps or mounded sand. This will help prevent terrestrial predators from accessing sensitive nesting areas.

WS recommends that state parks continue to remove carcasses off the beach as an effort to reduce attractants for scavenging predators.

WS recommends the continued removal of species that present a threat to the SNPL and CLTE populations at ODSVRA.

Report all common raven sightings to WS at any time of the year. Removal actions can take place year-round. Having a knowledge of raven activity prior to this date can allow removal efforts to be more productive.

WS recommends state parks continue hazing raptors from areas near SNPL and CLTE nesting areas. Caution should be used during hazing to avoid scaring SNPL and CLTE from their nests.

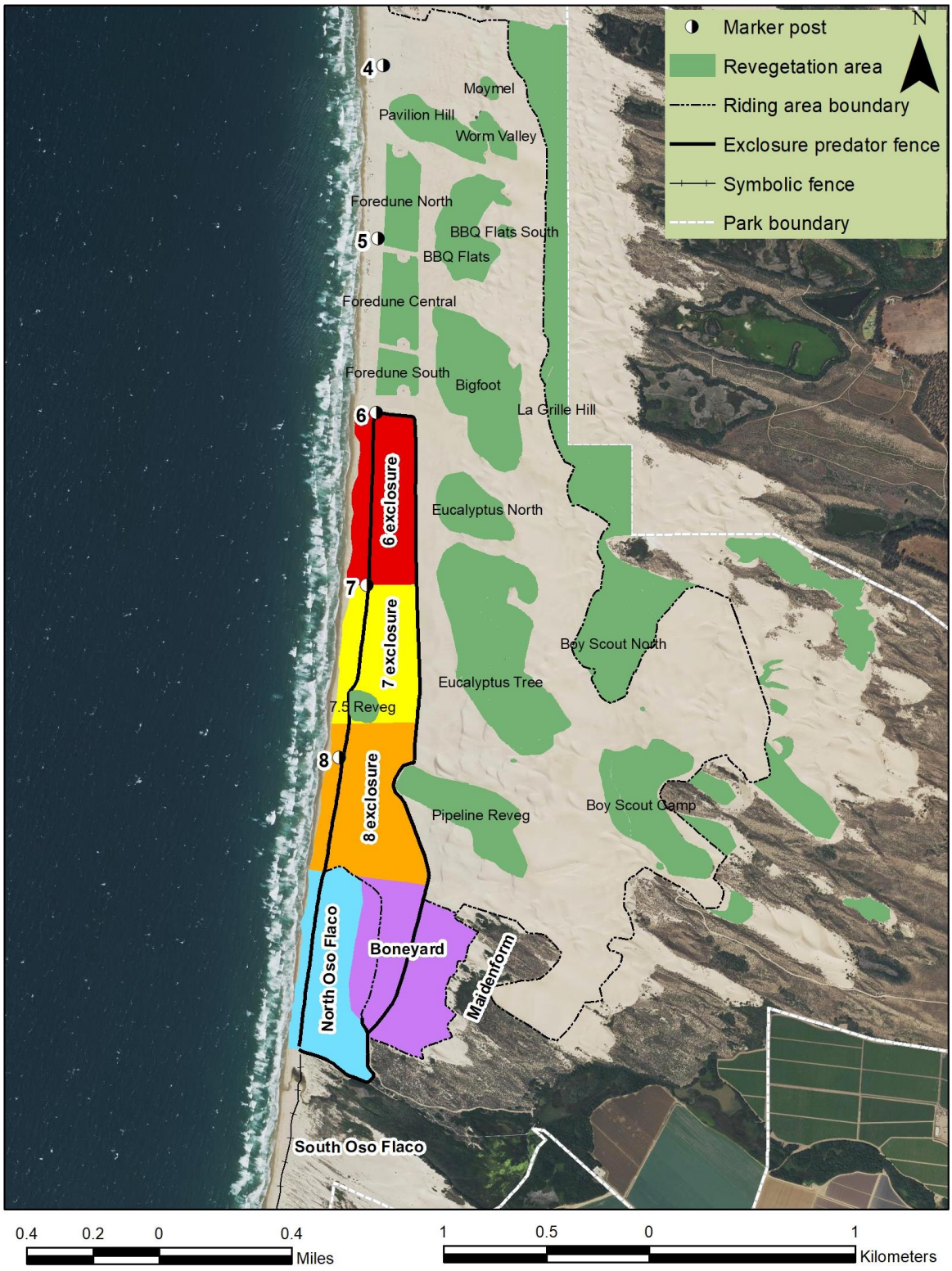
WS recommends state parks continues to consider the option to use egg platforms for future raven control efforts. The method of using egg platforms with eggs treated with the corvicide DRC-1339 has been successful in removing ravens at other SNPL nesting sites, including a neighboring property to Oceano Dunes. The active chemical in DRC-1339 3-Chloro-p-Toluidine Hydrochloride causes renal failure in the target bird species within 24 to 72 hours of ingestion. DRC-1339 was chosen because it is a selective avicide that is highly toxic to nest-depredating corvids but would require much larger doses to be toxic to mammals and other species of non-target birds (Appendices 3 and 4).

WS recommends continued monitoring for feral swine. If feral swine are located, contact WS as soon as possible so removal efforts can begin. If deceased feral swine are located with no obvious signs of death, do not approach or touch the carcass and contact WS as soon as possible at 1-866-4-USDA-WS. If it is possible and safe to do so, check the area for other signs of dead swine.

**Table 1: USDA Predator Removal Summary**

| Date | Species | Age | Location | Method |
|---|---|---|---|---|
| 4/19/2023 | American Crow | Adult | Foredune closure shoreline | Firearm |
| 5/4/2023 | Common Raven | Adult | Open riding area east of Eucalyptus Tree Revegetation area | Firearm |
| 5/9/2023 | Common Raven | Adult | Boneyard | Firearm |
| 5/9/2023 | Common Raven | Adul | Pavilion Hill | Firearm |
| 5/16/2023 | Common Raven | Adult | East of 7.5 Revegetation area | Padded Foothold |
| 5/16/2023 | Common Raven | Adult | East of 7.5 Revegetation area | Firearm |
| 5/26/2023 | Common Raven | Adult | East Boneyard | Padded Foothold |
| 6/5/2023 | Common Raven | Adult | Open riding area east of Pipeline Revegetation area | Firearm |
| 6/12/2023 | Common Raven | Adult | East Boneyard | Padded Foothold |
| 6/30/2023 | Coyote | Adult | Closed bugger area east of Foredune closure | Firearm |
| 7/5/2023 | Coyote | Adult | Open riding area east of Maidenform Revegetation area | Firearm |
| 7/12/2023 | Coyote | Juvenile | Bigfoot | Padded Foothold |
| 7/26/2023 | Western/California Gull | Subadult | 8 exclosure shoreline | Firearm |
| 7/28/2023 | Coyote | Adult | Eucalyptus Tree vegetation area | Padded Foothold |

**Barry Lowry, District Supervisor**
**San Luis District**
**CA Wildlife Services**




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

# Appendix 2: DRC-1339 EPA Label

## RESTRICTED USE PESTICIDE

**Due to High Acute Inhalation Toxicity and Eye and Skin Corrosiveness to Humans; High Acute Toxicity to Nontarget Birds and Aquatic Invertebrates; and the Need for Highly Specialized Applicator Training.**

For retail sale to and use only by USDA APHIS Certified Applicators trained in bird control or by persons under their direct supervision.

## COMPOUND DRC-1339 CONCENTRATE – LIVESTOCK, NEST & FODDER DEPREDATIONS

*For control of crows, ravens, and magpies that prey on newborn livestock, that prey on eggs or the young of Federally-designated Threatened or Endangered Species or of other species designated to be in need of special protection or that damage and feed on the contents of silage/fodder bags.*

| | |
|---|---|
| **ACTIVE INGREDIENT:** | |
| DRC-1339, 3-chloro-p-toluidine hydrochloride: | 97.0% |
| **OTHER INGREDIENTS:** | 3.0% |
| **TOTAL:** | 100.0% |

## KEEP OUT OF REACH OF CHILDREN

## DANGER-PELIGRO

## POISON

### FIRST AID

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. If you need immediate medical attention call the Poison Control Center at 1-800-222-1222 or a doctor. For non-emergency information concerning this product, call the National Pesticide Information Center at 1-800-858-7378.

| | |
|---|---|
| If swallowed | - Call a poison control center or doctor immediately for treatment advice.<br>- Have person sip a glass of water if able to swallow.<br>- Do not induce vomiting unless told to do so by the poison control center or doctor.<br>- Do not give anything to an unconscious person. |
| If on skin or clothing | - Take off contaminated clothing.<br>- Rinse skin immediately with plenty of water for 15-20 minutes.<br>- Call a poison control center or doctor immediately for treatment advice |
| If inhaled | - Move person to fresh air.<br>- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.<br>- Call a poison control center or doctor immediately for treatment advice. |
| If in eyes | - Hold eye open and rinse slowly and gently with water for 15-20 minutes.<br>- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.<br>- Call a poison control center or doctor immediately for treatment advice. |

**NOTE TO PHYSICIAN AND VETERINARIAN:** Probable mucosal damage may contraindicate the use of gastric lavage. See additional "**PRECAUTIONARY STATEMENTS**" on right panel. If pet eats bait, call a veterinarian at once.

## PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS

## DANGER

**Acute Hazards:** Fatal if inhaled. Corrosive. Causes irreversible eye damage and skin burns. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some people.

**Hazard Avoidance:** Do not get in eyes, on skin, or on clothing. Do not breathe dust. Wear protective clothing, eyewear, and respiratory protection as listed under "**PERSONAL PROTECTIVE EQUIPMENT**." Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash before reuse.

**PERSONAL PROTECTIVE EQUIPMENT (PPE):**

**Handlers who mix packages containing 1 lb (0.45 kg) or more of this product must wear:**
- Coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves (such as waterproof or rubber gloves)
- Chemical-resistant footwear plus socks
- Protective eyewear (goggles or face shield)
- A NIOSH approved particulate respirator with any N, R, or P filter with NIOSH approval number prefix TC-84A

**Handlers who mix packages containing less than 1 lb (0.45 kg) of this product must wear:**
- Long-sleeved shirt and long pants
- Chemical-resistant gloves (such as waterproof or rubber gloves)
- Protective eyewear (goggles or face shield)

**Applicators who handle bait must wear:**
- Long-sleeved shirt and long pants
- Chemical-resistant gloves (such as waterproof or rubber gloves)

**User Safety Requirements:**
- Follow manufacturer's instructions for cleaning/ maintaining PPE. If no such instructions are provided for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

### ENVIRONMENTAL HAZARDS:

This product is very highly toxic to birds and aquatic invertebrates. **Do not** use in any manner that may endanger nontarget and protected bird species. Runoff may be hazardous to aquatic organisms in neighboring areas. **Do not** apply when runoff is likely to occur. **Do not** apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. **Do not** contaminate water by the cleaning of equipment or disposal of waste.

**UNITED STATES DEPARTMENT OF AGRICULTURE**
**ANIMAL AND PLANT HEALTH INSPECTION SERVICE**
**4700 River Road, Unit 149**
**Riverdale, MD 20737**

**EPA Reg. No. 56228-29**
**EPA Est. No. 56228-ID-1**
**Net Contents: _____**
**Batch Code No.: _____**

Registration No. 56228-29, Page 1 of 3

## ENDANGERED SPECIES CONSIDERATIONS:

Before undertaking any control operations with the product, consult with local, State, and Federal Wildlife authorities to ensure the use of this product presents no hazard to any Threatened or Endangered Species. **DO NOT** apply treated baits where there is a danger that Threatened or Endangered Species will consume baits unless special precautions are taken to limit such exposures.

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**READ THIS LABEL:**
Read the entire label. This product must be used strictly in accordance with this label's precautionary statements and use directions, as well as with all applicable State and Federal laws and regulations.

Before using this product, contact the U.S. Fish and Wildlife Service and the applicable State wildlife agency and obtain all necessary kill or collecting permits. Use only for the sites, pests, and application methods described on this label.

**PRODUCT INFORMATION:**

This product contains a slow-acting avicide which kills target bird species (see list below) in 1 to 3 days. As many types of nontarget birds are potentially vulnerable to DRC-1339, it is necessary to use care and to follow the requirements of this label to minimize impacts to nontarget species.

### USE RESTRICTIONS:

Baits made from Compound DRC-1339 - Livestock, Nest & Fodder Depredations may only be used to control the following species:

- Common raven *(Corvus corax),*
- Chihuahuan raven *(Corvus cryptoleucus),*
- American crow *(Corvus brachyrhynchos),*
- Black-billed magpie *(Pica hudsonia),* and
- Fish crow *(Corvus ossifragus).*

This product may be used to prepare egg or meat-cube baits to control the target species listed above in the following use sites:

- Rangeland and pastureland areas where ravens or crows prey upon newborn livestock;
- Refuges or other areas where ravens or crows prey upon the eggs and/or young of Federally-designated Threatened or Endangered Species, or upon the eggs and young of other species which Federal or State wildlife agencies have determined to be in need of protection from nest predators due to documented declines in numbers and/or in nesting success; or
- Within 25 feet (7.6 m) of silage/fodder bags that have been damaged or are likely to be damaged by crows, ravens, or black-billed magpies.

Baits must be prepared and applied as specified on this label. DO NOT apply baits made from this product by air or by use of any mechanical equipment designed to broadcast baits or other pesticides. Users of this product must follow all limitations indicated on this label regarding the placement and monitoring of treated baits.

**Before baits made from this product are applied, sites** that are to be treated **must be observed** for evidence of nontarget activity **and must be prebaited** (see specific instructions for these activities). **DO NOT** apply treated baits where there is a danger that Threatened or Endangered Species will consume baits unless special precautions are taken to limit such exposures. Such precautions shall include observation of baited sites and use of hazing tactics to frighten away Threatened or Endangered Species that otherwise might feed upon baits.

## DIRECTIONS FOR USE, continued

### USE RESTRICTIONS, continued:

DO NOT apply treated baits within 50 feet (15.2 m) of permanent manmade or natural bodies of water, unless baited sites are under constant observation while baits are exposed.

**DO NOT exceed a maximum application rate of 0.083 lbs of active ingredient per acre (0.93 g active ingredient/100 $m^2$), or a maximum yearly application rate of 0.5 lb of active ingredient per acre (5.61 g active ingredient/100 $m^2$).**

DO NOT store treated bait in locations accessible to children, pets, domestic animals, or nontarget wildlife.

Prior to application, and during the time between the conclusion of application and the disposal of unconsumed bait, **DO NOT** temporarily place treated bait in locations accessible to children, pets, domestic animals, or nontarget wildlife. Follow the directions in "**ENTRY RESTRICTIONS**" to avoid exposure to children, pets, or domestic animals during application. Follow the directions in "**PRETREATMENT OBSERVATIONS**" to mitigate exposure to nontarget wildlife during application.

DO NOT apply bait in a way that will contact workers or other persons.

DO NOT use treated baits as food or feed.

DO NOT apply baits made from this product in any way that could contaminate human food or animal feed.

### ENTRY RESTRICTIONS:

Only protected applicators may be in the area during bait application. Keep pets and livestock, and persons other than authorized handlers away from the bait at all times, and exclude all unauthorized persons from application sites during prebaiting and baiting. For example, post signage near, in the vicinity of, or at main entrances or commonly used access points to prebaiting and baiting sites that warns persons not to pick up or handle any baits and to keep pets and livestock away from bait.

### PRETREATMENT OBSERVATIONS:

Prior to application, carefully observe target birds' feeding habits to locate their preferred feeding sites, determine the optimum time of application, and evaluate potential hazards of the application to nontarget and protected species.

### PREBAITING:

Prebaiting with untreated bait materials (or use of a draw station) is necessary to promote feeding by target species and to assess potential for exposure of nontarget species. Apply prebait using the same procedures that are prescribed below for the type of bait ("**EGG BAITS**" or "**MEAT BAITS**") that is to be used for toxic baiting.

Observe baited areas (from blinds) early in prebaiting period to determine whether nontarget species are approaching baits. Haze away Threatened or Endangered and nontarget species that might consume baits. Remove baits if such nontarget species continue to approach them.

**(See next page for additional "DIRECTIONS FOR USE")**

## DIRECTIONS FOR USE, continued

### BAIT PREPARATION:

**MEAT BAITS:**

**MEAT BAIT PREPARATION:**
Mix 0.027 oz (0.75 g) of this product with 0.18 oz (5.0 g) of powdered sugar.
Pour or sprinkle concentrate-sugar mixture over 200 meat cubes that measure about 0.5 in (1.3 cm) on each side.
Mix or tumble bait slowly until all meat cubes appear to be evenly covered.

**MEAT BAIT APPLICATION:**

**NOTE: During application, wear all PPE as listed under "PERSONAL PROTECTIVE EQUIPMENT."**

Control of crows, magpies, and ravens with meat baits prepared from this product is limited to the sites indicated above under "**USE RESTRICTIONS**." Wear rubber gloves while handling baits. Place no more than 75 meat cube baits at each baited site. Place 5 to 10 baits in clusters over an area not to exceed 1,000 $ft^2$ (93 $m^2$) where control of ravens, magpies, and/or crows is to be affected. **Draw stations** (fresh, unpoisoned animal carcasses) may be needed to attract ravens, magpies, and/or crows to the locations selected for bait exposure. If draw stations are used, place meat baits on or within a few feet of the animal carcasses.

**WHILE TREATED MEAT BAITS ARE EXPOSED, BAITED AREAS MUST BE OBSERVED CONTINUOUSLY FROM A DISTANCE OF NO MORE THAN 1,000 YARDS (914 m) TO DETECT APPROACHES BY THREATENED OR ENDANGERED SPECIES AND OTHER NONTARGET OR PROTECTED ANIMALS LIKELY TO EAT BAITS.** Because of wariness of target bird species, it may be necessary to observe baits from behind natural or specially-constructed blinds. Haze away Threatened or Endangered and nontarget species that might consume baits. Remove baits if such nontarget species continue to approach them.

Unconsumed bait cubes must be retrieved daily, at the conclusion of each observation period and no later than one hour after sunset. Dispose of retrieved baits in accordance with applicable State and Federal laws.

**EGG BAITS:**

**EGG BAIT PREPARATION:**

Dissolve 0.07 oz (2 g) of the product in 0.2 pint (100 ml) of warm potable water at 110 °F (43.3 °C) to make an approximately 2% solution; or dissolve 0.14 oz (4 g) of the product in 0.2 pint (100 ml) of warm potable water at 110 °F (43.3 °C) to make an approximately 4% solution; or in other proportions to produce a 2% or 4% solution.

Using an 18-gauge hypodermic needle or similarly-sized implement, make an entry hole in the end of each hard-boiled chicken, turkey, or duck egg to be used. Using a syringe and a 20-gauge hypodermic needle, slowly inject 0.002 pints (1 ml) of the 2% solution (or 0.001 pints or 0.5 ml of the 4% solution) into the yolk of each egg.

Make only enough solution to treat the desired number of eggs. Mark treated eggs with small skull and crossbones or the word POISON.

## DIRECTIONS FOR USE, continued

**EGG BAIT APPLICATION:**

**NOTE: During application, wear all PPE as listed under "PERSONAL PROTECTIVE EQUIPMENT."**

Control of crows, magpies, and ravens with egg baits prepared from this product is limited to the sites indicated above under "**USE RESTRICTIONS**". Place all egg baits to be used at one baited site within 25 ft (7.6 m) of the center of the site or within 25 ft (7.6 m) of any silage/fodder bags that are to be protected. Place 1-4 eggs in each bait set, and do not use more than a total of 18 eggs per baited site. If a draw station (fresh, unpoisoned animal carcass) is used, all bait sets must be located at least 10 ft (3 m) from the carcass. Wherever practical, bait sets should be made in "dummy" nests created by making small depressions in the ground. Dummy nests may be partially hidden by vegetation or other debris. In other situations, eggs may be placed on elevated wooden platforms 1 to 2 $ft^2$ (0.1 to 0.2 $m^2$) in area. Eggs placed on platforms must be restrained by wire to prevent them from falling off platforms or being removed by birds. Apply 2-3 eggs per platform.

**DO NOT USE MORE EGGS THAN ARE NEEDED TO EFFECT CONTROL, as ravens and crows tend to cache surplus food.**

Observe baited areas (from blinds) early in baiting period to determine whether nontarget species are approaching egg baits. Haze away Threatened or Endangered and nontarget species that might consume baits. Remove baits if such nontarget species continue to approach them.

Rebait with additional treated eggs when more than 50% of the treated eggs offered have been removed by ravens, magpies, or crows. When replacing baits, take care not to frighten target birds actively removing or feeding upon eggs. Retrieve unconsumed treated eggs within 7 days of exposure. Old treated eggs and treated eggs not eaten by the time control operations cease must be disposed of in accordance with applicable State and Federal laws.

### POSTTREATMENT CLEAN-UP (Meat and Egg Baits):

**NOTE: During clean-up, wear long-sleeved shirt and long pants and chemical-resistant gloves (such as waterproof or rubber gloves).** To further reduce the potential for exposure, use appropriate implements such as scoops or other tools to collect carcasses or uneaten bait.

Collect unconsumed and leftover meat daily, and unconsumed and leftover egg baits, dying birds, and carcasses within 7 days of treatment. Dispose of such baits and carcasses by burning or burial, as authorized by applicable laws and ordinances.

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

**PESTICIDE STORAGE:** Store only in original container, in a dry place inaccessible to children, pets, and domestic animals.

**PESTICIDE DISPOSAL:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spilled bait, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER HANDLING:** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Completely empty bags by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. If bags are not to be recycled, dispose of bags in a sanitary landfill or by incineration if allowed by State and local authorities. If burned, stay out of smoke.

Revised: 05-06-2016

Registration No. 56228-29, Page 3 of 3

# Appendix 3: Safety Data Sheet for DRC-1339

USDA APHIS

## Safety Data Sheet

**Issue Date:** 2-Feb-2004 **Revision Date:** 21-Dec-2017 **Version 4**

### 1. IDENTIFICATION

**Product Identifier**

**Product Name**

Compound DRC-1339 Concentrate – Feedlots
Compound DRC-1339 Concentrate – Gulls
Compound DRC-1339 Concentrate – Pigeons
Compound DRC-1339 Concentrate – Livestock, Nest & Fodder Depredations
Compound DRC-1339 Concentrate – Staging Areas
Compound DRC-1339 Concentrate – Bird Control
DRC-1339 Technical

**Other Means of Identification**

**SDS #** USDA-0001

**Synonyms**

Starlicide
3-chloro-p-toluidine hydrochloride
3-chloro-4-methylamine hydrochloride
3-chloro-4-methylbenzeamine hydrochloride
CPTH

**Registration Number(s)**

EPA Reg. # 56228-10: Compound DRC-1339 Concentrate – Feedlots
EPA Reg. # 56228-17: Compound DRC-1339 Concentrate – Gulls
EPA Reg. # 56228-28: Compound DRC-1339 Concentrate – Pigeons
EPA Reg. # 56228-29: Compound DRC-1339 Concentrate – Livestock, Nest & Fodder Depredations
EPA Reg. # 56228-30: Compound DRC-1339 Concentrate – Staging Areas
EPA Reg. # 56228-63: Compound DRC-1339 Concentrate – Bird Control
EPA Reg. # 56228-59: DRC-1339 Technical

**Recommended Use of the Chemical and Restrictions on Use**

**Recommended Use** Restricted Use Pesticide: For retail sale to and use only by USDA APHIS Certified Applicators trained in bird control or by persons under their direct supervision.

**Uses Advised Against** Any use(s) not strictly adhering to the Directions for Use on the EPA-approved labels is strongly advised against and a violation of federal law.

**Details of the Supplier of the Safety Data Sheet**

**Registrant Address**
United States Department of Agriculture
Animal & Plant Health Inspection Service
4700 River Road
Riverdale, MD 20737

**Manufacturer Address**
Pocatello Supply Depot
238 E. Dillon Street
Pocatello, ID 83201-6623

**Emergency Telephone Number**

**Company Phone Number** 1-208-236-6920
**Emergency Telephone (24 hr)**
INFOTRAC: 1-352-323-3500 (International)
INFOTRAC: 1-800-535-5053 (North America)
National Pesticide Information Center Hotline: 1-800-858-7378
Poison Control Center: 1-800-222-1222

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## 2. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** HAZARDOUS TO HUMANS AND DOMESTIC ANIMALS: Fatal if inhaled, harmful if swallowed, causes severe skin burns and serious eye damage, may be harmful in contact with skin, and may cause an allergic skin reaction. This chemical is a product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-EPA registered chemicals. Please see Section 15 for additional EPA information.

**Appearance** Off-white to yellow powder **Physical State** Powder **Odor** Moth ball

**Classification**

| | |
|---|---|
| Acute toxicity - Oral | Category 4 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 1 |
| Skin corrosion/irritation | Category 1C |
| Serious eye damage/eye irritation | Category 1 |
| Skin sensitization | Category 1B |
| Hazardous to aquatic environment, Acute | Category 1 |
| Hazardous to aquatic environment, Chronic | Category 1 |

**Hazards Not Otherwise Classified (HNOC)**

**Signal Word**
**Danger**

**Hazard Statements**
Fatal if inhaled.
Harmful if swallowed.
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
Very toxic to aquatic life with long lasting effects.

**Precautionary Statements - Prevention**
Wash face, hands and any exposed skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear respiratory protection.
Wear protective gloves/protective clothing/eye protection/face protection.
Contaminated work clothing should not be allowed out of the workplace.
Avoid release into the environment.

**Precautionary Statements - Response**
Immediately call a poison center or doctor/physician.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a poison center or doctor/physician.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
If skin irritation or rash occurs: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.
Collect spillage. Hazardous to the aquatic environment.

**Precautionary Statements - Storage**
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

**Precautionary Statements - Disposal**
Dispose of contents/container to an approved waste disposal plant.

**WHMIS Classification**
This product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations, and the SDS contains all the information required by these regulations.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms**

3-chloro-p-toluidine hydrochloride
3-chloro-4-methylaniline hydrochloride
3-chloro-4-methylbenzeamine hydrochloride
CPTH
DRC-1339
Starlicide

| Chemical Name | CAS No | Weight-% |
|---|---|---|
| 3-chloro-p-toluidine hydrochloride | 7745-89-3 | 97 |

**Chemical Additions** Other ingredients make up 3% of this product.
**Molecular Weight** 178.06 g/mol
**Molecular Formula** $C_7H_9NCl_2$

## 4. FIRST-AID MEASURES

**First Aid Measures**

**General Advice** Immediately call a poison center or doctor/physician.

**Eye Contact** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

**Skin Contact** IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor/physician.

**Inhalation** IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician. If person is not breathing, call an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.

**Ingestion** IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. DO NOT induce vomiting, unless directed by medical personnel. Have victim rinse mouth thoroughly with water and sip a glass of water, if conscious and able to swallow. Never give anything by mouth to a victim who is unconscious.

**Self-Protection of the First Aider** Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know locations of rescue equipment before the need arises.

**Most Important Symptoms and Effects**

| | |
|---|---|
| **Symptoms** | Overexposure or poisoning symptoms include: central nervous system depression, hematuria, diuresis, and burning of skin and eyes. |

**Indication of Any Immediate Medical Attention and Special Treatment Needed**

| | |
|---|---|
| **Notes to Physician** | Treat symptomatically. Possible mucosal damage may contraindicate the use of gastric lavage. |

## 5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water spray. Dry chemical. Carbon dioxide ($CO_2$).

| | |
|---|---|
| **Unsuitable Extinguishing Media** | Not determined. |

**Specific Hazards Arising from the Chemical**
Non-flammable. Non-explosive. Can release hazardous vapors during a fire. Nitrogen oxides ($NO_x$). Hydrochloric gas (HCl(g)).

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures**

| | |
|---|---|
| **Personal Precautions** | Handle only with protective gloves, clothing and face mask or respirator. |
| **For Emergency Responders** | Use personal protection recommended in Section 8: Exposure Controls/Personal Protection. |
| **Environmental Precautions** | Prevent from entering ditches, sewers, waterways and/or groundwater. See Section 12: Ecological Information. Notify authorities if spill has entered watercourse or sewer or has contaminated soil or vegetation. |

**Methods and Material for Containment and Cleaning Up**

| | |
|---|---|
| **Methods for Containment** | Prevent further leakage or spillage if safe to do so. |
| **Methods for Clean-Up** | Pick up spillage mechanically and place in suitable, closed, properly labeled container for recovery or disposal. For waste disposal, see Section 13: Disposal Considerations. |

## 7. HANDLING AND STORAGE

**Precautions for Safe Handling**

| | |
|---|---|
| **Advice on Safe Handling** | Wash face, hands, and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Wear protective gloves/protective clothing and eye/face protection. Contaminated work clothing should not be allowed out of the workplace. |

**Conditions for Safe Storage, Including Any Incompatibilities**

| | |
|---|---|
| **Storage Conditions** | Keep/store only in original container. Store locked up. Keep container tightly closed and store in a cool, dry and well-ventilated place. Keep away from children, pets and domestic animals. Keep away from other chemicals. Store away from food stuffs. Do not contaminate water, food or feed by storage. |
| **Incompatible Materials** | Strong oxidizing agents. |

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure Guidelines** This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

**Appropriate Engineering Controls**

| | |
|---|---|
| **Engineering Controls** | Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions. In using this material follow suitable precautions to control dust, this helps to prevent fire and health hazards. |

**Individual Protection Measures, Such as Personal Protective Equipment**

| | |
|---|---|
| **Eye/Face Protection** | ALL USERS: Protective eyewear (goggles or face shield). |
| **Skin and Body Protection** | ALL USERS: Chemical-resistant gloves.<br>USERS MIXING PACKAGES CONTAINING 1 LB OR MORE OF THIS PRODUCT: Long sleeved shirt and long pants. Chemical-resistant gloves. Chemical-resistant footwear plus socks.<br>USERS MIXING PACKAGES CONTAINING LESS THAN 1 LB OF THIS PRODUCT: Long sleeved shirt and long pants. Chemical-resistant gloves. |
| **Respiratory Protection** | USERS MIXING PACKAGES CONTAINING 1 LB OR MORE OF THIS PRODUCT: Respirator with a dust/mist filtering respirator (MSHA NIOSH approval number prefix TC-21C or NIOSH approved respirator with any N, R, P or HE filter).<br>USERS MIXING PACKAGES CONTAINING LESS THAN 1 LB OF THIS PRODUCT: No special protection required. |
| **General Hygiene Considerations** | Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash face, hands and any exposed skin thoroughly after handling. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on Basic Physical and Chemical Properties**

| | | | |
|---|---|---|---|
| **Physical State** | Powder | | |
| **Appearance** | Off-white to yellow powder | **Odor** | Moth ball |
| **Color** | Off-white to yellow | **Odor Threshold** | No data available |

| **Property** | **Values** | **Remarks • Method** |
|---|---|---|
| **pH** | 2.67 | |
| **Melting Point/Freezing Point** | Sublimes 220-230 °C (428-446 °F) | @ 760 mmHg |
| **Boiling Point/Boiling Range** | No data available | |
| **Flash Point** | No data available | |
| **Evaporation Rate** | No data available | |
| **Flammability (Solid, Gas)** | No data available | |
| **Upper Flammability Limits** | No data available | |
| **Lower Flammability Limit** | No data available | |
| **Vapor Pressure** | 1.408 x $10^{-2}$ Pa (1.06 x $10^{-4}$ mmHg) | @ 25 °C |

| | | |
|---|---|---|
| **Vapor Density** | No data available | |
| **Specific Gravity** | No data available | |
| **Water Solubility** | 9.1 g/100 ml water | @ 30 °C |
| **Solubility in Other Solvents** | 0.5 g/100 ml n-octanol | @ 30 °C |
| | 0.013 g/100 ml acetonitrile | @ 30 °C |
| **Partition Coefficient** | 0.022 | estimated |
| **Auto-Ignition Temperature** | No data available | |
| **Decomposition Temperature** | No data available | |
| **Kinematic Viscosity** | No data available | |
| **Dynamic Viscosity** | No data available | |
| **Explosive Properties** | No data available | |
| **Oxidizing Properties** | No data available | |
| **Density** | 0.44 g/ml or g/cm$^3$ | |

## 10. STABILITY AND REACTIVITY

**Reactivity**
Not reactive under normal conditions.

**Chemical Stability**
Stable under recommended storage conditions.

**Possibility of Hazardous Reactions**
None under normal processing.

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Conditions to Avoid**
Keep out of reach of children. Contact with incompatible materials. Heat above 300 °C (570 °F) will cause release of nitrogen oxides ($NO_x$) and hydrochloric gas (HCl(g)).

**Incompatible Materials**
Strong oxidizing agents.

**Hazardous Decomposition Products**
No data available.

## 11. TOXICOLOGICAL INFORMATION

**Information on Likely Routes of Exposure**

**Product Information** The EPA did not require a subchronic toxicity study for DRC-1339 Concentrate based on the low volumes used and restricted use nature of its application. The agency does not believe the potential exists for significant exposure of production workers or applicators to DRC-1139 Concentrate.

**Eye Contact** Causes severe eye damage. Contact causes burning, redness, and severe damage, including blindness.

**Skin Contact** Corrosive to skin. Causes severe skin irritation, dermatitis, and chemical burns. May cause an allergic skin reaction. May be absorbed through the skin in harmful amounts.

**Inhalation** Fatal if inhaled. Inhalation of dusts may be severely irritating and may cause chemical burns to the respiratory tract.

**Ingestion** Harmful if swallowed.

**Component Information**

| Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|---|---|---|---|
| 3-chloro-p-toluidine hydrochloride<br>7745-89-3 | 302–350 mg/kg (rat) | >2,000 mg/kg (rabbit) | No data available |

**Information on Physical, Chemical and Toxicological Effects**

**Symptoms** Please see Section 4: First-Aid Measures for symptoms.

**Delayed and Immediate Effects and Chronic Effects from Short- and Long-Term Exposure**

**Sensitization** May cause an allergic skin reaction.

**Germ Cell Mutagenicity** Negative test results in three mutagenicity studies.

**Carcinogenicity** This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

**Reproductive Toxicity** The EPA did not require a developmental toxicity study based on the use characteristics of DRC-1339 Concentrate. The agency does not believe the potential exists for repeat oral, dermal or inhalation exposures to production workers or applicators.

**Numerical Measures of Toxicity**
Not determined.

## 12. ECOLOGICAL INFORMATION

**Ecotoxicity**
This product is very highly toxic to birds and aquatic invertebrates. This product is toxic to fish.

| Chemical Name | Algae/Aquatic Plants | Fish $LC_{50}$ | Toxicity to Microorganisms | Crustacea $EC_{50}$ |
|---|---|---|---|---|
| 3-chloro-p-toluidine hydrochloride<br>7745-89-3 | No data available | 9.7 mg/l: *Oncorhynchus mykiss* (rainbow trout);<br>10.5 mg/l: *Lepomis macrochirus* (bluegill sunfish) | No data available | 0.07 mg/l: *Daphnia magna* (water flea) |

**Persistence/Degradability**
No data available.

**Bioaccumulation**
Slightly accumulates in bluegill sunfish (*Lepomis macrochirus*).

**Mobility**
No data available.

**Other Adverse Effects**
Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

## 13. DISPOSAL CONSIDERATIONS

**Waste Treatment Methods**

| | |
|---|---|
| **Disposal of Wastes** | Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinse is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or Hazardous Waste representative at the nearest EPA regional office. Never place any unused product down an indoor or outdoor drain. Do not contaminate water, food or feed by disposal. |
| **Contaminated Packaging** | Completely empty bag in application equipment. Then dispose of empty bag in a sanitary landfill or by incineration or if allowed by state and local authorities, by burning. If burned, stay out of smoke. Do not reuse or refill this container. |

## 14. TRANSPORT INFORMATION

**Note** Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances.

**DOT**

| | |
|---|---|
| **UN/ID No** | UN2239 |
| **Proper Shipping Name** | Chlorotoluidines, solid |
| **Hazard Class** | 6.1 (over 66 lbs) |
| **Packing Group** | III (over 66 lbs) |

**IATA**

| | |
|---|---|
| **UN/ID No** | UN2239 |
| **Proper Shipping Name** | Chlorotoluidines, solid |
| **Hazard Class** | 6.1 |
| **Packing Group** | III |

**IMDG**

| | |
|---|---|
| **UN/ID No** | UN2239 |
| **Proper Shipping Name** | Chlorotoluidines, solid |
| **Hazard Class** | 6.1 |
| **Packing Group** | III |
| **EmS-No** | F-A, S-A |

**TDG**

| | |
|---|---|
| **UN/ID No** | UN2239 |
| **Proper Shipping Name** | Chlorotoluidines, solid |
| **Hazard Class** | 6.1 |
| **Packing Group** | III |

## 15. REGULATORY INFORMATION

**International Inventories**

This product is excluded/exempt from TSCA regulation under FIFRA section 3(2)(B)(ii) when used as a pesticide (EPA Reg. # 56228-10, 56228-17, 56228-28, 56228-29, 56228-30, and 56228-63) and from DSL listing as it is regulated under the Pesticide Control Products Act when used as a pesticide.

| | |
|---|---|
| **TSCA** | Exempt |
| **DSL** | Excluded |

**Legend:**

*TSCA - United States Toxic Substances Control Act Section 8(b) Inventory*

*DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List*

**U.S. Federal Regulations**

**SARA 311/312 Hazard Categories**

| | |
|---|---|
| **Acute Health Hazard** | Yes |
| **Chronic Health Hazard** | Yes |
| **Fire Hazard** | No |
| **Sudden Release of Pressure Hazard** | No |
| **Reactive Hazard** | No |

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

**U.S. State Regulations**

**U.S. State Right-to-Know Regulations**

| Chemical Name | New Jersey | Massachusetts | Pennsylvania |
|---|---|---|---|
| 3-chloro-p-toluidine hydrochloride<br>7745-89-3 | | X | |

**EPA Pesticide Registration Numbers**

EPA Reg. # 56228-10: Compound DRC-1339 Concentrate – Feedlots
EPA Reg. # 56228-17: Compound DRC-1339 Concentrate – Gulls
EPA Reg. # 56228-28: Compound DRC-1339 Concentrate – Pigeons
EPA Reg. # 56228-29: Compound DRC-1339 Concentrate – Livestock, Nest & Fodder Depredations
EPA Reg. # 56228-30: Compound DRC-1339 Concentrate – Staging Areas
EPA Reg. # 56228-63: Compound DRC-1339 Concentrate – Bird Control
EPA Reg. # 56228-59: DRC-1339 Technical

**EPA Statement**

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

**EPA Pesticide Label**

SIGNAL WORD: Danger
PICTOGRAM: Skull and crossbones
ACUTE ORAL TOXICITY: May be fatal if swallowed.
ACUTE DERMAL TOXICITY: Harmful if absorbed through skin.
ACUTE INHALATION TOXICITY: Fatal if inhaled (EPA accepted Category I in lieu of animal testing data).
SKIN IRRITATION/CORROSION: Corrosive.
EYE DAMAGE/EYE IRRITATION: Causes irreversible eye damage and skin burns.
SENSITIZATION: Mild to moderate sensitizer. Prolonged or frequently repeated skin contact may cause allergic reactions in some people.
ENVIRONMENTAL HAZARDS: This product is very highly toxic to birds and aquatic invertebrates. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark.

## 16. OTHER INFORMATION

| | | | | |
|---|---|---|---|---|
| **NFPA** | **Health Hazards** | **Flammability** | **Instability** | **Special Hazards** |
| | 3 | 0 | 0 | None |
| **HMIS** | **Health Hazards** | **Flammability** | **Physical Hazards** | **Personal Protection** |
| | 3 | 0 | 0 | E |

**Issue Date:** 2-Feb-2004
**Revision Date:** 21-Dec-2017
**Revision Note:** Information updated

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.**

**End of Safety Data Sheet**

# Appendix 4: Tech Notes for the use of DRC-1339

TECH NOTE

Wildlife Services

APHIS

United States Department of Agriculture

Animal and Plant Health Inspection Service

Date 1 April 2001

## DRC-1339 (Starlicide)

DRC-1339 (3-chloro-4-methyl benzenamine HCl, Chemical Abstract Service Reg. No. 7745-89-3) is a slow-acting avicide that is registered with the Environmental Protection Agency (EPA) for the control of several species of pest birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. Technical DRC-1339 (Starlicide Technical, EPA Reg. No. 602-134) contains 97 percent DRC-1339. Starlicide products and DRC-1339 were developed jointly by Ralston Purina, Inc., Purina Mills, Inc., and the National Wildlife Research Center (NWRC) of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). Registrations are maintained by PM Resources, Inc., Earth City Resources, and APHIS.

APHIS/WS currently has the following DRC-1339 products registered with EPA to resolve bird problems that cannot be solved by the use of the commercially available Starlicide Complete (EPA Reg. No. 602-136) [See table].

The use of all APHIS/WS DRC-1339 registrations is restricted to Certified Applicators and WS personnel trained in bird control (or persons under their direct, onsite supervision). All APHIS/WS DRC-1339 products are prepared from Starlicide Technical.

A number of APHIS/WS State Special Local Need (Section 24[c]) registrations also are available to solve local problems, such as blackbirds in sunflowers, blackbirds in rice, and grackles in citrus.

### Acute Toxicity to Birds and Mammals

DRC-1339 was developed as an avicide because of its differential toxicity to animals. More acute avian toxicity data are available for DRC-1339 than for any other pesticide used in the world: more than 40 species have been tested. DRC-1339 is highly toxic to most sensitive bird species ($LD_{50}$'s range from 1 to 10 mg/kg), allowing a toxic dose to be placed on a single bait. But it is only slightly to moderately toxic to many nonsensitive birds, most predatory birds, and most mammals ($LD_{50}$'s range from 100 to 1,000 mg/kg). Some species, including waterfowl and gallinaceous birds, are intermediate in sensitivity to DRC-1339 ($LD_{50}$'s range from 10 to 100 mg/kg). Most bird species that are sometimes pests, including starlings, pigeons, blackbirds, crows, and magpies, are sensitive to DRC-1339. Many other bird species, such as raptors and some small granivores are classified as nonsensitive. Known exceptions are owls and felines, with $LD_{50}$'s of about 5 mg/kg placing them in the sensitive category.

### Mode of Action

The mode of action of DRC-1339 in sensitive birds is irreversible kidney and heart damage; a quiet and apparently painless death normally occurs 1-3 days following ingestion. In nonsensitive species, the mode of action is quite different, and the process requires 10-100 times more DRC-1339. In these species, the central nervous system is depressed, resulting in cardiac

| Product | Registered Uses |
|---|---|
| Compound DRC-1339 Concentrate-Feedlots (EPA Reg. No. 56228-10) | For controlling blackbirds and starlings in livestock feedlots. |
| 1339 Gull Toxicant 98% Concentrate (EPA Reg. No. 56228-17) | For controlling gulls to protect colonial nesting seabirds. |
| Compound DRC-1339 Concentrate-Pigeons (EPA Reg. No. 56228-28) | For controlling pigeons in and around structures |
| Compound DRC-1339 Concentrate–Livestock Depredations (EPA Reg. No. 56228-29) | For controlling corvids (e.g., ravens) depredating on newborn livestock, threatened or endangered species, or other species needing special protection. |
| Compound DRC-1339 Concentrate--Staging Areas (EPA Reg. No. 56228-30) | For controlling birds in staging areas associated with roosts. |

or respiratory arrest; a quiet death usually occurs after 2-10 hours. The kidney and heart damage that occurs in sensitive birds that ingest DRC-1339 is irreversible; however, the central nervous system depression resulting from ingestion of DRC-1339 in nonsensitive mammals and raptors can be successfully treated symptomatically.

DRC-1339 is metabolized and excreted from all animals very quickly, with 90 percent or more of the compound lost within 2 hours. Most metabolites are much less toxic than DRC-1339. DRC-1339 is not accumulated in the body, thus the compound's residues generally range from 0 to less than 0.1 ppm when death occurs.

## Potential Primary Hazards

Repeated exposure to DRC-1339 in feed can result in the poisoning of sensitive species. The concentration of DRC-1339 in feed that is lethal to 50 percent of treated starlings ($LC_{50}$) is 4.7 ppm after 30 days of exposure and 1.0 ppm after 90 days exposure. For bobwhite quail, the $LC_{50}$ concentration in feed is 14.1 ppm, and for species of intermediate sensitivity, such as mallard ducks, the 5-day $LC_{50}$ is 322 ppm. DRC-1339 does not appear to affect avian reproduction except at levels very close to where toxicity is expressed.

Numerous studies conducted by NWRC and WS Operations show that DRC-1339 poses a small risk of primary poisoning to most nontarget species. The primary hazards to nontarget birds are generally site specific and can be controlled by selecting a bait and bait sites that are not used by nontarget birds. The risk to nontarget birds can be further mitigated by careful prebaiting and observation prior to bait application. The risk of primary poisoning to most mammals is extremely low because of the low level of toxicity of DRC-1339 to most mammals, the baits that are used, bait dilution factors, and minimal treatment rates. Birds and mammals that may be at risk are identified in the WS Technical Notes prepared for specific DRC-1339 end-use products.

## Potential Secondary Hazards

NWRC and WS Operations have been monitoring the use of all DRC-1339 products since 1968. There have been no documented secondary poisonings of mammalian or avian scavengers and predators with DRC-1339, except for a crow that may have scavenged the gut contents of a recently treated pigeon. NWRC has conducted long-term feeding studies where birds poisoned by DRC-1339 were collected and fed to raptors and scavenger mammals for 30 to more than 200 days. No symptoms of poisoning or mortalities occurred.

Special precautions may be warranted when using DRC-1339 where owls and cats may be exposed to poisoned birds. Although it is possible that a cat or owl could ingest a lethal dose of DRC-1339 if fed birds poisoned by the compound exclusively for more than 100 days, the actual risk is normally minimal because exposure to DRC-1339-poisoned birds occurs over a few weeks or less. To reduce any potential hazard, poisoned birds should be retrieved, then burned or buried, whenever possible.

## Toxicity and Stability in the Environment

DRC-1339 is generally unstable in the environment and degrades rapidly when exposed to sunlight and heat or ultraviolet radiation. DRC-1339 is highly soluble in water but does not hydrolyze. Photodegradation occurs in water with a half-life that ranges from 6.5 to 41 hours, depending upon the season (faster in summer, slower in winter). DRC-1339 is very tightly bound to soil (70-90 percent) and has low mobility. The half-life of DRC-1339 in biologically active soil is about 25 hours, and identified metabolites have low toxicity. These data indicate that DRC-1339 degrades rapidly in soils, does not persist, and will not migrate. The 96-hour $LC_{50}$ of DRC-1339 to bluegill sunfish is 11 ppm; to rainbow trout, 9.7 ppm; and to water fleas, 0.079 ppm, indicating that DRC-1339 is only moderately toxic to fish but that some invertebrates may be very sensitive to the compound.

## Sources of Information

Additional information on this product can be found in the April 1994 ADC Final Environmental Impact Statement (Appendix P), in Material Safety Data Sheets supplied by the Pocatello Supply Depot, and in the 1995 Handbook on Prevention and Control of Wildlife Damage. Specific information on this product can be obtained through the National Wildlife Research Center (NWRC) (970-266-6000) or through the NWRC web site http://www.aphis.usda.gov/ws/nwrc. For further information about the availability of this product, contact your WS State Director, or the Pocatello Supply Depot.

# Raptor and Owl Management for the Protection of California Least Terns and Western Snowy Plovers Nesting at Oceano Dunes State Vehicular Recreation Area, San Luis Obispo County, California

Annual Report – 2023

*Prepared by:*

Wildlife Innovations
11629 Westridge Place
Lakeside, CA. 92040

*Prepared for:*

California Department of Parks and Recreation, 340 James Way, Suite 270
Pismo Beach, Ca. 93449

*Under Agreement with:*

Department of Parks and Recreation, 1416 9th Street,
Sacramento, Ca. 95814
Agreement No. C2053010

**October 2023**

## ABSTRACT

Predation by native and non-native predators plays a major role in the recovery efforts for both the California Least Tern (*Sternula antillarum browni*; hereafter "tern") and Western Snowy Plover (*Charadrius nivosus nivosus*; hereafter "plover") at Oceano Dunes State Vehicular Recreation Area (ODSVRA), and populations throughout the west coast. Predator control programs, including trapping and translocation of raptors and owls, have contributed to increased reproductive success of sensitive shorebird species. Wildlife Innovations (WI) was hired to provide raptor and owl management at ODSVRA and developed a program that focused on the targeted capture and translocation of problem individuals identified during intensive surveillance, to reduce predation pressure upon terns and plovers. During the 2023 nesting season, a total of 237 avian predators from 11 species were recorded in or near protected tern and plover nesting sites at ODSVRA. Of those, 56.5% were observed within colony nesting areas. Within colony nesting areas, more avian predators were recorded at the 8 Exclosure site (n = 31; 23.1%) than other sites, and Northern Harrier (*Circus hudsonius*; NOHA) was the most observed avian predator (n=31; 23.1%). Avian predator observations peaked in April (n=75; 31.6%) at all nesting areas. A greater proportion of American Kestrels (*Falco sparverius*; AMKE; 78.6%) and NOHA (45.2%) when observed within colony nesting areas, resulted in disturbance to terns and/or plovers than other raptors or owls. Three raptors were captured and translocated from within or near tern and plover nesting sites at ODSVRA, including one NOHA, one Cooper's Hawk (*Accipiter cooperii*; COHA), and one Peregrine Falcon (*Falco peregrinus*; PEFA). Approximately 55.9% (n= 521.9) of all trap hours were expended targeting a single AMKE that was not able to be captured.

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# INTRODUCTION

California Least Terns (*Sternula antillarum browni;* hereafter "terns"), one of three subspecies of Least Tern, and Western Snowy Plovers (*Charadrius nivosus nivosus;* hereafter "plovers") nest along the coastline of California (USFWS 1980; 2019). Due to population declines, resulting primarily from loss of habitat (Craig 1971, Cogswell 1977), California Least Terns were federally listed as endangered in 1970 (USFWS 1973) and were listed as endangered in California by the California Department of Fish and Game in 1971 (CDFG 1976). In 1993, the Pacific coast population of Western Snowy Plovers was listed as federally threatened under the Endangered Species Act (USFWS 1993) and is considered a "species of special concern" in California by the California Department of Fish and Wildlife (CDFW). The listings under the Endangered Species Act (ESA) mandated protection of tern and plover nesting sites in California that continues to this day (USFWS 1985). Oceano Dunes State Vehicular Recreation Area (ODSVRA), a site in California, provides important habitat for nesting terns and plovers, and was estimated to account for 1.96-2.44% of the breeding population of terns in California in 2017 (Sin 2021).

California Least Terns nest along the coastlines of Western North America, from the San Francisco Bay area to Baja California, Mexico (USFWS 1980). They forage for small fish in the open ocean, along with bays, lagoons, estuaries, tidal marshes, river mouths, ponds, and lakes. California Least Terns are threatened by multiple factors, including 1) predation by native and non-native predators, 2) habitat availability, 3) decreased nesting and foraging habitat quality, 4) human disturbance at breeding sites, 5) potential degradation or loss of wintering habitat, and 6) other temporary or long-range factors such as changes in resource availability, disease, and potential effects of climate change (USFWS 2006).

The breeding range of the Pacific Coastal population of plovers extends from Midway Beach, Washington, to Bahia Magdalena, Baja California Sur, Mexico (USFWS 2019). Threats to plovers have not changed significantly since listing on the ESA, as evidence of habitat loss and degradation remains widespread. Although the degree of habitat loss and degradation varies by geographic location due to disturbance from human use of areas, urban development, introduced beachgrass, and expanding predator populations, remain the management focus in all recovery units (USFWS 2019, Riensche *et al.* 2015, USFWS 2007).

Avian and mammalian predators are significant threats to nesting terns (Burr 1988, Massey 1988, USFWS 1988). Predation can result in a direct decrease in the number of birds but can also lead to nest and colony abandonment and negatively impact site fidelity (Frost 2015, Velasco 2015). In tern breeding surveys conducted in 2014 and 2017 by CDFW, the predators primarily responsible for tern predations in California were Peregrine Falcons (*Falco peregrinus*; PEFA), rats (*Rattus* spp.), Common Ravens (*Corvus corax*; CORA), Northern Harrier (*Circus hudsonius*; NOHA), American Crows (*Corvus brachyrhynchos*; AMCR), and coyotes (*Canis latrans*; Frost 2015, 2017; Sin 2021). In 2017, coyotes accounted for 62% of tern nest predations across California, and CORA and AMCR were responsible for 30% of nest predations. During that same season, PEFA were responsible for 62% of fledgling and 39% of adult predations, and AMKE (*Falco sparverius*, AMKE) and Great Blue Herons (*Ardea herodias;* GBHE) were the primary predators of chicks (Sin 2021). Other notable predators of terns included rats, Gull-billed Terns (*Gelochelidon nilotica;* GBTE), NOHA, Great Horned Owls (*Bubo virginianus;* GHOW), Western Gulls (*Larus occidentalis*; WEGU), and Burrowing Owls (*Athene cunicularia;* BUOW). During other years the predators listed above are also prevalent causes of predation of terns and tern nests, although

additional predator species have also been documented to depredate terns.

Documented avian predators of plovers greatly overlaps with the predators of terns and include gulls, PEFA, AMKE, NOHA, COHA, RTHA, GHOW, BNOW, BUOW, Loggerhead Shrikes (*Lanius ludovicianus*; LOSH), CORA, AMCR, European Starlings (*Sturnus vulgaris;* EUST), GBHE, GBTE, and Black-crowned Night Herons (*Nycticorax nycticorax*; BCNH; CDPR 2019, 2020, USFWS 2006, Zimmerman 2008, Marschalek 2012, Jake Manley pers. comm.). Due to increasing populations of some native predators on coastal beaches, such as crows and ravens, predation pressure upon plovers may also increase and threaten the survival of the species (Neuman *et al.* 2004, USFWS 1993).

Due to the reduction in the number of nesting terns and plovers on the Pacific coast and their federal listing under the Endangered Species Act, wildlife agencies increased their monitoring and management efforts. Tern and plover monitoring at ODSVRA began in 1991 and 1992, respectively (CDPR 2017). From 2002 through 2021, the number of breeding plovers at ODSVRA ranged between 32 and 226, with an average of 151 adults and an average fledging rate of 38.3% (CDPR 2022). From 2005 through 2020, the average number of tern pairs at ODSVRA ranged from 40 to 43. Between 2006 and 2021, the average fledging rate was 72.3% (CDPR 2021). During the 2023 nesting season, fewer tern pairs (41-42) nested at ODSVRA and laid fewer nests than during 2021 (n=45, respectively). More adult plovers (minimum 229 breeding adults) laid more nests than during 2021 (n=223, respectively). Less terns (n=35) but more plovers (n=231) reached fledging age.

Wildlife Innovations (WI) entered into a three-year contract with the California Department of Parks and Recreation (CDPR) during the 2021 nesting season, to provide surveillance, behavioral evaluation, and mitigate predation of terns and plovers nesting at ODSVRA by raptors and owls. All other avian and mammalian predators are managed by USDA/APHIS/Wildlife Services (WS) under a separate contract with CDPR. Wildlife Innovations initiated raptor and owl management efforts for the 2023 nesting season on 15 March. When predations were identified by ODSVRA staff, WI investigated all predations, when possible, to attempt to determine the species responsible. The results of these predation investigations, along with direct predator surveillance and behavior evaluation data, enabled WI to utilize an adaptive and highly targeted approach to manage predator species. This methodology helps to ensure that only high-threat predators are targeted for management, thereby reducing potential for negative impacts to the native predator community, while also mitigating predation pressure on terns and plovers to support increased nesting success.

## STUDY AREA

Oceano Dunes State Vehicular Recreation Area is a park managed by the CDPR in southern coastal San Luis Obispo County, California. It is part of the 18-mile-long Guadalupe-Nipomo Dunes complex that extends from Pismo Beach to Point Sal. The southern end of the park directly abuts Guadalupe-Nipomo Dunes National Wildlife Refuge. Inside the park, both street-legal and off-highway vehicles are allowed throughout designated open riding areas (ORA). These areas extend approximately 0.5 to 1.5 miles from the coast. Eight numbered marker posts, approximately one-half mile apart, are positioned along the coastal strand to orient park visitors and staff (CDPR 2022). From the shoreline to the western edge of the ORA, beginning at the northern edge of the Foredune Closures, are regions both seasonally and permanently closed to public access, collectively referred to as colony nesting areas. These exclosures have been established to protect

nesting terns and plovers, of which terns are only present during the breeding season (April–September) whereas some plovers are onsite year-round (CDPR 2020).

The following terminology and associated descriptions are used within this report (taken from CDPR 2023).

*ODSVRA*—All areas administered by the Oceano Dunes District are part of the ODSVRA. The CDPR manages 4,900 acres, 9.1 of which are ocean shorelines (CDPR 2020). During 2022, an estimated 183,900 street-legal vehicles and 73,000 off-highway vehicles visited ODSVRA (CDPR 2023).

*Open Riding Area (ORA)*—The area within the ODSVRA open to vehicle use during the nesting season. This area was approximately 874 acres at the beginning of the 2023 nesting season, but installation of nest buffers, expansion of the Foredune Closure shoreline fencing in response to plover nesting activity, and establishment of closed buffer areas decreased the overall area of the ORA throughout the nesting season. The majority of the ORA consists of bare sand, limited sections of artificial debris patches, little or no vegetation, and regions of steep topography, all of which contribute to suboptimal nesting habitat (CDPR 2023).

*Closed buffer area*—Portions of the ORA closed to the public to provide a buffer for tern or plover nests, in areas of high chick activity, or at tern night roosts. As OD staff locate nests, management closes areas to the public to provide this buffer area. The closed buffer area frequently varied in size during the nesting season. Additionally, each year the closed buffer will also vary, in accordance with locations of nests found.

*Foredune Closure*—Restoration area within the ORA, established in 2020 to improve air quality conditions. The closure's colony fencing is 48 acres in total, extending from approximately a quarter mile south of marker post 4 to north of post 6, approximately covering 0.8 miles of shoreline. The closure is divided into three plots and referenced as: Foredune North, Foredune Central, and Foredune South. The fence surrounding each plot is intended to keep people and vehicles out of the restoration area, but it is not maintained as predator fencing and coyotes and other mammals can easily move through the area. The shoreline is closed during the nesting season.

*Southern Exclosure*—A single contiguous area within the central and southern portion of the riding area that is closed to entry year-round and is a large part of the nesting colony (Fig. 1). The colony fencing of the exclosure is maintained predator fencing, unlike the fences of the Foredune Closure and vegetation islands. Although contiguous, for the purpose of data collection and accurate reporting there are individually identified areas referred to as the following:

*6 Exclosure*—The area extending from marker post 6 to marker post 7, approximately 0.5 miles of shoreline and 62 acres.

*7 Exclosure*—The area extending from marker post 7 to the southern edge of 7.5 Revegetation Area , approximately 0.4 miles of shoreline and 63 acres.

*8 Exclosure*—The area extending from the southern edge of 7.5 Revegetation Area to the North Oso Flaco fencing south of marker post 8, approximately 0.5 miles of shoreline and 82 acres.

*Boneyard*—The area east of the North Oso Flaco dunes. Primarily bare sand, although has more

densely vegetated hummocks in the western portion. The area is bisected by a predator fence during the nesting season, establishing the western portion as West Boneyard (WBY) and the eastern portion as East Boneyard.

*Oso Flaco*—The shoreline and dunes in ODSVRA south of the ORA. Consists of approximately 1.7 miles of shoreline and divided into two areas referred to as the following:

*North Oso Flaco*—The area extending south of 8 Exclosure to the Oso Flaco boardwalk access trail, approximately 0.5 miles of shoreline and 68 acres. The shoreline portion is closed to pedestrians with symbolic fencing during the nesting season. The area east of the shoreline is surrounded by predator fencing and, along with the Southern Exclosure, is referred to as the Exclosures.

*South Oso Flaco*—The area from the Oso Flaco boardwalk (South of North Oso Flaco and not visible on Fig.1) and extending to the ODSVRA southern boundary, approximately 1.2 miles of shoreline.

*Exclosure*—The contiguous area enclosed by the predator fencing surrounding the Southern Exclosure and North Oso Flaco. The area within the fencing is approximately 260 acres (does not include the closed shoreline areas) and was established to exclude coyotes, humans, and vehicles for the protection of nesting terns and plovers (Tamar Carmona pers. comm.).

*Dunes Preserve*—An area of tall sand dunes with densely vegetated foredunes in its western portion, 0.4 miles north of the Foredune Closure.

*Vegetation Islands*—Revegetated areas fenced to prevent access by vehicles and referred to as the following: Pipeline (PLR), Maidenform, Eucalyptus North, Eucalyptus Tree, Bigfoot, Boy Scout Camp, Pavilion Hill, and BBQ Flats (Fig. 1).

*Arroyo Grande Creek*—Seasonally flowing creek that feeds into the Pacific Ocean approximately 0.4 miles north of the Foredune closure. A large amount of precipitation during the prior winter caused increased flow of the Arroyo Grande (AG) creek and subsequent closure of ODSVRA to visitors for part of the 2023 nesting season.

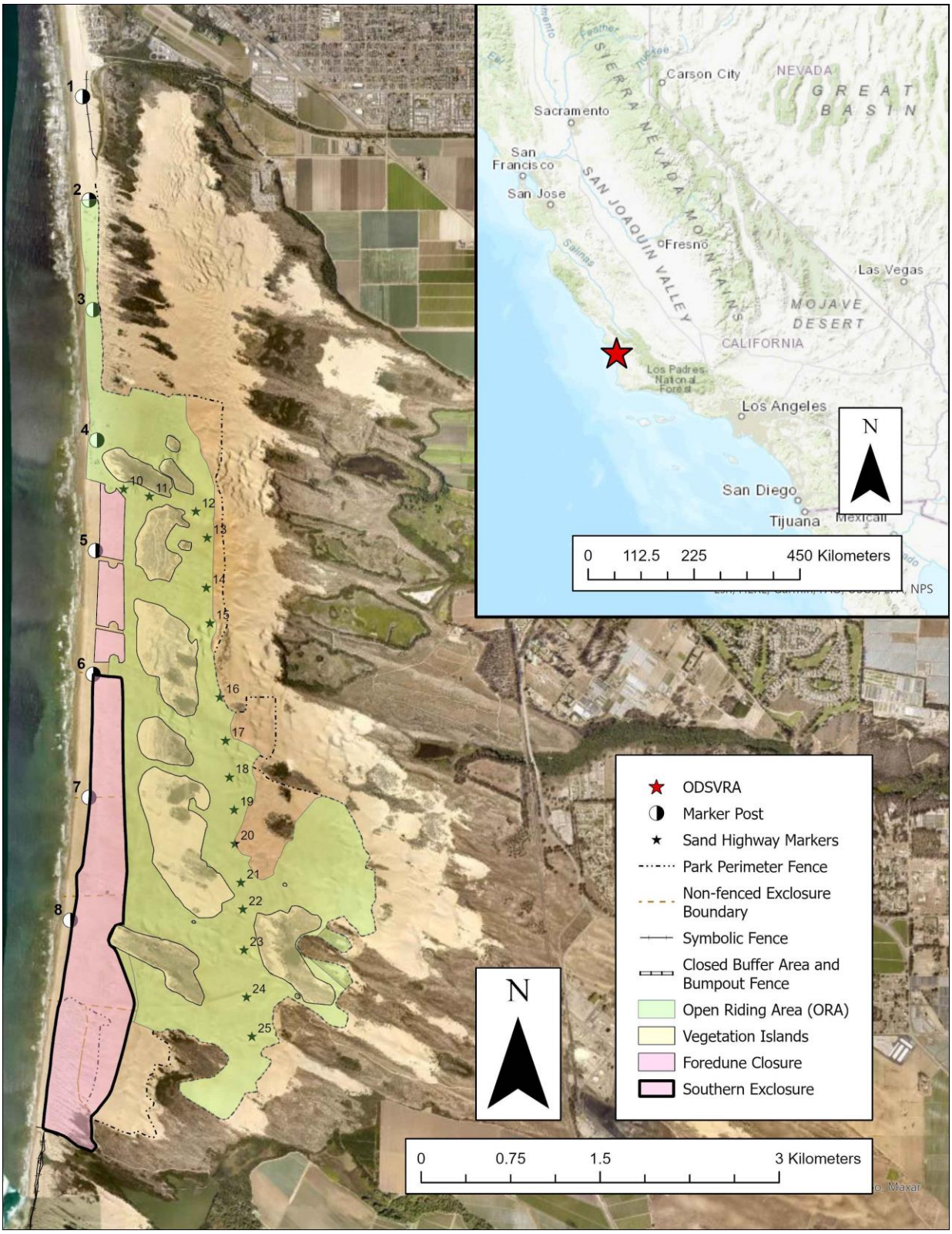


**Figure 1.** Map of ODSVRA, including colony fencing, ORA, and other points of interest, where raptor and owl management was conducted for terns and plovers during the 2023 nesting season.

# METHODS

Raptor and owl management efforts during the 2023 tern and plover nesting season were conducted in and near previously identified beach nesting areas at ODSVRA between 15 March and 24 August 2023. Those efforts included conducting predator surveillance, behavioral evaluation and threat assessment of individual predators, investigation of tern and plover predations to determine species or individual responsible, and targeted trapping for raptors or owls documented depredating or threatening terns or plovers or their nests. Surveillance data and predation investigations reported herein are data collected by WI, and do not include observations made by ODSVRA staff or other cooperative entities. However, all observations and information reported to WI were used to inform adaptive management efforts and may be referenced during species specific narrative summaries as that information contributed to management decisions.

All WI vehicles and personnel conducting management work on ODSVRA were fitted with identifiable markings, such as reflective truck decals and shirts and/or hats displaying the WI logo, allowing park rangers, game wardens, and other park staff to easily identify them in areas closed for tern or plover nesting.

**Predator Surveillance**

The amount of time spent surveilling each nesting site area varied throughout the season. More patrols and fixed-position surveillance were conducted in areas where more avian predator observations or predator sign occurred, and in areas where documented or suspected predations of terns or plovers occurred. Additionally, when WI personnel were not required to remain in one location (e.g., while monitoring active traps), more time was spent monitoring high-density tern and plover nesting sites. Fixed-position surveillance was also utilized frequently during the 2023 nesting season to attempt to pattern individual raptors or to collect specific information on activities of high-threat species such as NOHA, PEFA, or CORA.

Predator observations were recorded during both daytime and nighttime hours while conducting routine patrols of exclosure fence lines and shoreline areas, during surveillance from fixed and topographically advantageous positions, while trapping for targeted individuals, and while performing predation investigations within nesting areas. Predator observations were recorded and mapped where the predator(s) were first detected unless the individual(s) focused its activity or conducted a noteworthy behavior (e.g., depredated or attempted to depredate a tern or plover) in a specific location during the observation. During the latter portion of the 2023 nesting season, a shift in data collection procedure was made to accommodate a request made by ODSVRA Staff. This shift included recording all relevant nesting exclosures or otherwise identified areas in order of visitation, following the initial observation location. Multiple observations of a nondescript individual belonging to the same species within 10 minutes of the first observation, were assumed to be the same individual and only recorded once, unless physical characteristics allowed for confident differentiation and identification as multiple individuals of the same species, in which case multiple individuals were recorded.

In addition to observations of predators, disturbance to terns and plovers caused by predators was recorded. If the presence or activity of a predator elicited a behavioral response from a tern or plover (e.g., crouching, alarm calling, displaying, mobbing), it was recorded as a disturbance. When avian predators were observed within areas expected to be occupied by terns or plovers, but disturbance could not be confirmed, it was recorded as “disturbance unknown.” If the avian predator was observed flying over terns or plovers visible to the observer and no disturbance to

terns or plovers was observed, "no disturbance" was recorded. Not all disturbance may have been detected due to factors such as topography, distance, and weather induced reductions in visibility.

Not every raptor observation was recorded to better utilize personnel time while conducting field work. For example, Osprey (*Pandion haliaetus*, OSPR) were not recorded as their diet is nearly entirely comprised of live fish, and they were rarely observed. In addition, while RTHA were commonly observed in and near vegetation islands, they rarely threatened nesting terns and plovers. As a result, only those RTHA observed inside tern and plover nesting exclosures were recorded. Also, while many gull species are documented predators of terns and plovers, because there are so many present at ODSVRA, only individuals observed threatening or depredating terns or plovers were recorded. Due to these factors, "avian predators" will include all raptors, owls, and corvids observed, but may not include gulls, RTHA, or OSPR observed.

Wildlife Innovations developed a standard weekly surveillance intended to sample all time periods within the course of each week, in an effort to prevent avian predators from going undetected. The standard schedule was adapted based on expected or detected predator presence. The standard surveillance schedule consisted of at least two mornings, two evenings, and one overnight period. The surveillance schedule designed and worked by WI was also adapted as needed or requested, to fill gaps between work schedules of other entities within the ODSVRA tern and plover program, and as a result provide valuable and complimentary information.

Wildlife Innovations conducted nighttime surveillance using thermal imaging optics to gather additional and valuable information regarding activity by nocturnal predators. Nighttime surveillance was conducted by determining the most appropriate observation location based on knowledge of predator presence and reports provided by ODSVRA staff detailing locations of tern and plover nests, chicks, and fledglings. WI personnel arrived at surveillance locations prior to sunset to become familiar with terrain during daylight, which helped to improve understanding and evaluation of habitat and predator behaviors observed through the thermal optic at night. Beginning nighttime surveillance shifts prior to sunset also enabled WI to assist ODSVRA staff in documenting tern roosting locations and to count the number of roosting individuals. Nighttime surveillance was primarily performed from a fixed point to both limit driving near identified tern roosting areas and the possibility of altering nocturnal predators' behavior.

Time spent performing nighttime surveillance and trapping for owls reduced personnel hours available for monitoring of diurnal raptors. WI senior and field staff utilized ODSVRA staff reports of avian predator observations made during daytime hours, combined with data collected by WI during nighttime surveys, to continuously reevaluate, prioritize, and shift between nighttime and daytime surveillance schedules to best meet the needs of the program.

**Avian Predator Trapping**

Trapping and translocation of raptors and owls is a complicated process, requiring sufficient justification of the impacts or potential for impacts to listed species to satisfy requirements of state and federal regulatory agencies, translocation site approval, and completed banding and reporting paperwork, to remain in compliance. Before trapping was initiated, focused surveillance was conducted to gather ample justification, planning for translocation was conducted, and notification of state and federal regulatory agency representatives was completed when required and appropriate. Justification to begin trapping followed guidelines developed by CDFW and the U.S. Fish and Wildlife Service (USFWS) for the translocation of raptors associated with Threatened and Endangered species protection programs (Migratory Bird Permit Office 2013). Capture and justification forms were completed and delivered to both regulatory entities, as requested.

Raptors or owls documented depredating terns or plovers, observed exhibiting threatening predatory behavior (including activities that elicited alarm calls from terns or plovers), or repeatedly hunting within sensitive tern or plover nesting habitat, whether observed by ODSVRA monitoring staff or by WI personnel, were targeted for removal via capture with traps and translocation. Wildlife Innovations tailored the type of trap and method of deployment to be most effective for the species and the behavior of the targeted individuals. Wildlife Innovations additionally considered any characteristics or constraints posed by the trap site. A variety of standard trap types as described by Hull and Bloom (2001), were used to target and capture these avian predators. Most traps were anchored by attaching them to two-to-five-pound weights via a bungee cord which acted as a shock-absorber to reduce potential injury to captured individuals and served to maintain tension for snare-based traps. All captured raptors were banded, translocated, and released during the 2023 season.

All captured avian predators were banded with an aluminum USGS service band and, depending on species, an auxiliary band from Acraft Sign and Name Plate Co. Ltd. that contained an alpha-numeric code (black code on silver band) intended to be readable from a distance using optics. Peregrine Falcon captured during the 2023 season were instead banded with a black V.I.D. (Siler code on black band) instead of an auxiliary band. Captured individuals were released at CDFW- and USFWS-approved locations by WI, CDFW, or Natural Resources Volunteer Program (NRVP) personnel.

**Predation Investigations**

Wildlife Innovations investigated all reported tern and plover predations when personnel were in the field and transited to the field to investigate any depredation sites suspected to be raptor based on information provided by ODSVRA staff. If predator species was able to be determined based on ODSVRA data and photos, WI recorded the predation for trapping justification but otherwise did not include it within summary statistics. If a species could not be confirmed through evidence provided by ODSVRA and the predation was suspected to be from a non-raptor or owl species, WI investigated the predation the next time WI personnel were onsite. When WI performed the depredation investigations, a WI biologist experienced and permitted to operate within tern and plover nesting colonies and trained in identifying predator tracks/sign walked to the nest site, frequently accompanied by ODSVRA staff. During investigations, depredations were assigned to the species-level when possible and assigned a level of confidence regarding the determination.

Predation investigations presented in this report represent only those directly investigated by WI and not all investigations or depredations observed or investigated by other entities at ODSVRA. Since WI did not survey within nesting areas regularly, WI relied on ODSVRA staff reports to

detect predations. Detections most often involved an initial record of a plover or tern being off the nest during at least one regularly scheduled ODSVRA staff "nest-check". Following that observation, or opportunistically if ODSVRA staff were already within a nesting area and discovered a depredated nest, the site was checked for signs of predation. In instances that WI was not onsite, or ODSVRA staff had otherwise located a depredation site while walking within the exclosure, the site was initially investigated by ODSVRA staff. Frequent high winds at ODSVRA often damaged or removed evidence at depredation sites if not investigated promptly. To prevent loss of evidence and promote accurate identification of the cause of each predation, if WI was not available, ODSVRA staff performed the depredation investigation. Due to the above-listed challenges, many discovered predations were not able to be identified to species and as a result were recorded as "unknown" or "unknown avian." For a comprehensive summary of all predations for the 2023 nesting season, please see the ODSVRA monitoring report (CDPR 2023).

**Data Management and Analysis**

Smart phones and tablets, containing the ESRI Field Maps or Collector for ArcGIS Applications (ESRI, Redlands CA), were used to record all predator management data collected in the field. These applications were customized by WI for collection of all relevant information for effective predator management. Some examples of data collected include the following: name of personnel, date and time of observation or work being conducted, name of nesting area where work was conducted (e.g., Boneyard), type of predator control work (e.g., trapping), specific equipment used (e.g., Bal-chatri trap), activity (i.e. trap-set, trap-check, trap-pulled), specific bait used (e.g., mouse), species captured (e.g., PEFA), and final species disposition. These data were later summarized, analyzed, and mapped using ESRI ArcGIS Pro and Microsoft Excel (Microsoft Office Excel 2016, Mircrosoft Corp., Redmond, WA). Observation data were summed by time period, geographic area (e. g., Site or Exclosure), and species, and were reported as the number of individuals observed or as a percentage of those observed, which was calculated by dividing the number of observations within a given category by the total number of observations made. Observations recorded within vegetation areas were summed across all areas rather than by reporting individually. Predator observations recorded within occupied plover or tern areas, such as the nesting exclosures or on the shoreline, were summarized by site to better describe predator activity and predation threat within each site and across all sites. Survey data displayed within maps is of observational events, and each icon within those maps may represent more than one individual observed. Many raptors and owls are solitary, so most icons in maps only represent a single individual. Observational data within tables includes summary of the total number of individuals observed, rather than of observation events.

# RESULTS

**Predator Surveillance**

Between 15 March and 24 August 2023, 237 avian predators of 11 species were recorded within and near tern and plover nesting areas at ODSVRA (Table 1). Over half of the avian predator observations were recorded within colony nesting areas (n=134; 56.5%). The colony nesting area with the greatest number of avian predator observations was 8 Exclosure (n=31; 23.1%). However, combining exclosures and their corresponding shorelines (i.e., 8 Exclosure and 8 Shoreline), the combined area with the greatest number of avian predator observations was 6 Exclosure and Shoreline (n=35; 26.1%). Within all areas of ODSVRA, more observations of NOHA (n=58; 24.5%) were recorded than of other species of avian predator, 46.6% of which were observed outside of colony nesting areas (Table 1, Fig. 3). Within colony nesting areas, more observations

of NOHA (n=31; 23.1%) and PEFA (n=20; 14.9%) were recorded than of other species of avian predator (Table 1, Fig. 3, Fig. 6). More avian predators were observed in all areas during April (n=75; 31.6%) than during other months (Fig. 8). The lowest number of predator observations within all areas were recorded during August (n=9; 3.8%; Fig. 8). AMCR were most prevalent during March and April, whereas CORA were most prevalent during May (Fig. 8). A greater proportion of observations of AMKE (n=11; 78.6%) and NOHA (n=14; 45.2%) within nesting colony areas resulted in disturbance to terns and/or plovers than from observations of other avian predator species (Fig. 9).

**Table 1.** Avian predator observations recorded, by site and species, during the 2023 tern and plover nesting season at ODSVRA.

| Site | AMCR | AMKE | BNOW | CAGU | CORA | COHA | GHOW | NOHA | PEFA | RTHA | WEGU | Unidentified Corvid | Unidentified Gull | Unidentified Raptor | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Colony Area** | **15** | **14** | **0** | **2** | **12** | **2** | **4** | **31** | **20** | **16** | **5** | **6** | **7** | **0** | **134** |
| Foredune Closure | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Foredune Closure Shoreline | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 5 |
| 6 Exclosure | 2 | 3 | 0 | 0 | 2 | 0 | 0 | 5 | 2 | 0 | 1 | 0 | 1 | 0 | 16 |
| 6 Shoreline | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 0 | 0 | 0 | 3 | 0 | 19 |
| 7 Exclosure | 1 | 3 | 0 | 0 | 3 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 0 | 13 |
| 7.5 Revegeation Area | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 4 |
| 7 Shoreline | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 3 |
| 8 Exclosure | 6 | 1 | 0 | 0 | 5 | 1 | 4 | 2 | 2 | 4 | 0 | 6 | 0 | 0 | 31 |
| 8 Shoreline | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| North Oso Flaco | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 2 | 9 | 0 | 0 | 0 | 0 | 19 |
| North Oso Flaco Shoreline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 4 |
| South Oso Flaco | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Boneyard (West of IBY) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| **Other Areas** | **40** | **8** | **2** | **0** | **7** | **3** | **5** | **27** | **2** | **5** | **0** | **3** | **0** | **1** | **103** |
| Location Unconfirmed[b] | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ORA: Open Riding Area | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| East Boneyard (East of IBY) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| Vegetation Areas[a] | 35 | 8 | 0 | 0 | 6 | 3 | 5 | 26 | 2 | 4 | 0 | 3 | 0 | 1 | 93 |
| **Total** | **55** | **22** | **2** | **2** | **19** | **5** | **9** | **58** | **22** | **21** | **5** | **9** | **7** | **1** | **237** |

[a] Vegetation Areas include: BBQ Flats, Bigfoot, Dune Preserve, Eucalyptus Tree, Eucalyptus North, Oso Flaco Boardwalk/Flats/Lake, Pavilion Hill, Pipeline, Maidenform and Tabletop.

[b] Location unconfirmed due to auditory detection in dense fog.

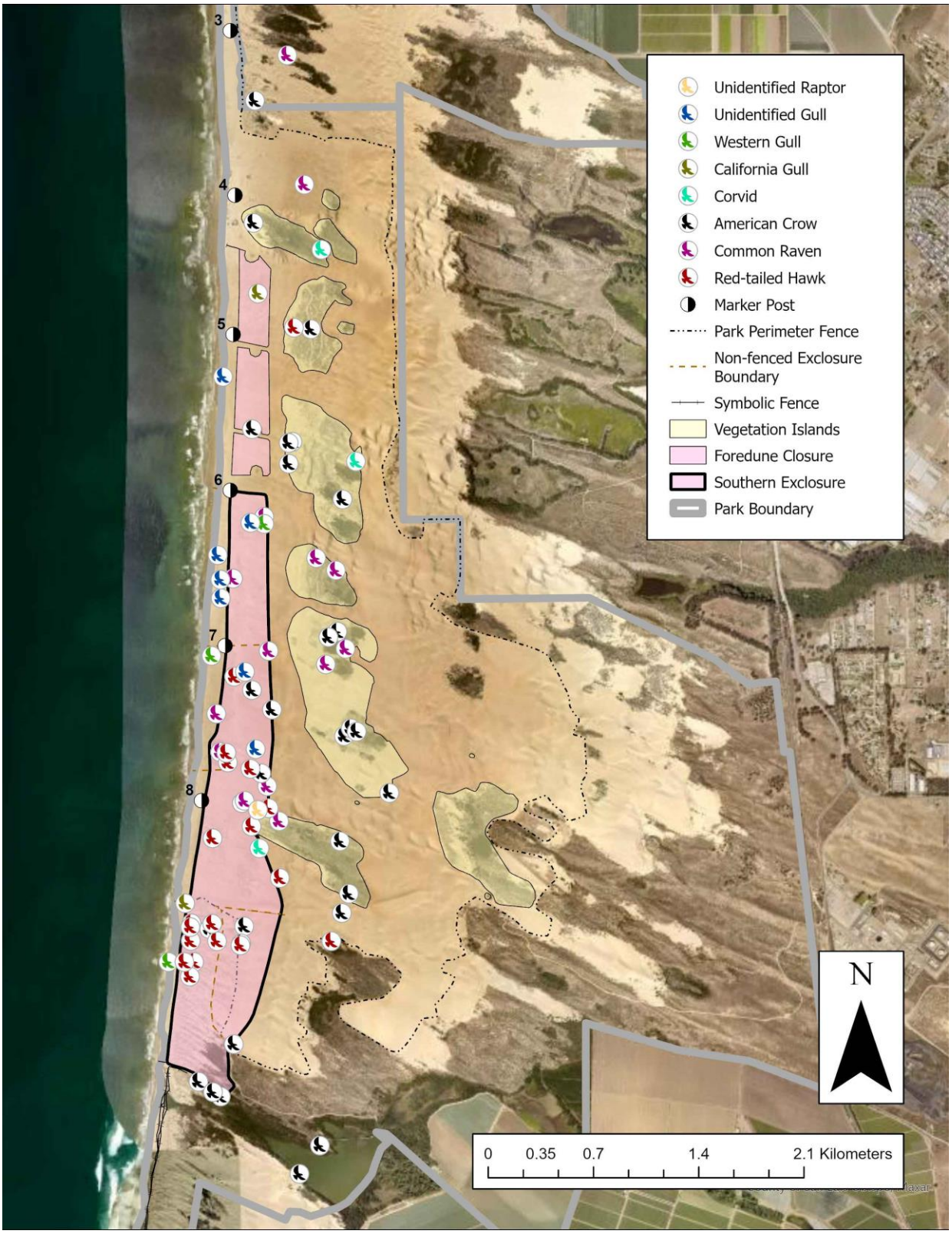


**Figure 2.** Locations of avian predators observed by WI within and near tern and plover nesting sites at ODSVRA, excluding the species captured or targeted for capture, during the 2023 nesting season.

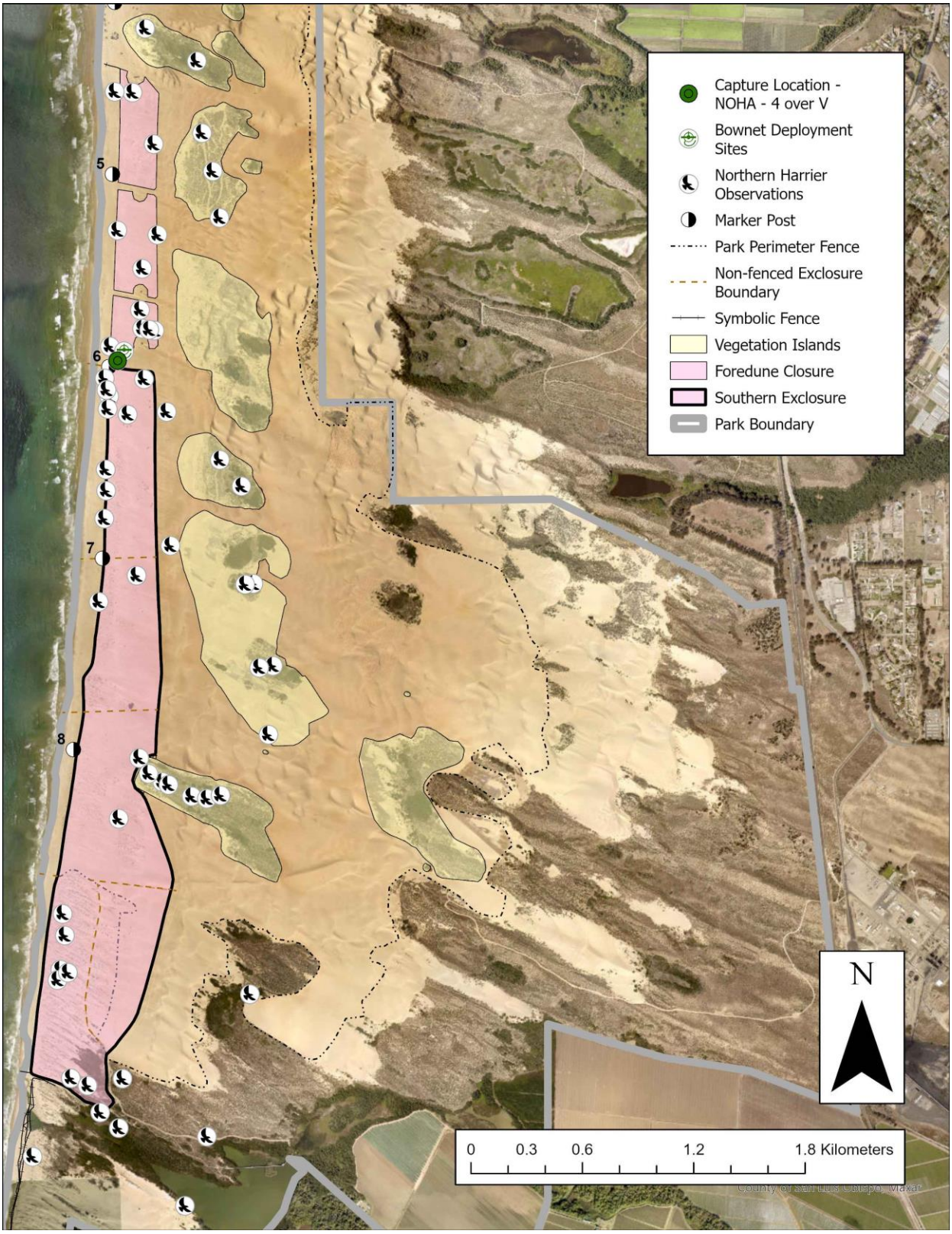


**Figure 3.** Locations of NOHA observations made by WI, traps placed for them by trap type and the capture location, within or near tern and plover nesting sites at ODSVRA during the 2023 nesting season.

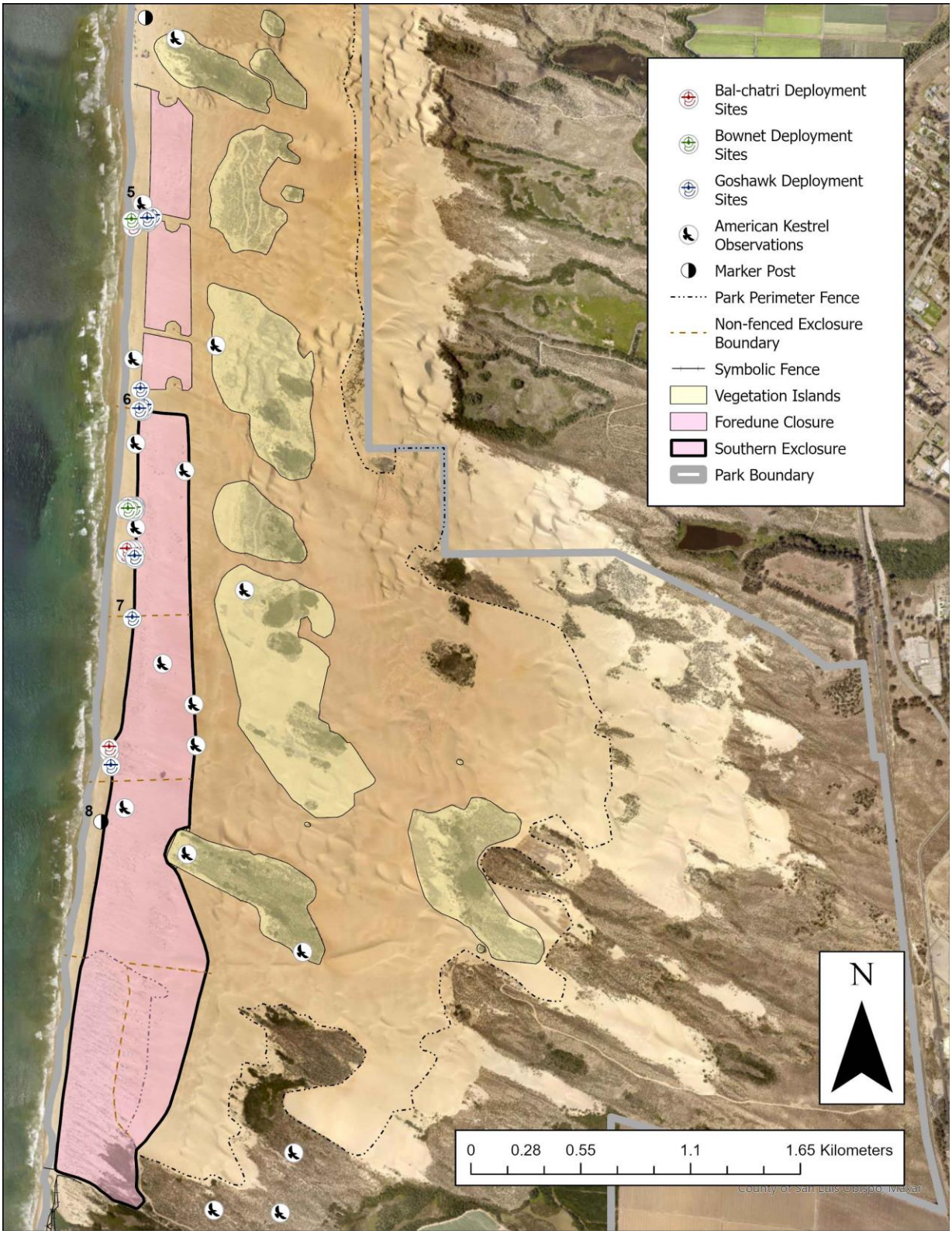


**Figure 4.** Locations of AMKE observations made by WI and traps placed by trap type, within or near tern and plover nesting sites at ODSVRA during the 2023 nesting season.

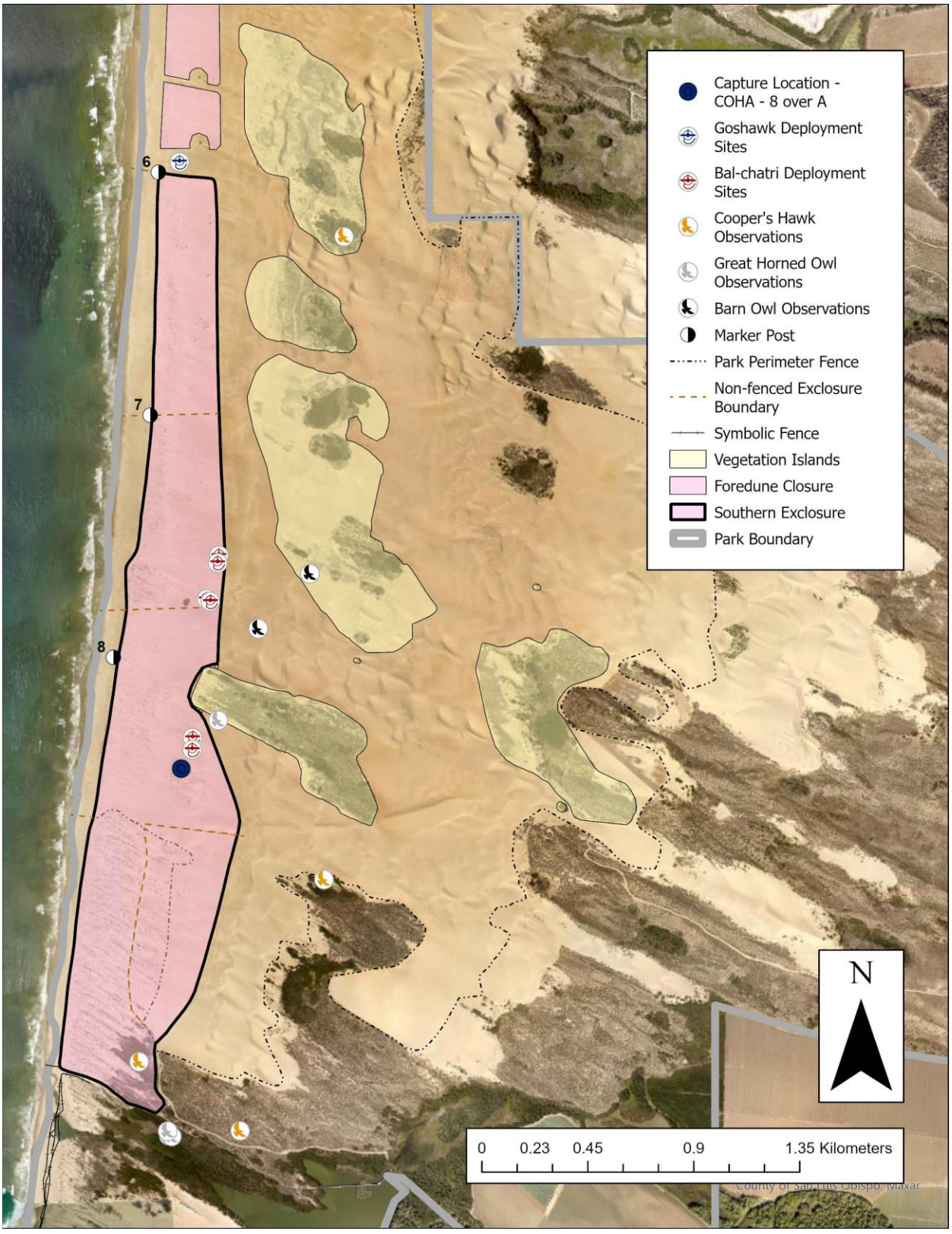


**Figure 5.** Locations of owl and COHA observations made by WI, traps placed for owls by trap type, and the COHA capture location, within or near tern and plover nesting sites at ODSVRA during the 2023 nesting season.

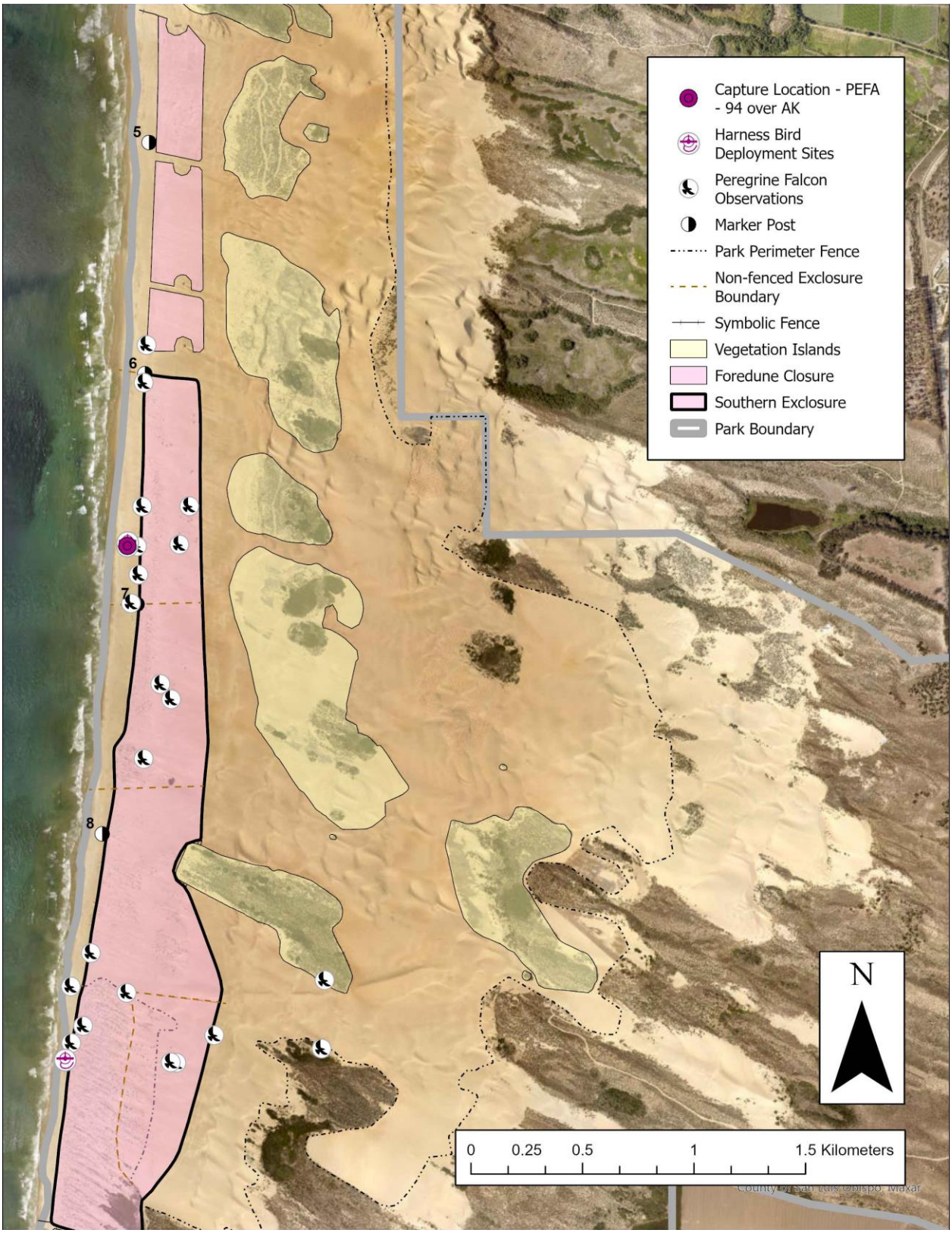


**Figure 6.** Locations of PEFA observations made by WI, traps placed by trap type, and the capture location within or near tern and plover nesting sites at ODSVRA during the 2023 nesting season

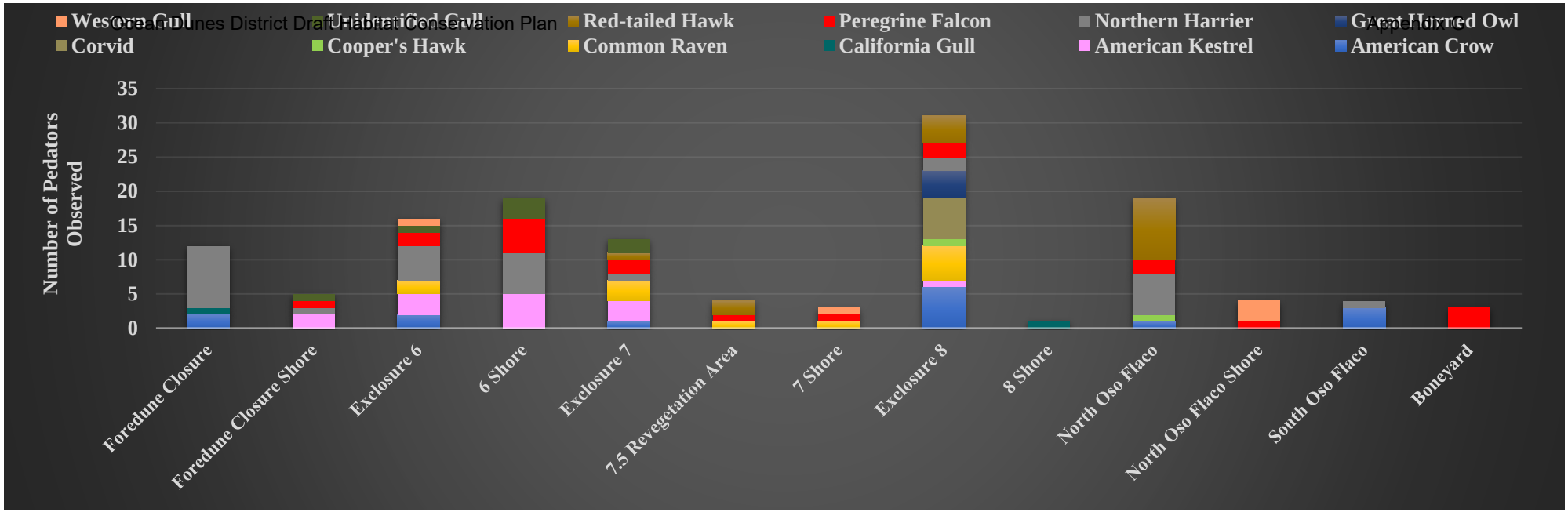


**Figure 7.** Number of avian predators observed by species, excluding all vegetation areas at ODSVRA during the 2023 tern and plover nesting season.

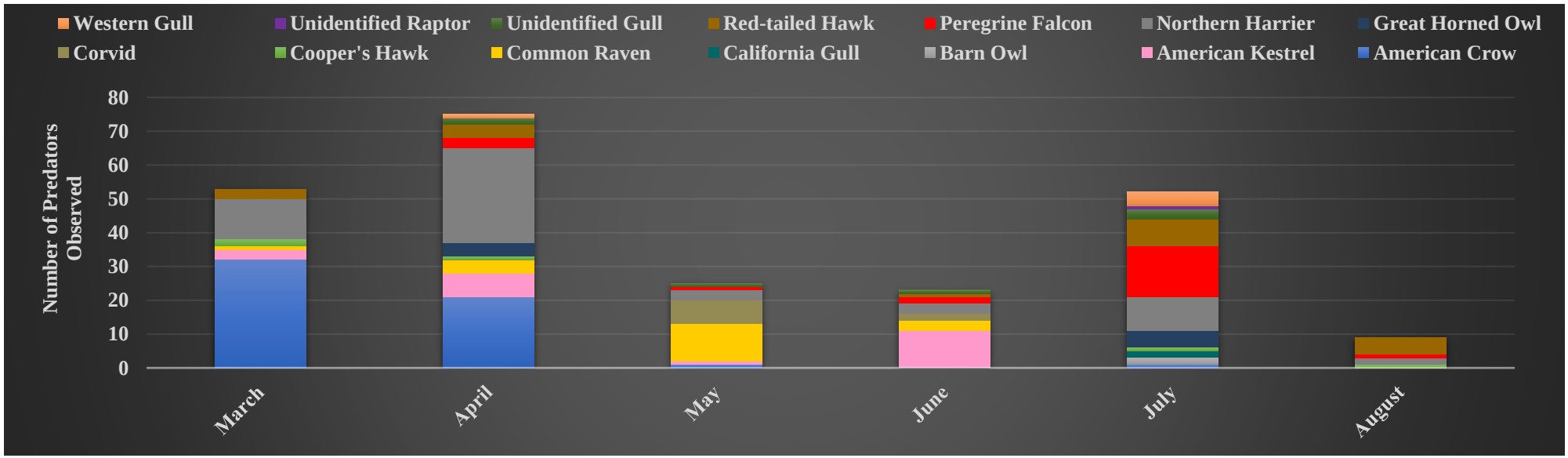


**Figure 8.** Number of avian predators observed by month and species at ODSVRA during the 2023 tern and plover nesting season.

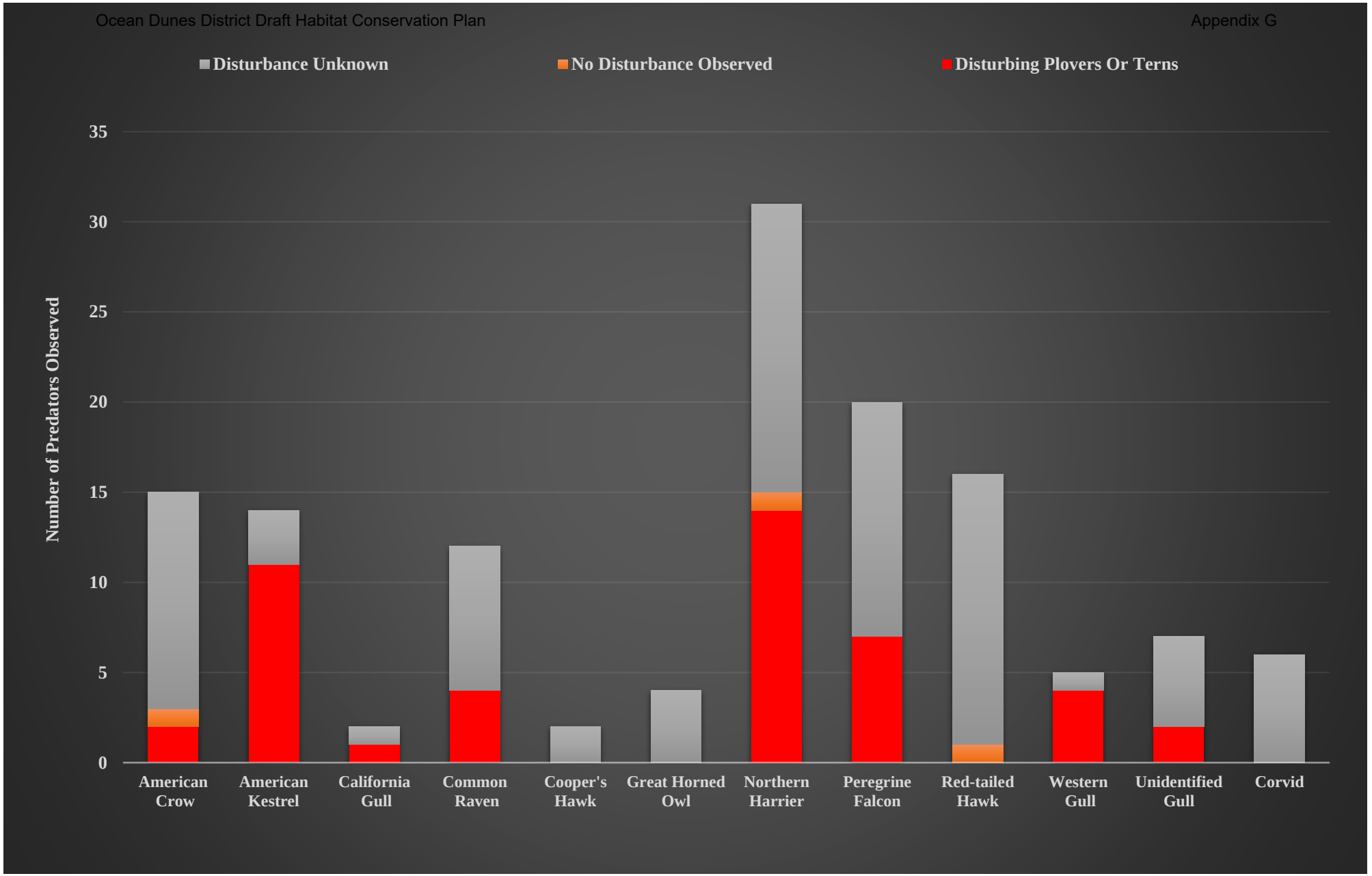


**Figure 9.** Number of avian predators observed by species, and whether disturbance of terns and plovers occurred during those observations, within colony nesting areas in ODSVRA, during the 2023 tern and plover nesting season.

## Avian Predator Removal

During the 2023 nesting season, four avian predators were targeted for capture within or near tern and plover nesting sites on ODSVRA, resulting in the removal of three individuals belonging to three species (Table 2, Table 3). Four different trap types were deployed, for a total of 934.39 trap hours. Over half of all trap hours were spent attempting to capture an adult male AMKE (55.9%; Table 3). A large percentage of the remaining trap hours (34.8%) were spent targeting GHOW.

The adult male NOHA captured early in the season was released by CDFW in Butte County, CA (Table 4). The AHY female PEFA was transferred to Redding NRVP and transported to the Pit 3 Powerhouse for release (Table 4). The SY female COHA was release by WI at the Blue Oak Ranch Preserve in Santa Clara County (Table 4).

**Table 2.** Avian predators removed by species and trap type, during the 2023 tern and plover nesting season at ODSVRA.

| Species | Modified Goshawk Trap | Bownet | Harnessed Pigeon | Captures |
|---|---|---|---|---|
| Northern Harrier | 0 | 1 | 0 | **1** |
| Cooper's Hawk | 1 | 0 | 0 | **1** |
| Peregrine Falcon | 0 | 0 | 1 | **1** |
| **Total** | **1** | **1** | **1** | **3** |

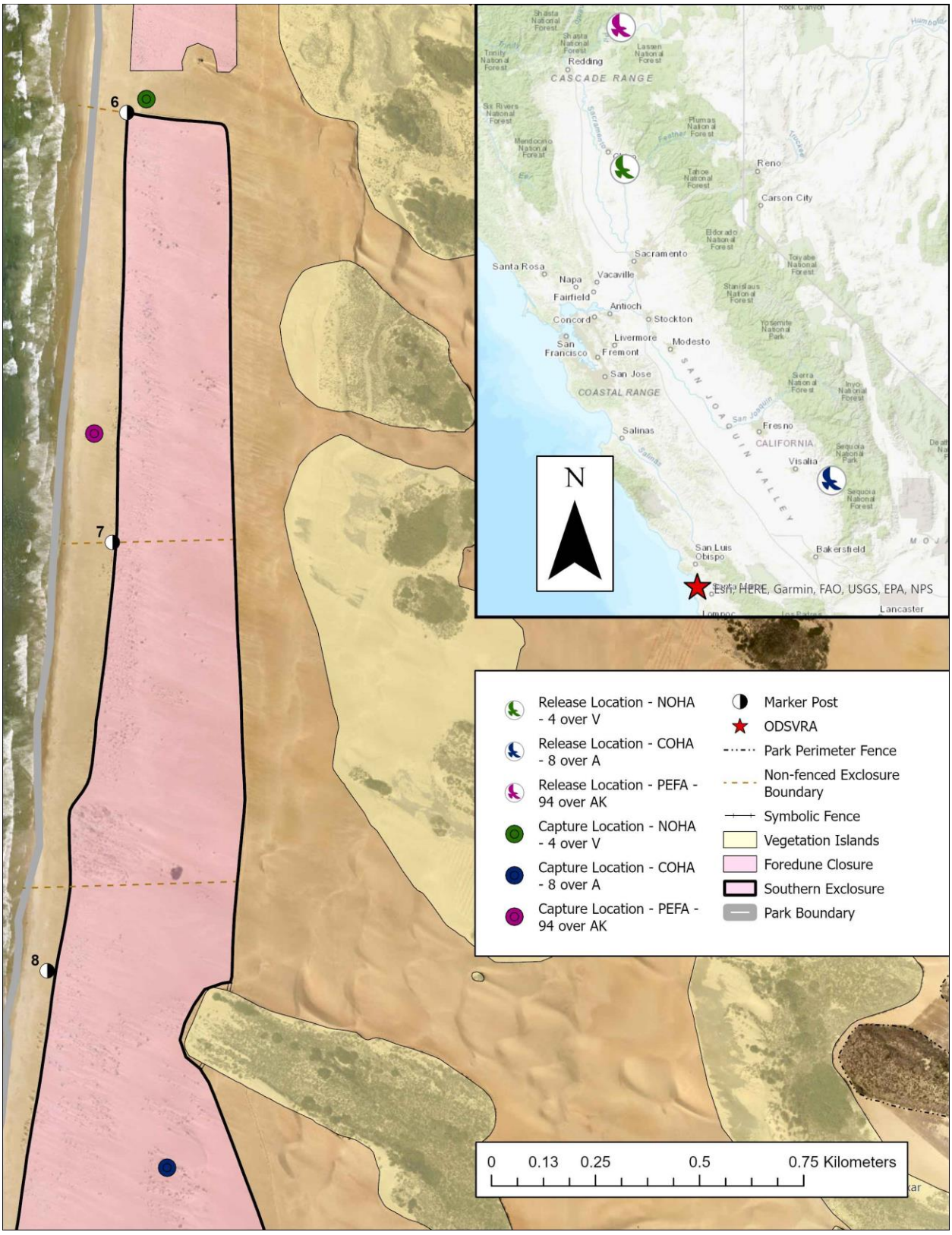


**Figure 10.** Capture and release locations of raptors removed from within and near tern and plover nesting areas at ODSVRA during the 2023 nesting season. Release locations are depicted within the bounds of the inset map.

**Table 3.** Avian predators targeted for removal, and trapping information for efforts conducted during the 2023 tern and plover nesting season at ODSVRA.

| Targeted Individual | Age | Sex | Areas Trapped | Trap Types Used | # Of Days Trapping | # Of Trap Hours | Total Trap Hours | Targeted Individual Captured | Date Captured |
|---|---|---|---|---|---|---|---|---|---|
| NOHA | Adult | Male | Post 6 Alleyway | Bownet | 2 | 24.5 | 24.5 | YES | 5/1/2023 |
| AMKE | Adult | Male | Foredune Shore, Post 6 Alleyway, 6 Shore, 7 Shore, 8 Shore | Bal-chatri, Modified Goshawk, Bownet | 11 | 362.77 | 521.94 | No | N/A |
| GHOW | UNK | UNK | 6 Alleyway, 7 Exclosure, 8 Exclosure | Bal-chatri, Modified Goshawk | 14 | 302.6 | 325.37 | No | N/A |
| PEFA | Juvenile | PEFA | 6 Shore, NOF Shore | Harnessed Bird | 4 | 62.58 | 62.58 | N/A | N/A |
| **TOTAL** | | | | | **31** | **752.45** | **934.39** | | |

**Table 4.** Raptors captured and translocated from within ODSVRA, during the 2023 tern and plover nesting season.

| Capture Date | Capture Site | Species | Age | Sex | Service Band # (Right Leg) | Secondary Band Type | Secondary Band (Color; Left Leg) | Capture Method | Bait Used | Translocation Site | Translocation Distance | Release Date | Released By |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/01/2022 | Post 6 Alleyway | NOHA | AHY | Male | 1134-00922 | ACRAFT | Black on Silver; 4 over V | Bownet | Quail Egg | Butte County | 506.1 km | 5/2/2023 | CDFW |
| 7/24/2023 | 8 Exclosure | COHA | SY | Female | 1266-00896 | ACRAFT | Black on Silver; 8 over A | Modified Goshawk | Collared Doves & Starlings | Blue Oak Ranch Preserve, Santa Clara County | 210.2 km | 7/24/2023 | Wildlife Innovations |
| 7/31/2023 | 6 Shore | PEFA | AHY | Female | 2187-22101 | VID | Silver on Black; 94 over AK | Harnessed Bid | Pigeon | Pit 3 Powerhouse, Shasta County | 666.7 km | 8/3/2023 | NRVP |

# DISCUSSION

This was the third year of a 3-year agreement between ODSVRA and WI, to provide raptor and owl management to benefit nesting terns and plovers. Avian predator surveillance was primarily conducted by one returning and experienced biologist during 2023, with supplemental surveillance, behavioral assessment, trapping, and project management support provided by senior level staff.

Ahead of and during each season working as a part of cooperative conservation programs, WI expends great effort to continuously review and scrutinize strategies and methods employed, to look for ways to improve the efficiency and effectiveness of each program in every aspect possible to best assist in achieving program goals. With another year of experience working on ODSVRA as a part of the tern and plover program, WI again gained more knowledge of site dynamics, predator use of the site, and developed, tested, and implemented new strategies to improve raptor and owl management during the 2023 nesting season.

**Predator Surveillance**

Wildlife Innovations has standardized survey efforts to support comparisons between sites and time periods, by establishing and conducting protocol-level point-count and transect surveys for the duration of the nesting season at other project sites. However, at ODSVRA during the 2023 nesting season point-count or transect surveys were not conducted for the following reasons: 1) the amount of time necessary to transit between areas at ODSVRA was extensive, 2) access to some locations may be restricted due to presence of terns or plovers, and 3) the site is large and predator diversity and abundance is high for only one full-time biologist to cover. Variation in surveillance time and effort across each site at ODSVRA made it difficult to quantify avian predator activity or make comparisons between sites and time periods using only observational data collected while conducting field work.

The standard surveillance schedule employed this season seemed to be effective. Flexibility to shift as needed to cover time periods and areas where predators were active, and to surveil areas where high densities of tern and plover nesting were likely to attract predators, was an important facet and contributed to program success during the season. As possible with funded staff hours during future seasons, a similar strategy should be utilized to best meet the needs of the tern and plover program at ODSVRA.

**Avian Predator Trapping**

Four Modified Goshawk Traps (MGT) were added to the variety of traps employed at ODSVRA during the 2023 nesting season. This trap-type can be operated without direct in-person monitoring, unlike Bal-chatri traps (BC), Bownets, or Verbail traps, which have to be monitored constantly, and personnel must be nearby to remove captured individuals nearly immediately after capture. The MGT is more passive and less selective, as any bird may enter and trigger the trap, compared to a Bownet, that requires personnel to remotely trigger the trap. Adding MGTs to the set of tools used at ODSVRA allowed WI to operate more traps in more areas simultaneously. MGTs were monitored with cellular cameras when placed within areas with cellular coverage to reduce personnel time investment, and as an added measure to allow captured individuals to be removed from traps as soon after capture as possible. MGTs operated to target owls were opened just before sunset and closed before or at sunrise to avoid capture of nontarget individuals. MGTs are a cage-like structure in appearance, and some species and individuals may not enter the trap as a result of that appearance. Due to that MGTs are best used as one tool within a diverse set of tools

employed within a well-rounded trapping program.

Raptor and owl traps were placed outside of tern and plover nesting areas when possible to do so and also effectively capture targeted raptors or owls. This was done to avoid all potential for disturbance to nesting terns and plovers associated with placing and operating traps. When necessary to trap within nesting exclosures or on shoreline areas densely occupied by plover or tern chicks, trap placement and operation permissions required detailed coordination, approval, and often an escort from ODSVRA staff. Placing traps and parked vehicles used as blinds while monitoring traps at distances from tern and plover broods required to comply with ODSVRA site procedures, reduced the number of suitable trapping locations in or near high-density nesting areas, where raptors often preferred to hunt. As a result, traps sometimes had to be placed in areas not used by raptors for hunting, meaning that capture success was reliant on trap sets to attract and capture raptors as they transited to or from higher density nesting areas to hunt. These factors reduced efficiency of some trapping efforts, delaying capture of targeted individuals while more predation occurred, and may have ultimately prevented capture of some targeted individuals.

With each nest, chick, fledgling or adult that a predator depredates and consumes, the predator may become more fixated on that food source, which can make it more difficult to attract a targeted individual to pursue a lure animal offered from within a trapset as an alternative prey item. Once raptors or owls become fixated on depredating terns or plovers, capture of those individuals becomes more difficult, as it is not possible to use tern or plover chicks as lures due to permitting constraints (and WI wouldn't recommend doing that even if possible). For species such as NOHA that may be innately neophobic to unfamiliar prey sources or presentations, once they also become fixated on a food source that cannot be matched (e.g., terns or plovers) within a trapset, that may further reduce potential for successful capture. For species such as AMKE that cover lots of ground while hunting, it can be difficult to predict and then place traps where they will encounter them. If a trap cannot be placed very close to the area where the raptor or owl last successfully captured prey, and placed quickly after the raptor was last observed hunting there, capture may be delayed or ultimately unsuccessful. For these reasons, it is important to target problem individuals as soon after they begin depredating terns and/or plovers as possible, and to place traps as close to the location where predators were last hunting, to promote successful capture and mitigate predation loss of terns and/or plovers.

Deploying some traps during daylight hours increases potential for targeted birds to observe trap-deployment. The level of risk associated with this varies slightly by trap type and species targeted. If targeted birds observe personnel or vehicles interacting with trap sets, they may negatively associate the trap or lure presentation with the vehicles and humans observed. This may result in targeted individuals avoiding traps thereby inhibiting or preventing capture. If raptors or owls documented to depredate terns or plovers cannot be nonlethally captured and translocated, lethal removal may be the only option to prevent predation impacts to nesting terns and plovers from those predators.

Site access request and approval procedures necessary to place and operate traps for raptor and owl management within the ODSVRA tern and plover program are time consuming and have prevented placement of traps within optimal areas and at optimal times to capture targeted predators. This has delayed or prevented capture of some predators, and caused additional depredation loss of terns and plovers that may have been prevented with more streamlined and less restrictive trapping access procedures. The potential for additional predation loss due to an active predator should be carefully weighed against the potential for temporary disturbance to nesting

terns and plovers that may occur due to placement and operation of traps. Identification of these challenges within the program are provided here to support recommendations later within this document and are provided with the best intentions for the program and terns and plovers nesting on ODSVRA. Where and when site access restrictions for trapping are necessary and cannot be adapted due to unwritten programmatic or public pressures, WI has and will continue to work to develop innovative ideas to maximize efficiency and effectiveness of capturing problem raptors and owls within the guidelines of the program.

**Predation Investigations**

At ODSVRA, WS manages all non-raptor and non-owl avian species. As such, surveillance and associated data collected by WI focused on raptor and owl observations and predations and did not include the same level of collection efforts for corvid species. For a comprehensive summary of all plover and tern predations documented at ODSVRA, please refer to the CDPR 2023 monitoring report.

To detect tern or plover predations from owls, WI relied on direct observations during nighttime surveillance and ODSVRA staff reports of owl depredation sign or other activity within or near colony nesting areas. Typical sign included plover or tern feather piles near owl tracks, or owl pellets containing plover or tern remains and/or bands. No owl predations of terns or plovers were detected or directly observed during the 2023 nesting season. It is possible that predation occurred that was not detected, and owl predations may be more difficult to detect than predation by diurnal predators for various factors. At ODSVRA, monitors do not walk the entirety of tern and plover nesting areas to avoid unnecessary disturbance. As a result, most predations are detected using binoculars or spotting scopes from a distance or discovered while traveling on foot to and from a limited number of scheduled in-person nest checks. Given the dynamic topography at ODSVRA, it is likely that not all nests, predator sign, or predations were detected. This is compounded by frequent high wind events that move sand and blow away sign or other remains from predations. These site-specific challenges emphasize the need for extensive personnel time expended to attempt to visually cover as much of the nesting area as frequently as possible from a distance, and during all time periods to attempt to not miss predator activity and predation that may otherwise go undetected.

The following data summary is a compilation of depredations discovered and investigated or directly observed by both ODSVRA staff and WI personnel. A more comprehensive summary of nesting efforts and results can be found within Appendix B and H of CDPR 2023. During 2023, terns laid a total of 42 nests, 40 with known location and fate, 37 (92.5%) of which hatched, and three tern juveniles were depredated by PEFA. Plovers laid 260 nests, 251 with known location and fate, 67 (26.7%) of which were determined to have been predated. Of those predated, 58 (86.6%) are strongly suspected to have been by avian predators, with CORA (n=36, 62.1%), NOHA (n=10, 17.2%), and unidentified avian (n=10, 17.2%) were the most prominent identified avian predators of plover nests. Additional plover nests with failed, unknown cause or abandoned pre-term fates, were likely the cause of predation (CDPR 2023). In addition to nest predation, a total of 11 plovers were determined to have been predated. Of the plovers predated, 63.6% (n=7) were chicks, one was either a juvenile or adult, two were juveniles, and one was an adult. Of the predated individuals for which the predator was able to be determined, 9.1% (n=1) were Western Gull, 27.3% (n=3) were PEFA, and 63.6% (n=7) were AMKE.

## Raptors as Predators of Terns and Plovers by Species

### Northern Harriers

Northern Harriers are cryptic marsh hawks, and males are sometimes described as "gray ghosts" by birdwatchers due to their cryptic nature. Northern Harriers specialize in hunting birds and small rodents and are well known to depredate eggs, nestlings, and chicks of listed species at many California nesting sites, including terns and plovers at ODSVRA (CDPR 2019, 2020; Wooten *et al.* 2017, 2018, 2019). Northern Harrier's have been documented to depredate large numbers of nests with eggs, and also chicks, at other CA plover and tern nesting sites and at ODSVRA (CDPR 2021; Wooten *et al.* 2019, 2021). Since the NOHA is a Species of Special Concern in California, more justification is required before attempting to capture NOHA on state regulated properties. In addition to that state protection, long-term raptor researchers believe that the coastal NOHA population in California is not doing well, which has prompted regulatory agency representatives to scrutinize justification for trap and translocation more.

Depredation of plover nests with eggs by NOHA was again documented on ODSVRA during the 2023 nesting season and the lighter-toned adult male was captured and translocated as a result. Some research supports that during their nesting season, NOHA within some regions primarily target voles as a food source (Hamerstrom *et al).* The majority of NOHA observed on ODSVRA during 2023 were observed targeting, carrying, or consuming rodents. Maintaining presence of low-threat resident adult NOHA documented to focus on food sources other than terns and plovers would benefit tern and plover management efforts, as those individuals should hold territories that may otherwise be filled by NOHA that may target terns or plovers. Additionally, those low-threat individuals that produce juvenile NOHA may teach their offspring to also target rodents, thereby reducing potential for future conflict with nesting terns and plovers. Due to the wide range of NOHA behavior observed during this season, future monitoring should continue to prioritize threat assessment and determining high-threat individuals to target for capture and translocation to effectively mitigate the predation threat to terns and plovers.

Capture of NOHA can be time intensive and some NOHA are difficult or impossible to capture. NOHA seem to be neophobic to unfamiliar prey and unfamiliar presentations, and as a result lure presentation and an unobtrusive trap-type are necessary to promote success. Female NOHA are often targeted via trapping at their nests, as the nest provides both a predictable location and strong lure for the targeted birds to return to. Males are more difficult to capture since they are wary, and it is harder to predict where and when they will be to place a trap ahead of their arrival. There are few unobtrusive trap types available to support successful capture of wary NOHA. If an individual captured within one of those trap-types and translocated returns to the site and is again a threat to nesting terns and plovers, it is even less likely to be recaptured, leaving lethal removal as the only remaining management option to mitigate depredation of terns and plovers. Due to these factors, it is imperative to correctly assess and identify problem NOHA to the individual level and to only target, capture, and translocate those problem individuals. In addition, it is also imperative that all controllable factors are mitigated to ensure that traps are not observed being placed by trappers, and that trap placement, function, and operation are completed perfectly. These factors make the capture and translocation process for NOHA more time-intensive and challenging, than for many other species of raptor or owl

A minimum of seven NOHA were observed at ODSVRA during the 2023 tern and plover nesting season, based on assessment of physical characteristics (i.e. plumage development and unique characteristics), their use of different areas, and timing of presence. Since some observations didn't

allow for identification to the individual level, more NOHA may have been present. As this is a relatively large number of NOHA, ODSVRA and the surrounding properties likely provide ample and important habitat for NOHA.

During the early part of the plover nesting season (March and April), the greatest number of NOHA observations occurred within the Foredune Closure. These observations were likely of a single adult male NOHA, that later in the season began targeting WSPL nests within that area. Due to the documented behaviors and high-density of terns and plovers in that area, that individual was captured on 01 May and translocated. The majority of NOHA observations for the remainder of the nesting season were of individuals hunting within the vegetation islands, which were more sparsely occupied by nesting plovers than other nesting areas. Additionally, NOHA within the vegetation islands were most often observed targeting and depredating small mammal species, which is typical NOHA behavior (Hamerstrom *et al.* 1985). The combination of those factors supported that those NOHA were a low threat to nesting terns and plovers and therefore no management actions were taken.

The seven distinct NOHA are discussed in detail below.

*Two Adult Female NOHA*—A single adult female NOHA was first recorded by WI personnel on 30 March hunting the southern portion of the NOF foredunes. Throughout the remainder of the 2023 nesting season female NOHA were rarely observed, which is likely because they were tending to their own nests, and no predations or predation attempts were documented from adult female NOHA. Observations of female NOHA were separated into two geographically distinct areas of the site, supporting that they were of two different individuals, with one foraging in each of those geographic areas. The first individual primarily hunted the southern section of ODSVRA, typically within the NOF foredunes and the vegetation adjacent to the Oso Flaco maintenance road. Observations of this individual were very infrequent, and as the individual was not documented disturbing or targeting plovers or terns, management was not warranted. This individual was likely the mother of the two juvenile NOHA observed hunting the same areas of the site later in the season. The second adult female NOHA was only observed flying through the Foredune Closure once, and during other observations exclusively hunted within vegetation islands (i.e. BBQ Flats, Bigfoot, and Eucalyptus Tree), therefore it was assessed as a low threat to terns and plovers and capture and translocation were not warranted.

*Two Adult Male NOHA March/Early April*—The first sighting of an adult male NOHA by WI personnel occurred on 18 March. This individual hunted over the vegetation islands and did not display threatening behavior at the time. An adult male NOHA was next observed on 23 March, when it hunted within vegetation islands and briefly in 8 Exclosure. On 28 March, a plover nest (SP1) was found depredated within the Foredune Closure, by ODSVRA staff. ODSVRA staff investigated the predation and took photos of avian predator tracks and remains of the nest. WI personnel were not able to investigate the predation until later that afternoon, and all tracks or other evidence from the predation had been destroyed from wind by then. Photos documented overlapping and atypical tracks, which could have been from NOHA, but did not allow for confident identification of the predator responsible to the species level. During the same day an adult male NOHA was observed by ODSVRA staff hunting low over both the Foredune Closure and 6 Exclosure. During that observation, the male NOHA appeared to

observe the location of depredated SP1, slowed its speed of flight, and circled the location before continuing south. No plover adults flushed from the nest during that observation, indicating that the nest was most likely already depredated. These observations may indicate that adult male NOHA was continuing to hunt the area after depredating SP1, or instead observed the predated nest for the first time if it was not the predator responsible.

Following the reported predation on 28 March, WI adjusted surveillance efforts to gather more information on adult male NOHA activity to identify hunting patterns and better evaluate the potential threat to nesting terns and plovers. Follow-up surveillance efforts were focused around the Foredune Closure, 6 Exclosure, and 7 Exclosure, although time was also spent surveilling the east side of the vegetation islands. Prior to 29 March, the adult male was the only NOHA observed on the site north of PLR. On 29 March however, a sub-adult NOHA was observed hunting within the Eucalyptus Tree vegetation island, indicating a territory overlap between the sub-adult and the adult. On 30 March, two adult male NOHA were identified hunting in different colony nesting areas simultaneously. These collective observations indicated that there were at least two adult males and one sub-adult NOHA active within or near colony nesting areas at ODSVRA at that point in the season. Since multiple NOHA were present, additional observations were needed to ensure that the correct NOHA was targeted for capture and translocation to mitigate additional nest predations.

No adult male NOHA were observed again until 2 April, when an adult male was briefly observed hunting within 6 Exclosure and on 6 Shoreline by ODSVRA staff. This individual was described as lighter in plumage color, matching the NOHA that was observed hunting over the SP1 plover nest on the same day it was predated. A variety of environmental factors can influence how plumage coloration is perceived including lighting, angle of wings, and specific activity during observation (i.e. in-flight or perched). As such, identification of male NOHA based solely on plumage coloration assessment without support from more definitive features may result in incorrect classification. Therefore, more assessment was needed to identify the individual responsible for the predations and to target via trapping.

Following 2 April, observations of adult male NOHA were infrequent but often included an individual characterized as having lighter coloration (hereafter “lighter coloration” and “light-tone” are used interchangeably). At that time, only two plover nests had been discovered and were known to be present within ODSVRA and only SP2 was still active. Therefore, the threat from an egg-eating NOHA was low. On 7 April, a camera set at the SP2 plover nest documented an adult male NOHA depredating the eggs within the nest and the NOHA appeared to have lighter-colored plumage. Photos of NOHA observations recorded by both ODSVRA staff and by WI were carefully reviewed, and two distinctly different NOHA were identified from photos. One of those was light-toned gray with a clear white breast and belly, and the other was generally darker in tone, with dark spotting on the belly, dark upper breast feathers, and generally darker feathers on its back and tops of wings. Additional photos comparisons indicated that all observations of adult male NOHA hunting and depredating nests within exclosures between 30 March and 7 April were determined to be of the lighter-toned male. Northern Harriers are territorial and should be more territorial during nesting season. As these observations occurred during the period that NOHA should be nesting, it is likely that the lighter-toned male displaced the darker-toned male observed earlier in the season.

With the lighter-toned male NOHA identified as the predator of two plover nests with eggs, WI focused on patterning the location and timing of its behaviors (i.e. transiting and hunting), to

inform targeted capture efforts if additional nest predations were found. The lighter-toned adult male NOHA was observed within nesting areas daily between 7 and 10 April, although the time of the day and the areas hunted varied. Initial observations consisted of hunting (i.e., slower flight, making loops/circling, returning to hunt over previously predated nests), along the western fence of the exclosures or closer to the shoreline. On 10 April, the lighter-toned male NOHA shifted to transiting more quickly through nesting exclosures instead of slowly hunting those areas. This change in behavior could have been the result of it targeting different prey sources in other areas, and it was observed transiting through tern and plover nesting areas enroute to those alternate areas. Additionally, lack of hunting success within nesting areas at ODSVRA due to low density of plover nests at that time may have caused the male NOHA to transit through without expending hunting effort for little or no reward. Without a strong pattern of hunting behavior within tern and plover nesting areas, trapping was not warranted nor would have been effective at this time, so NOHA-focused surveillance was continued.

The lighter-toned adult male NOHA was next observed on 20 April. During this observation it was hunting within the southern section of the Foredune Closure (same location that SP2 had been depredated). It was flying within one foot of the ground, flushing shorebirds and disturbing plovers as it hunted. Between 21 April and 27 April, the adult male NOHA was observed by both WI and ODSVRA staff hunting near daily within different sections of the tern and plover nesting Exclosure. On 28 April two nests, SP26 and SP27, were found depredated in the southern portion of the Foredune Closure. During investigation of SP27, definitive tracks and one egg remained with puncture marks consistent with NOHA predation were documented. No tracks nor definitive evidence remained at SP26, but a nest camera documented the lighter-toned NOHA consuming plover eggs. Also on 28 April, the adult male NOHA was observed by ODSVRA staff depredating nest SP28.

On 29 April, ODSVRA staff observed the adult male NOHA depredating two plover nests, predation of SP35 was investigated and identified to have been from NOHA, and WI observed the lighter-toned male NOHA depredate SP22 during the late evening hours. This series of events indicated a drastic shift to targeting and depredating plover nests over just two days. The extreme behavioral shift, and because more plover nests were being laid and were available to depredate, sufficient threat to nesting plovers existed to warrant capture and translocation of the NOHA. Wildlife Innovations recommended beginning to trap for the NOHA and ODSVRA approved.

Most observations of the male NOHA were of it flying at a low height through terrain. Due to that, the NOHA may not see traps if not deployed directly below its flight path. A Bownet was selected for use to target the NOHA that trap type can be concealed and is the least conspicuous trap type available for NOHA. ODSVRA Staff suggested that trapping be conducted at one of the recently depredated nests in the southern portion of the Foredune Closure. However, that area is composed of vegetated and tall hummocks, which would have reduced visibility of traps, and also visibility of NOHA when interacting with the trap. Visibility of the NOHA and the trap are essential to both evaluating interactions with the trap and also for triggering the trap.

To minimize disturbance to nesting plovers, and to target where the lighter-toned adult male had been observed crossing between Post 6 and the center of the southern Foredune Closure, WI requested to place traps within the Post 6 alleyway and that request was approved by ODSVRA Staff. Before sunrise on 30 April, two WI biologists deployed two Bownet traps separated by about 40m, each baited with different lures. Ten hours of trapping were conducted

that day, however the adult male NOHA did not enter the site. Traps were redeployed the following morning (1 May), and the adult male NOHA was captured in one of the Bownet traps at 08:15. The targeted individual was banded, and transported to Sacramento CA, where it was transferred to the USFWS. The USFWS then transferred the NOHA to CDFW who transported it to Butte County, CA, and released it on 2 May. A total of 10 plover nests were determined to be depredated by NOHA during the 2023 nesting season, all of which were suspected to have been by this individual. Following successful capture of the targeted NOHA, no other plover predations attributed to NOHA occurred and observations of male NOHA decreased significantly.

*Adult Male NOHA Late Season*—On 25 May, an adult male NOHA was observed hunting within PLR and successfully capturing and consuming a rodent. Following that observation, adult male NOHA were seen intermittently at ODSVRA, most often hunting within vegetation islands or transiting when observed within exclosures. On multiple occasions, adult male NOHA were observed capturing rodents and consuming them or otherwise carrying them offsite. In instances where they were hunting within vegetation islands close to the exclosures, or were otherwise transiting over exclosures, terns were often disturbed and mobbed them until they departed the area. Based on multiple observations, one of the adult male NOHA was missing primary feathers, making it uniquely identifiable, and differentiating it from the two adult male NOHA documented earlier in the season, resulting in a minimum of three adult male NOHA active at the site during the 2023 nesting season.

*Sub-Adult NOHA*—The first sub-adult NOHA was observed at ODSVRA on 22 March hunting over the Oso Flaco Maintenance Road near Oso Flaco Lake. This individual was rarely seen further north, but the next observation was of it arriving from the south and hunting over Tabletop, Eucalyptus Tree, and Eucalyptus North. On 2 April it was observed hunting low over the vegetation within North Oso Flaco. On 26 April, a sub-adult NOHA was observed twice, once hunting over tabletop and again an hour later flying out of 7 Exclosure into the vegetation islands where it hunted. No other observations of sub-adult NOHA were made during the season, and no threatening predatory behavior was observed to warrant trapping for sub-adult NOHA.

*Juvenile NOHA Late Season*—Juvenile NOHA were first documented at ODSVRA by WI personnel on 18 July. Following the initial observation, juvenile NOHA were only observed on three other days and all observations occurred between 18 and 30 July. On 30 July, two juvenile NOHA were observed hunting together in the NOF foredunes. No aggressive behaviors were documented between the individuals. As most raptors exhibit territorial behavior, they might have been siblings. Their area usage overlapped with the adult female NOHA observed in that area earlier in the season and discussed above within this report section. This supports that she may have had a nest offsite to the south of ODSVRA, and the juveniles may have been her offspring. Since the juvenile NOHA were only briefly present on-site, they either altered their hunting patterns to target off-site areas or they may have dispersed away from the site.

**American Kestrel**

American Kestrels are aggressive predators of insects, small rodents, and birds (Toland 1987) and have been documented as a high threat to nesting terns and plovers on other coastal sites. AMKE have been documented depredating chicks more often than other age classes of terns or plovers, although they have also been observed taking adults. On another site during a previous breeding season a single AMKE was observed taking up to six plover chicks in less than two hours (J.

Manley, Wildlife Innovations, personal communication). Given their capacity to quickly depredate large numbers of tern or plover chicks in a single depredation event, especially when feeding their own chicks and mate, AMKE can be a significant threat to chick survival within tern and plover colonies.

American Kestrels were observed at ODSVRA during the 2023 tern and plover nesting season. Most AMKE were observed transiting over the ORA, hunting in vegetation islands, and primarily targeted insects, without approaching tern and plover nesting sites. Most AMKE observations were males (86.4%, n=19), and nearly all observations of male AMKE were believed to be of one individual. During early May, few plover chicks were present within nesting areas due to CORA predation of nests with eggs, and AMKE observations occurred in vegetation islands. By the middle of May, a marked change in behavior of one male AMKE occurred, and it began focusing hunting within shoreline nesting areas occupied by plovers and taking plover chicks. Due to the threat to nesting plovers, that male AMKE was targeted for capture.

The AMKE's arrival and use of areas was highly erratic and difficult to pattern for trapping. During a 11-day period, WI deployed and operated three trap types, operating multiple types in multiple locations simultaneously on nearly all days, with up to two biologists trapping within different areas simultaneously on some days, to attempt to increase potential of exposing the AMKE to traps and capture it. Trapping was conducted within 6, 7 and 8 shorelines, and within the Foredune Shoreline. The male AMKE was briefly hung up on a BC trap, but it pulled free. This negative interaction with that trap type may have educated the AMKE, resulting in subsequent avoidance of that trap type, even when traps were placed in different locations and baited with different lure animals. The male AMKE landed on the door of a MGT once, but the lure animals were hiding under food and water containers, rather than actively moving around their enclosure. Additional observations indicated that male AMKE may have observed other traps but did not interact with them.

Wildlife Innovations requested to place traps in areas where the AMKE was last observed actively hunting. Many of the requested trapping locations were not approved by ODSVRA staff due to perceived potential for temporary disturbance to plovers associated with placement and removal of traps, and for perceived potential to attract the AMKE to an area where plover chicks were located thereby increasing potential for predation of plover chicks. Placement and operation of traps within less advantageous areas inhibited and may have prevented capture of the AMKE and resulted in additional predations of plovers. On multiple occasions, the male AMKE arrived and began hunting within location that WI had previously requested to place traps and depredated additional chicks without being exposed to traps that were not approved to be placed there. The process of requesting to place traps within optimal areas and having those requests denied, delayed capture of the AMKE.

In total, the male AMKE depredated a minimum of five plover chicks, and one adult plover. It was not able to be captured, and the last time it was observed was 11 June. The shift away from hunting within ODSVRA was likely due to a change in the status and foraging needs associated with the development of the AMKE nest it was likely feeding.

Begin narrative of AMKE observations, depredation, and summary of trapping efforts:

> *18 May*—A male AMKE was observed hunting multiple shorelines while perching on post markers before returning to the vegetation islands. These observations marked a shift in hunting behavior and may have indicated an interest in shorebirds as prey.

*30 May*—Adult male AMKE hunted the shoreline and depredated one plover chick and likely a second chick within a two-hour period. During the first predation, it carried one of the chicks offsite which may indicate that he was delivering prey to a nest of his own.

*1 June*—WI shifted surveillance efforts to focus on the male AMKE and observed it hunt along the west fence of the Exclosures and depredate a Horned Lark (*Eremophila alpestris;* HOLA). Successful predation of plover chicks, and documented return to resume hunting the shoreline in an area occupied by more plover chicks, indicated a high enough threat to justify capture and translocation.

*2 June*—WI deployed a MGT customized for AMKE within the Post 6 Alleyway. The adult male AMKE was observed hunting shorelines on two additional occasions during that day, predating one plover chick from near the high tide line, and again carrying the plover chick off site, further supporting that the AMKE was delivering prey to a nest. The AMKE did not observe the MGT deployed within the Post 6 Alleyway during either visit to the shoreline. When the AMKE arrived, it landed on Post 6 facing to the southwest. To target this behavior, WI recommended that the MGT be moved to the southwest of the Post 6, but ODSVRA lead staff did not approve the location due to proximity to plover broods.

*3 June*—WI deployed a second MGT west of Post 7 and three BC traps baited with different combinations of lure animals in an east-west line stretching from near the fence to near the tide line. The male AMKE arrived and perched on the west fence of 6 exclosure near the traps. The AMKE quicky approached the trap and began attacking it to get at the mice within it. This continued for several minutes before the AMKE fell with wings splayed, a typical sign of successful capture. To prevent the AMKE from escaping, WI began approaching the trap. During approach, the AMKE fell backwards off the trap again with wings splayed and flapping, indicating it was still caught, but after a brief struggle on the ground, it broke free and flew to the fence line. After resting on the fence line, the AMKE resumed hunting the shoreline and depredated another plover chick. Upon examining the BC trap the AMKE had interacted with, multiple nooses were chewed where they attached to the cage structure of the trap, indicating chewing damage from rodent lure animals, and other nooses were cleanly snipped by the AMKE. Both factors contributed to the AMKE breaking free from the trap.

*4 June*—Traps were deployed again, using a different bait selection to change the visual appearance of traps. That afternoon, the AMKE hunted large sections of the shoreline and was most active on the foredune shoreline, specifically perching on Post 5 while scanning the surrounding habitat for prey. Due to this new hunting behavior, WI recommended moving the MGT from Post 7 to the previous 6 Shoreline trapping location and deploying BC traps at Post 5 would have the greatest likelihood of trap exposure to the AMKE. Wildlife Innovations additionally identified MGT placement at Post 5 as an effective approach if BC traps were identified as causing too much disturbance in that area. Following this request, WI was permitted to deploy traps at the 6 Shoreline location, as well as at Post 6, but trap deployment authorization for the Foredune Shoreline near Post 5 was deferred while ODSVRA staff came to a decision.

*5 June*—WI deployed and opened MGTs on 6 Shoreline and Post 6, and deployed BC traps on 6 Shoreline while waiting for an authorization decision to place traps within the Foredune Shoreline. The AMKE hunted along the Foredune Shoreline and perched on Post 5, then predated a fourth plover chick. Following the plover chick predation ODSVRA lead staff

authorized WI to deploy BC traps on the Foredune Shoreline, 100-150 feet farther south of Post 5 than the requested location. After authorization was received, WI removed BC traps from 6 Shoreline and deployed them on the Foredune Shoreline in the authorized location. Following deployment of the traps, the AMKE returned and crossed centrally over the Foredune Closure and landed on Post 5, causing it to not observe BC traps deployed to the southwest in the shoreline habitat. Once perched on Post 5, the AMKE scanned the shoreline to the north. Since the northern shoreline was densely occupied by plover chicks and WI was not authorized to place traps there, ODSVRA staff requested to haze the AMKE and WI concurred, as hazing was the only option at that point. After being hazed with pyrotechnics, the AMKE flew east to the vegetation islands. The AMKE was observed for the third time that day hunting along 6 Shoreline and perching on Post 6. While perched on Post 6, the AMKE visibly noticed the MGT and perched on the door of the trap while looking down at the lure animals. After sitting on the door of the trap for some time, the AMKE continued north into the Foredune Shoreline, flying very low to the ground, passing the deployed BC traps and perched on Post 5. It was not clear whether the AMKE observed the BC traps when transiting or while perching on Post 5. The AMKE was unsuccessful hunting on the Foredune Shoreline, and returned to the south, and again interacted with the MGT, showing signs of interest in lure animals but did not enter the trap, then departed the site to the east. The lure animals may have been hiding under the food and water dishes provided within the trap or were otherwise less active than desired to lure the AMKE into the trap.

*6, and 7 June*—Traps were again deployed. The 6 Shoreline MGT was moved to east of the Foredune Shoreline in the alleyway separating the northern and central sections of the Foredune Closure to target the AMKE as it flew west to the shoreline. Traps were deployed in these locations for two consecutive days but the AMKE was not observed.

*8 June*—On the third day, traps were again deployed. The AMKE returned to the site and was observed hunting at 6 and 7 Shoreline. During an initial observation, a AMKE that was not confirmed to be male consumed a plover chick on the ground before flying off-site, possibly carrying the prey item. During a second observation a half hour later, the male AMKE predated an adult plover. The AMKE had perched on top of a circular mini-exclosure, constructed to prevent CORA nest depredations, and flushed the adult plover from the nest and subsequently predated it. The circular mini-exclosure may have contributed to the predation event. Following this observation on 8 June, the AMKE was not seen for the rest of the day.

*9 June*—WI began trapping using two biologists, allowing more sections of the shoreline to be covered. BC's and MGT's were deployed at two locations on 6 Shoreline, on the shoreline west of 7.5 Revegetation Area, and southwest of 7.5 Revegetation Area to increase the likelihood of trap exposure to the AMKE. That day the AMKE was observed hunting most of the shorelines on two occasions and depredated a plover chick. There was no indication that the AMKE observed deployed traps.

*10 June*—WI deployed two Bownet traps, one on the Foredune Shoreline and one on 6 Shoreline, in addition to BC and MGTs. This combination of traps was time intensive to set but covered the greatest amount of ground given the large hunting area utilized by the male AMKE. That day, the AMKE was observed twice, first transiting over 8 Shoreline and later perched on the western fence of 6 Shoreline. During the second observation, the AMKE flew north over the Foredune Shoreline and passed by multiple trap sets, including a Bownet, without observing them. After flying past the traps and landing on Post 5, the AMKE flew down to the high tide

line and hunted from on foot, appearing to be searching for plover chicks but was ultimately unsuccessful. The AMKE briefly returned to Post 5, then flew high to the east over the vegetation islands while hunting. After a short time hunting vegetation islands, it flew briefly over 7 Exclosure before departing the site.

*11 June*— Since the AMKE did not observe any of the traps, WI continued trap deployment in the same areas but the AMKE was not observed within tern and plover nesting areas.

*12 June*—Trapping was continued for the AMKE, but it was not observed. Following two consecutive days of AMKE not being seen at ODSVRA, trapping efforts were discontinued to attempt to pattern the changing behavior. The next observation of a male AMKE occurred on 17 June within the eastern section of PLR, away from the tern and plover nesting areas. No additional confirmed observations of the targeted male AMKE were reported for the remainder of the 2023 nesting season and no additional depredation loss to AMKE was identified.

**Peregrine Falcon**

Peregrine Falcons are prominent predators of tern and plover chicks, fledglings, and adults and have been documented doing so at numerous sites along the California coast, including ODSVRA (CDPR 2019, 2020, 2023; Biteman and Manley 2021; Wooten *et al.* 2016, 2017, 2018, 2019; Marschalek 2009). Peregrine Falcons are commonly observed using the central coastline of California for nesting, hunting, and perching, and as a result were a focus of raptor monitoring efforts again during the 2023 tern and plover nesting season. Wildlife Innovations anticipated the return of a previously captured, banded, and translocated adult female PEFA (W49), following regular presence on-site during the 2021 and 2022 seasons, however, no banded PEFA were observed during 2023 nesting season.

PEFA were frequently observed transiting north or south along the shoreline at ODSVRA. Capture and translocation of PEFA can be time intensive, and likelihood of return to ODSVRA may be more likely than for some sites in California for several reasons. Following a successful capture, it is crucial that PEFA are translocated as far as possible to prevent return to the site of conflict with terns or plovers, as some individuals have returned from long distances (e.g., >800 miles). Adult PEFA with established territories are more likely to return to the area of capture than younger birds, due to more established site fidelity. Previously trapped PEFA are typically difficult, and some individuals may be impossible to recapture. Additionally, since ODSVRA is located within the central portion of California, and legal permissions will not allow translocation of captured raptors beyond California borders, distances available for translocation of PEFA captured at ODSVRA are limited to less than 500 miles if taken to the north and less than 400 miles if taken to the south. Due to these factors, it is important to only attempt to capture and translocate individuals that are well-documented and have begun to preferentially target terns or plovers and are likely to continue to do so. To accomplish this, WI focused on identifying problem individuals documented to target terns or plovers on multiple occasions, through intensive adaptive surveillance.

Peregrine Falcons were observed by WI and by ODSVRA staff, transiting through or otherwise using every nesting area at ODSVRA during the 2023 season. A minimum of six individuals were identified, based on plumage characteristics, habitat use, and timing of presence. Since non-resident, migrating, or dispersing PEFA may be present at ODSVRA during different periods of the season, and individuals may quickly transit through the site, it can be difficult to accurately estimate the number of individuals that used ODSVRA during the course of a 6-month tern and

plover nesting season. Therefore, the number of individuals identified herein is a minimum, and it is possible that more were active at ODSVRA during the 2023 nesting season.

Observed hunting behavior, predations observed, and kill-sites investigated by WI indicated that most PEFA hunting activity targeted HOLA, Brewer's Blackbirds (*Euphagus cyanocephalus*), or gulls. What was believed to be one juvenile PEFA was documented depredating at least three tern fledglings, and trapping was conducted to target that individual. In addition, a juvenile PEFA depredated one plover chick, one plover fledgling, and one juvenile plover, late in the season after WI had exhausted all fieldwork hours available with the annual budget for the project, so no trapping was conducted for that PEFA.

Observations of both the juvenile PEFA that was targeted for capture, and of an adult female PEFA that was captured and translocated are discussed below.

*27 June*—A juvenile PEFA was first observed on 27 June, transiting through 7 Exclosure and disturbing terns. That individual was characterized by a thick rounded malar, dense vertical streaking throughout the belly to upper breast feathers, blue cere, and yellow legs.

*4 July*— A juvenile PEFA with the same description was observed by ODSVRA lead staff chasing terns over 7 Exclosure but did not successfully capture any terns. That individual was not observed again until 19 July.

*19 July*— A juvenile PEFA with the same description was observed by ODSVRA staff within the NOF foredunes. During this observation, the PEFA flushed from its perch, presumably due to vehicle proximity. Young PEFA are not typically shy of vehicles, and this trait complicated capture efforts for this individual. If shy of vehicles, mobile trapping may not be possible, and large buffers between traps and trapping personnel, and other monitoring personnel may be necessary.

*20 July*—ODSVRA staff observed a juvenile PEFA with similar plumage diving on a non-plover or tern avian species within SOF.

*21 July*—The juvenile PEFA was observed depredating a banded tern fledge within 7 Exclosure. During the observation, the PEFA was hazed repeatedly by ODSVRA staff using both pyrotechnic devices and by staff walking on foot. WI shifted to daily surveillance focused on PEFA following this observation.

*25 July*—The juvenile PEFA was observed perching and hunting on the NOF Shoreline, swooping and chasing small white shorebirds and gulls.

*27 July*—The juvenile PEFA hunted on 6 Shoreline and depredated a tern fledge. The PEFA was initially hazed by ODSVRA staff using a pyrotechnic whistler while the PEFA was hunting the tern. Following this predation, WI recommended allowing the PEFA to finish consuming the prey before hazing again to prevent the PEFA from killing additional terns if hazed from its catch before finishing, and to allow the PEFA to establish a hunting pattern that could be targeted via trapping. After the PEFA finished consuming the prey it was hazed and flew east landing east of 6 Exclosure. Following this instance, WI recommended that subsequent hazing efforts be conducted on foot to avoid conditioning the PEFA to fear vehicles, which could prevent effective trapping when using a vehicle as a blind. Photos taken during that incident were compared to photos taken on 27 June, and comparisons indicated that the same individual may have caused both incidents. WI recommended attempting to capture the PEFA and ODSVRA approved. To prevent the PEFA from observing traps being placed by personnel,

which may complicate or prevent successful capture leading to more predation loss of terns or plovers, WI requested to access the shoreline before sunrise to place traps. That request was denied, to avoid potential impacts to plovers from entering the shoreline during the dark.

*28 July*—When ODSVRA lead staff and WI personnel were able to access the shoreline after sunrise, the juvenile PEFA was perched on the western fence of 6 Shoreline near the planned first trap deployment site. Traps were not deployed to prevent the PEFA from seeing WI personnel placing traps. The PEFA flew south and perched in the mid-habitat of 6 Shoreline near Post 7. The PEFA then left its perch, depredated a banded tern juvenile, and landed directly at the location planned for trap deployment and began consuming the tern. While one WI biologist monitored the PEFA, a second WI biologist transited south and deployed a trap on the NOF Shoreline in case the PEFA left in that direction. After the PEFA finished consuming the tern it left to the east, and WI deployed a second trap at the 6 Shoreline location. The PEFA did not return to the shoreline that day.

*29 July*—WI again requested to access the shoreline before sunrise to place traps for the PEFA before it arrived onsite, and ODSVRA lead staff approved that request. WI deployed traps at 6 Shore before sunrise and waited at that location until after sunrise to transit farther south to place a second set of traps, per ODSVRA staff request. The juvenile PEFA was not observed on 29 July.

*30 July*—An additional trap was added to the 6 Shoreline location and placed before sunrise, and trapping was again conducted within NOF simultaneously. The juvenile PEFA was not observed on 30 July.

*31 July*—Traps were again deployed prior to sunrise, but only at 6 shore and no traps were placed in NOF. A juvenile PEFA was observed perching on the western fence of 6 Shoreline at sunrise, but quickly flew north out of sight into the fog without observing the trap. The PEFA returned but was north of the area where traps were deployed. ODSVRA Staff tried to bump it from that area on foot to prevent it from depredating tern fledges and to try to push it towards deployed traps. The PEFA left but headed to the east and away from traps. It was observed several more times during the day, and again ODSVRA staff attempted to bump it from areas occupied by terns or plovers and towards where traps were located, without success.

While WI was preparing to remove traps from the field an adult PEFA flew over 6 Shoreline, swooping and hunting, and engaged one of the traps deployed for the juvenile PEFA. Since the adult PEFA was hunting within occupied tern and plover habitat and due to the potential problems associated with recapturing an individual if released onsite, it was banded, transported to Sacramento CA, and transferred to CDFW for translocation.

*27 August*—After WI exhausted all hours budgeted for field work, ODSVRA staff observed what may have been the same juvenile PEFA depredate a plover chick. After consuming the plover, the individual was repeatedly hazed.

*1 September*— ODSVRA staff reported a juvenile PEFA was observed hunting multiple shorelines, with no sign of any prey item. On this occasion, the juvenile was also hazed.

*11 September*— ODSVRA staff reported a juvenile PEFA was repeatedly observed hunting along the shoreline and was hazed using a vehicle. No predations were documented.

*12 September*—ODSVRA staff reported a juvenile PEFA depredated two plover juveniles. Following the second predation, ODSVRA staff hazed the individual multiple times with

vehicles.

Wildlife Innovations reviewed all photos provided by ODSVRA of observations and compared them to photos of the juvenile PEFA targeted for trapping during July. Plumage characteristics were very similar, and based on hunting behavior it may have been the same individual that was targeted for capture, but that cannot be confirmed.

**Cooper's Hawk**

Cooper's Hawks are typically found in woodland habitats and have been documented as a significant threat to nesting terns and plovers, especially their chicks, on other sites (Frost 2015, Velasco 2015). Cooper's Hawks are known to be very quick when in flight and can retain juvenile brown flight feathers through their second year, making identification of younger birds difficult. Cooper's Hawks were observed five times throughout the 2023 nesting season by WI personnel, with the majority of observations within vegetation islands.

On the morning of 24 July, a second-year COHA was captured within an MGT operated within 8 Exclosure to target owls. The trap was not set until after sunset, and a camera monitoring the trap indicated that the COHA entered the trap after dark. Since COHA are tenacious predators, and well documented to depredate terns and plovers, and this individual was well outside of typical COHA habitat and within occupied tern and plover habitat, it was translocated to protect nesting terns and plovers.

COHA likely enter ODSVRA from the southern woodland habitat near Oso Flaco Lake, North Oso Flaco, and Maidenform Revegetation Area, where they are typically observed and were again during the 2023 nesting season. The COHA captured after sunset, and other COHA observations around sunrise suggest that COHA within ODSVRA may be more active during pre-dawn and post-sunset hours. During future nesting seasons, southern exclosure areas should be surveyed for COHA activity during these crepuscular time periods.

**Red-tailed Hawk**

Red-tailed Hawks have been documented to depredate nesting terns and plovers (Carillo 2004, Caffrey 1998) and have been observed killing multiple chicks in a short period of time on other nesting sites in California (Biteman and Manley 2021, 2022). During the 2023 tern and plover nesting season, RTHA were observed nearly every day, with activity occurring throughout the daylight hours (morning, noon, afternoon hours). Individuals observed were most often within or near the vegetation islands, and no threatening behavior was observed. This was also the case during the 2021 and 2022 nesting seasons. During 2023, RTHA were occasionally observed within nesting site exclosures during the latter part of the season, and less often during the early part of the season. The individuals observed in exclosures were not consistently present and did not show interest in terns or plovers.

Maintaining close surveillance of RTHA when chicks are on the ground (typically July–September) will continue to be an important part of depredation mitigation efforts, as that is the time of the season when RTHA have been most problematic on other tern and plover sites. Early detection of individual RTHA that have shifted to begin targeting terns or plovers can allow for expedited mitigation efforts and prevent unnecessary loss of chicks to RTHA predation.

**<u>Owls as Predators of Terns and Plovers by Species</u>**

**Great Horned Owl**

Great Horned Owls are common within many ecosystems, occupying a variety of habitats, and are

well known to depredate adult, fledgling, and chick terns and plovers (Lau *et al.* 2017). Since they are typically uniformly distributed across the landscape, the removal of an individual that is not targeting terns or plovers has the potential to open niche space for individuals that may be more problematic as predators of terns and plovers. During the 2023 nesting season, WI again balanced surveillance and management of diurnal predators with nights conducting surveillance for and behavioral assessment of GHOW activity within and near tern and plover nesting areas at ODSVRA. For the majority of the season, WI incorporated at least one nighttime surveillance shift each week. Surveillance was conducted by positioning in a topographically advantageous position that provided visibility of sections of the colony with the highest density of tern or plover nests, chicks, or fledglings. In addition to direct observations of individuals during nighttime surveillance, tracks and pellets found during daytime surveillance and other evidence of activity or predation by GHOW were used to indicate presence and activity by GHOW. When reports were received, or evidence of activity was discovered by WI biologists, WI altered the surveillance schedule to include nighttime surveillance of the locations where sign of GHOW activity was most recently detected.

During portions of the 2023 nesting season, threatening diurnal raptor activity necessitated WI shift personnel efforts from nighttime surveillance to diurnal surveillance or trapping. In those instances, nighttime surveillance was resumed as soon as the threat from diurnal raptors decreased. When those shifts were necessary, nighttime surveillance was most often resumed by conducting consecutive nights within multiple areas, to prevent a high-threat GHOW from going undetected.

Following observations of owl sign within exclosures occupied by nesting terns and plovers, and during a period when WI personnel were busy with diurnal raptor activity and were not able to do nighttime surveillance, two MGTs were operated for owls. The MGTs were placed in two locations, one inside of 8 Exclosure and the other within the Post 6 Alleyway. Those traps were operated during two periods, the first between 20- 28 July, and the second between 3- 12 August. Due to lack of additional evidence of owl activity, trapping was discontinued after 12 August.

Wildlife Innovations spent four distinct periods conducting surveillance for GHOW, and a minimum of three GHOW were identified based on territory use and behavior. Observations made during nighttime surveillance are divided by time period and location and summarized below.

*Oso Flaco Lake/Maintenance Road GHOW Pair*—On 26 March, the first GHOW of the 2023 nesting season was observed perching east of the Oso Flaco parking lot. Following this observation, GHOW were not observed during nighttime surveillance until 13 April. Between 13 and 19 April, at least one GHOW was observed consistently perching in the vegetation adjacent to the Oso Flake Maintenance Road and Oso Flaco Lakes. During one of these observations, two GHOW were observed perching within the vegetation in close proximity. Behavior and time of year indicated they were likely a mated pair. All observations of this pair took place outside of the tern and plover nesting exclosures, and no observations indicated a threat to plovers or their nests, so no management actions were necessary. In addition, the presence of the mated pair outside of the southern exclosure had potential to prevent other higher-threat individuals from occupying that area. On 15 May, two GHOW were observed in the southern portion of ODSVRA, one perched on the Oso Flaco Boardwalk fence line and the other within Maidenform. These two individuals were assumed to be the mated pair. Due to previous observations of their use of territory, they were again assessed as a low threat and not targeted for mitigation.

*Early May 7.5 Reveg/6 Shore GHOW Surveillance*— On 9 and 10 May, possible GHOW tracks were located in 7.5 Reveg and on 6 Shore, respectively, by ODSVRA staff. Following these reports, WI shifted the surveillance schedule to focus solely on nighttime surveillance, and focused efforts in those areas. Over four consecutive days WI spent 40 hours conducting surveillance of 7.5 Revegetation Area, 7 Exclosure, and 6 Exclosure, detecting no nocturnal avian predators within or near the colony nesting areas. During that same period, no additional owl tracks were observed by ODSVRA or other contracted staff. Surveillance results indicated the threat level did not warrant further actions and therefore nighttime surveillance was discontinued. On 15 May, ODSVRA staff discovered possible GHOW tracks within the east side of Eucalyptus Tree Vegetation Island. Since GHOW presence within the vegetation islands did not threaten nesting terns or plovers, no additional actions were warranted.

*Late May 6 Exclosure GHOW/CORA Surveillance*—On 25 May, ODSVRA staff located fresh GHOW tracks within the northern end of 6 Exclosure, and as a result WI shifted to nighttime surveillance to assess the threat posed by GHOW. ODSVRA lead staff requested WI work a hybrid schedule to help survey for CORA activity during the evening hours, since CORA had depredated a large number of nests during the weeks prior. Beginning on 25 May, WI filled gaps in surveillance coverage when WS personnel were off during evening hours and on weekends. To help cover these time periods, less nighttime surveillance for owls was possible. On 26 May, GHOW tracks were discovered in the ORA within the protective fencing constructed around plover nest, SP40. This nest had already hatched, and the plovers chicks had already moved to the shoreline. Since WI conducted surveillance that night, and near that area, but did not see the GHOW, it is likely that the GHOW was active after WI left for the evening. Split evening and overnight surveillance continued for five consecutive days, resulting in multiple detections of CORA actively hunting within the colony nesting areas, but no other sign or observations of threatening owl activity. On 30 May, ODSVRA staff observed the male AMKE depredating two plover chicks, and WI transitioned off of nighttime surveillance for owls to focus on AMKE.

*June WBY GHOW Surveillance*—While WI was conducting AMKE focused trapping and surveillance, additional evidence of GHOW activity was found by ODSVRA staff. Most of the GHOW sign was located in the southern portion of ODSVRA, in sections with lower tern and plover presence. Sign of GHOW presence was found along the IBY fence line and within Boneyard multiple times between 12 June and 19 June. Multiple pellets were located, which upon examination, contained only small mammal remains. One non-plover or tern species feather pile with accompanying GHOW tracks was found within 8 Exclosure on 12 June. Since those locations were far from areas densely occupied by terns or plovers, surveillance and trapping for the male AMKE were prioritized over additional GHOW surveillance. Following the last observation of the male AMKE on 11 June, WI switched back to performing nighttime surveillance. During four days of consecutive overnight surveillance from 22 June to 25 June, WI did not observe any nocturnal avian predators within or near the colony nesting areas and therefore switched back to the general schedule.

*8 Exclosure E Fence GHOW Trapping*—WI began conducting consecutive overnight surveillance shifts on 15 July with the intention of assessing nocturnal avian predator presence and activity within the nesting exclosures. Two overnight surveillance shifts were completed, however dense fog significantly obstructed visibility and no predators were observed. Since weather predictions indicated that fog conditions would persist for at least a week, to avoid

wasting surveillance hours, WI transitioned back to diurnal surveillance. On 19 July, ODSVRA staff located broken fragments of a pellet inside of Boneyard near the WBY fence. On examination, small mammal remains without any bands or other indications of avian prey were identified. Since fog prevented nighttime surveillance and operation of BC traps, and tern and plover nesting efforts were peaking, two MGTs were placed, one to the south and one to the north of where high-density chicks were located to attempt to capture owls that may enter that area. Trap locations were chosen to target areas where owls have been observed transiting and hunting during previous seasons, and to avoid disturbance to terns and plovers from necessary trap operations. MGTs were opened before sunset and closed at sunrise daily from 20 July to 27 July. On 23 July, ODSVRA staff found GHOW tracks inside of PLR along the fence boundary separating the vegetation island from 8 Exclosure. A second WI biologist began nighttime surveillance and deployed BC traps within the eastern fence of 7 exclosure. That evening, the fog conditions lifted and no GHOW were detected. On 25 July, WI operated BC traps slightly further south, just within the east fence of 8 Exclosure on the north side of PLR but no owls were observed. When exiting the field in the morning and closing the MGT for the day, WI found GHOW tracks at the 8 Exclosure trap. On review of the camera footage, WI confirmed a single GHOW landing on door of the MGT at 23:05. This observation implied that the GHOW was interested in the bait type presented, however, did not land on the perch trigger to result in a capture. In response, WI altered the perch trigger to provide a more appealing target. On 26 July WI again deployed BC traps southeast of PLR within 8 Exclosure, in a position determined to be visible from the MGT location, so that if the GHOW did not enter the MGT, it may see the BC trap sets improving likelihood for capture. No owls were observed within or near the colony nesting areas that night.

On 27 July, WI opened both MGTs without performing nighttime surveillance. During trap setting at sunset, a GHOW was observed on the southwest corner of PLR, near the 8 Exclosure fence line within view of the trap. This individual may have been the same one leaving tracks along the eastern fence of 8 Exclosure and previously recorded interacting with the MGT on camera. Overnight, a GHOW suspected to be the same individual landed next to the MGT twice based on camera surveillance. During both observations, the GHOW investigated the lure birds through the side of the trap, clearly showing interest but did not enter through the top of the trap to land on the perch trigger. The following day (28 July), WI discontinued owl trapping to focus on the juvenile PEFA reported depredating tern fledges. Both MGT lure bird cages were removed from the field and traps were closed to prevent exposure to the owl without a means of capture. On that evening, camera footage recorded the GHOW walking on the ground next to the closed MGT top chamber. As there was no bait present at the time, this behavior strongly supported that it was the same individual that investigated the trap previously and remembered the location. Noting this, WI planned to resume trapping at that location as soon as the threat from the juvenile PEFA subsided. During PEFA trapping efforts, GHOW tracks were discovered by ODSVRA staff on 30 July at the IBY gate within east Boneyard.

Following the capture of an adult female PEFA hunting 6 Shoreline and disappearance of the targeted juvenile PEFA from the site, WI shifted efforts back to owl trapping on the night of 3 August. Since remaining field work hours within the available budget were low, WI worked a modified schedule which included fewer field hours to extend field work as late into August as possible. During that period, MGTs were operated for four consecutive nights weekly from 3 August through 11 August, and surveillance was conducted around closing of the traps in the morning and opening of the traps in the evenings. During trapping efforts, sets of GHOW tracks

were found at a distance greater than 10 feet from the 8 Exclosure trap on both 9 and 10 August. This indicated GHOW presence within colony nesting areas was intermit and that the GHOW may have no longer been interested in the MGT. Since the nesting season was almost over, and few tern fledges and plover broods remained, and few field hours remained within the available budget, WI discussed with ODSVRA lead staff and jointly decided that BC trapping was not necessary. Following the decision, no additional direct observations or signs of owls were detected at ODSVRA, and MGTs were removed from the field.

During the 2023 nesting season, WI spent more time conducting surveys for and trapping diurnal raptors. This left less time for nighttime surveillance of GHOW activity and resulted in fewer nocturnal predator observations recorded by WI. Since GHOW have been prevalent during previous seasons at ODSVRA, nighttime surveillance should be continued with some frequency during subsequent seasons. Overnight fog conditions have occurred frequently at ODSVRA. Periods of fog have lasted between days and weeks, inhibiting nighttime surveillance using thermal optics during those periods. If project funding and associated personnel time can support this level of effort, WI recommends weekly nighttime surveys to attempt to detect all owls using the site. Since beginning nighttime surveillance in 2021, valuable information has been gathered regarding nocturnal predator behavior (including owls, coyote, skunks, and location and size of the tern night roost) that would not have been otherwise detected or learned.

**Barn Owls**

Barn Owls are well documented to depredate adult and juvenile terns and plovers on other sites in California. During the 2023 nesting season, no tern or plover predations detected at ODSVRA were attributed to BNOW. Evidence of BNOW activity within or near the nesting areas was only detected once by ODSVRA staff (NOF shoreline), and WI heard vocalizations by BNOW twice during nighttime surveillance. Although the exact locations where the vocalizations came from were not able to be determined due to dense fog, one BNOW was heard near the vegetation islands east of 7 Exclosure, and the second was within 7 Exclosure or within the ORA on the east side of 7 Exclosure. The number of BNOW detections during 2023 was much lower than in 2022. BNOW typically only land on the ground when making attempts to capture prey, making detection of their presence and activity within tern and plover nesting areas difficult when relying solely on discovery of tracks, impact marks, or predations. During 2022 WI spent more time doing nighttime surveillance due to higher owl activity, fewer issues with diurnal avian predators that required daytime shifts, and this may be why more BNOW were detected. Nighttime surveillance may be especially important to detect BNOW activity because of their behavior. Nighttime surveillance to detect BNOW activity may be most important around high-density tern and/or plover nesting or roosting areas, and during the periods of the season when density is highest. A more complete understanding of BNOW activity and presence at ODSVRA during future nesting seasons would benefit from more frequent nighttime surveillance, if threat posed by diurnal raptors is lower or personnel time is greater.

**Non-Raptor or Owl Predators**

*American Crows*—AMCR are a prominent and problematic predator of nesting terns and plovers at other nesting sites in southern California, such as Naval Base Coronado, Marine Corps Base Camp Pendleton, Venice Beach, and Huntington Beach (Biteman and Manley 2021; Manley and Johnson 2019; Brinkman and Garcelon 2016; Liebezeit and George 2002). American Crows are synanthropic predators that thrive around human development (Johnston 2001, Marzluff *et al.*

2001) and whose populations in urban areas of California may be growing. Monitoring of AMCR continued throughout the 2023 breeding season in an effort to best assist the tern and plover program at ODSVRA. During 2023, AMCR were almost exclusively observed during March and April, and were most frequently observed within 8 Exclosure. This may indicate that AMCR primarily accessed the site from the south or east, rather than the north. Despite the observed presence of AMCR within developed areas to the north and northeast of ODSVRA, they were seldom observed entering nesting sites or shorelines from those directions. However, two depredated plover nests located north of primary and protected nesting areas, bordering areas historically and actively utilized by ODSVRA campers, were investigated by WI personnel, and determined to be depredated by AMCR. Nesting in this area might have taken place in this non-typica area during the 2023 season due to a large amount of precipitation during the prior winter, which caused increased water flow within AG creek and a resulting safety closure of ODSVRA to visitors. Without vehicle access, much of the traditionally camper-occupied sections of beach remained unoccupied by humans, making it more available for plover nesting. Once camping and vehicle access to ODSVRA was allowed to resume during the 2023 season, AMCR may have been drawn to the area and subsequently located the plover nests. Observations made by WS indicate that AMCR activity may have increased between the 2021 and 2022 nesting seasons. If that trend is valid and continues, AMCR may become a more prominent threat to nesting terns and plovers at ODSVRA during future seasons. Monitoring of AMCR should be continued and the threat to nesting terns and plovers reevaluated continuously. An important facet of AMCR management will be to identify anthropogenic food sources and other attractants within and near ODSVRA. Anthropogenic food subsidies are a primary source of corvid population growth around developed areas. Removing those attractants or excluding AMCR from accessing them would be an important step in a comprehensive management program.

*Common Ravens*—CORA are extremely intelligent, can have large territories, and have been documented to have significant negative impacts on listed species across the western US (Wooten *et al.* 2016, 2017, 2018, 2019, Frost 2015 Liebezeit and George 2002, Burrell and Colwell 2012, Smith and Murphy 1973, Craighead and Craighead 1956). In California alone, CORA are known to be predators of the eggs and young of threatened and endangered species, including California Least Terns, Western Snowy Plovers, California Condors, San Clemente Island Loggerhead Shrikes, Greater Sandhill Cranes, Marbled Murrelets, and desert tortoises (Liebezeit and George 2002). Common Raven populations in the United States have increased an estimated 2.87% annually for the last 50 years and by 3.46% annually within the last ten years (Sauer *et al.* 2017). Additionally, CORA populations within California deserts have increased by more than 1000% during a recent 25-year period (Boarman and Berry 1995). As it is probable that CORA populations within and near ODSVRA will also follow these growth trends, the threat of predation to terns and plovers by CORA will also likely increase in subsequent years.

During the 2023 tern and plover nesting season, CORA were observed within sensitive nesting site exclosures by WI and documented to have depredated at least 36 nests by ODSVRA staff (CDPR 2023). Common Ravens were most often observed in pairs, foraging and hunting from the wing while transiting through the site. As with AMCR, when directly observed or after being alerted by ODSVRA staff, WI supported WS personnel by helping visually track CORA to support removal. All CORA observations made by WI took place between March and June, with the highest number of CORA observed during May. Common Ravens were most frequently observed

by WI within vegetation islands, or 8 Exclosure.

During a period of high plover nest depredation during May, ODSVRA lead staff requested WI alter surveillance periods to include evening and weekend hours. To benefit the overall program, WI modified the intended work schedule from full overnight owl surveillance and began evening and early nighttime surveys on 25 May. During the first two consecutive evenings of surveillance, WI observed two CORA, presumed to be a mated pair, hunting within the plover colony. Common Ravens have been documented to recognize and remember human faces and may alter their behavior following a negative experience or observation of another CORA experiencing a negative interaction with predator control personnel or equipment. Once educated and wary, the likelihood of removing those individuals decreases substantially. Based on occurrences both reported by ODSVRA staff and directly observed by WI, CORA may have altered their activity periods to avoid the site during weekdays before 17:00, when WS was typically present.

Careful management of CORA is important to effective predation mitigation for terns and plovers. To support effective management of CORA, it is important to prevent targeted individuals from witnessing and surviving the use of management methods. CORA that observe personnel or management methods employed may be difficult or impossible to remove, and predation from educated CORA may be prolonged, as they can live as long as 15 years (Lutmerding and Love 2020). Due to those factors, a single mistake when managing CORA may result in recurring depredation events both within and across seasons. Attempting to mitigate recurring depredation from an educated CORA can be extremely costly of personnel time and reduce the amount of time available for other essential predator management tasks within a tern and plover program. To prevent educating CORA, great care should be taken to only attempt to remove CORA with a firearm when all individuals in proximity or view can be removed simultaneously, and great care should be taken to ensure that all trap sets are optimized at all times.

*Coyotes*—Coyotes have been documented to negatively impact nesting terns and plovers at multiple colony sites across southern and central California and are responsible for depredating the largest number of terns alongside CORA, AMCR, and PEFA (Wooten *et al.* 2016, 2017, 2018, 2019; Frost 2015). Coyotes can have large home ranges that include both urban and rural areas (Gehrt 2007) and have been documented to consume many nests during a single predation event, making them particularly detrimental to ground nesting species such as terns and plovers. As an olfactory dominant predator, coyotes are capable of navigating to prey without visual cues or daylight, making them particularly threatening to tern and plover nests and/or chicks. Regular presence of coyote within nesting areas and repeated depredation may affect site fidelity. Further, depredation events may be under detected within ODSVRA, as site-specific protocols do not include regular walking of nesting sites by monitoring personnel and predator control personnel. Additionally, depredation of chicks by coyotes would likely not be detected as chicks are likely to be consumed whole.

During the 2023 tern and plover nesting season, coyote tracks were observed by WI, ODSVRA staff, and WS personnel almost daily, along the shoreline and/or adjacent to or within nesting site exclosures, or other sensitive habitats occupied by terns and plovers, their nests, chicks, and fledglings. Coyotes are a proliferate generalist predator species abundant within and surrounding ODSVRA. Coyote tracks between vegetation islands are not unexpected, and coyote activity in those areas may not be a threat to nesting terns and plovers. However, tracks were found entering the Foredune Closures, where brood concentration was high for most of the 2023 nesting season, in Boneyard, and within the Exclosures. Due to tidal movements, the shoreline sand was wiped clean daily, providing an irrefutable indicator of the timing of coyote presence. Tracks not only indicated regular presence, but foraging behavior by

coyote, as tracks were observed moving from the hard packed sand up into dune habitat occupied by nesting terns and plovers on numerous occasions.

While performing nighttime surveillance and trapping for owls, WI documented coyotes foraging on the shoreline and within nesting exclosures through thermal optics, although locations and techniques utilized were tailored towards detecting and monitoring owls. Nighttime fog often obscured thermal surveillance of the shoreline. When exclosures remained clear of fog and allowed surveillance of those areas for owl activity to continue but may not have detected coyote activity farther west. Frequency and number of coyote tracks observed, combined with thermal surveillance that also detected coyote activity, indicate that regular coyote foraging occurred frequently within tern and plover nesting areas during the 2023 season. The frequency and abundance of coyote foraging within nesting areas may have impacted reproductive success of both species at ODSVRA, and efforts should be made to continue to improve effectiveness of coyote exclusion, deterrence, and removal to support recovery efforts for terns and plovers.

## MANAGEMENT RECOMMENDATIONS

1) ODSVRA staff should continue to notify predator control personnel as soon as significant changes in the number of active nesting terns or plovers within an area or exclosure are realized. During the 2023 season, WI utilized the summarized data produced by ODSVRA lead staff which detailed location of brood concentrations and fledge rates by shoreline, as often as it was available. That information was used to help identify and classify threats and respond accordingly. Frequent data summaries help to ensure that WI has the most current and complete information, to use when assessing and prioritizing management efforts, thereby promoting maximum efficiency and effectiveness.
2) Due to the size of ODSVRA, the diversity and abundance of the predator suite present, and because predator control and monitoring personnel resources are finite, WI recommends that raptor and owl management for terns and plovers continue to be conducted with population level implications in mind, rather than attempting to protect smaller outlier groups or individuals equal to higher density nesting areas. Raptor species or individuals determined to be a low-threat, and operating within low-density tern and plover nesting areas (i.e. the veg islands), should be allowed to remain within those areas free from hazing.
3) ODSVRA staff should continue to haze predators using pyrotechnics sparingly, and should only target individuals perceived to be an immediate threat for terns and/or plovers, when located within areas that contain higher densities of active nests or broods (i.e. exclosures and on shorelines). Overuse of any hazing method can reduce its effectiveness by desensitizing target individuals to the method being used. Hazing of avian predators should be conducted from on foot first, and only from a vehicle when hazing from on foot is not possible. Some predators hazed with vehicles (i.e. horn or driving directly towards them) may begin to associate vehicles with the negative experience. If raptors that need to be targeted with traps become wary of vehicles, they may be more difficult to trap as a vehicle may not be able to be used as a blind when trapping.

4) ODSVRA staff should reconsider the potential for disturbance caused by predator management personnel entering active tern and plover nesting areas before sunrise to place and operate traps for individual predators documented to be taking tern or plover individuals or nests. Based on a minimum of ten years and more than 15,000 hours of senior personnel conducting trapping, direct firearm removal, and predation investigations within occupied tern and plover nesting areas, potential for negative effects, and especially for take, are extremely low (no incidents of take documented during all that time). Additionally, the positive ramifications of quickly removing a high-threat predator documented actively hunting within high-density nesting areas and depredating nests or individuals likely outweighs the potential for temporary disturbance.
5) ODSVRA staff should continue to be cognizant and prevent disturbance from ODSVRA monitoring staff and vehicles in areas where raptor traps are active. It is recommended that ODSVRA staff and vehicles maintain a minimum distance of 400m from active traps when possible unless transiting through to another location. Strong coordination between WI field staff and ODSVRA staff should be maintained during trapping efforts if monitoring must occur in the same area as trapping is being conducted.
6) ODSVRA staff should request that contractor's responsible non-raptor and owl predator control adjust work schedules as needed to best target time periods when predators are active, as WI has done, to better support success within the tern and plover program.

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California Department of Fish and Wildlife, Office of Spill Prevention and Response
Marine Wildlife Veterinary Care and Research Center, 151 McAllister Way, Santa Cruz, CA 95060

# Seabird Mortality Event Necropsy Report

NECROPSY NUMBER: 23-0252

OTHER IDENTIFICATION: N/A

COMMON NAME: Snowy Plover

SCIENTIFIC NAME: *Charadrius nivosus*

DATE FOUND: 5/4/2023

COUNTY: San Luis Obispo

STATE: CA

NECROPSY DATE: 11/2/23

REPORT DATE: 11/8/23

NECROPSY BY: Corinne Gibble

## Event Background

On May 4th 2023, Oceano Dunes State Vehicular Recreation Area (ODSVRA) staff found an adult snowy plover carcass within the large fenced nesting exclosure in the North Oso Flaco area. This area is completely closed to public activity and the carcass was found approximately seven feet from exclosure fencing. The bird was stored frozen and submitted to MWVCRC for gross necropsy.

## Necropsy Summary

Due to the ongoing outbreak, this bird was tested for Highly Pathogenic Avian Influenza (HPAI) at the California Animal Health and Food Safety Laboratory in Davis, CA (CAHFS) prior to gross necropsy. Test results confirmed that the bird was negative for HPAI.

Postmortem radiographs revealed slight lateral displacement of the keel. During external examinations, this bird was found to be in fair condition with no scavenging. There was blood surrounding the left eye. Two abrasion wounds were found at the upper left portion of the back, and abrasion wounds were found at the left side of the neck, at the keel, and at the juncture between left femur and tibiotarsus (knee). There was blood and sand found at the bill and the left eye was proptosed (pushed out of the socket). The right eye was deeply sunken.

Internal examination confirmed lateral displacement of the keel, and acute subcutaneous and intramuscular hemorrhage of the pectoral muscle. There was also a hairline fracture at the lower right caudal border of the keel. The liver was mildly dorsoventrally compressed, with small hepatic ruptures

throughout. The trachea and lungs were filled with blood. The bird was in good nutritional condition with subcutis, and pericardial adipose present, and the pectoral muscle complex projected slightly above the keel, with no discernable pectoral muscle atrophy. The ventriculus was full of semi-digested insect shells and the gastrointestinal tract was full of digesta signifying the bird had recently eaten. The skull was grossly intact, however there was hemorrhage throughout the brain, with a large area of hemorrhage at the back of the head in the occipital region and behind the eyes.

The presumptive cause of death is acute crush trauma. No gross evidence of pre-existing disease or postmortem scavenging was found.

## Completed Tests and Procedures

1. Gross photographs
2. Radiographs
3. Gross Necropsy

## Gross Findings

Acute severe crush trauma, characterized by:

-Abrasion to left upper back, neck, keel, left knee (juncture between femur and tibiotarsus)

-Keel displacement

-Multifocal acute hemorrhage and bruising

-Dorsoventral compression of liver

-Occipital hemorrhage, eye proptosis

## Final Diagnoses

Presumptive cause of death: acute crush injury

## Samples Saved

Carcass, pectoral muscle, liver, spleen

## Images

Figure 1. Abrasion to keel, left knee (juncture between femur and tibiotarsus)

Figure 2. Hemorrhage behind the eyes and at the occipital region

# Appendix H. Pesticide Information

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## Pesticides in the HCP Area

The U. S. Fish and Wildlife Service (USFWS) analyzed the effects of pesticides on several taxa in the *Recommended Protection Measures for Pesticide Applications of Region 2* (White 2007). In this report, protective measures are based on a screening-level hazard assessment for pesticide ecotoxicity. Pesticides are rated by a classification system that categorizes the level or type of protection to be given for a pesticide with respect to ecotoxicity. The classification system is as follows:

- Class 0 includes pesticides that are practically nontoxic to a specific group of animal species that have similar toxicological responses (e.g., fungicidal toxicity for large mammal species). Class 0 pesticides ordinarily do not require protection measures for animal species.
- Class 1 includes pesticides that are slightly to moderately toxic to a specific group of animal species that have similar toxicological responses. Buffer zones and other protection measures for Class 1 pesticides would be necessary, but limited, for animal species (e.g., malathion toxicity for small mammal species).
- Class 2 includes pesticides that are highly toxic to a specific group of animal species that have similar toxicological responses. Buffer zones and other protection measures for Class 2 pesticides would be relatively substantial for animal species.

The application and function, targeted invasive species groups, and potential environmental effects of the pesticides used in the Habitat Conservation Plan (HCP) area are discussed in more detail below.

**Glyphosate**

Glyphosate (RoundUp) is a non-specific post-emergent systemic herbicide that kills both broadleaf and grass species; it is highly toxic to plants but has low toxicity to birds, fish, and mammals (White 2007). The Oceano Dunes District uses glyphosate alone or mixed with other herbicides to treat European beach grass (*Ammophilia arenaria*), Russian wheat grass (*Elytrigia juncea* ssp. *boreali-atlantica*), veldt grass (*Ehrharta calycina*), ice plant (*Carpobrotus edulis*), and Cape ivy (*Delairea odorata*).

Laboratory studies show glyphosate transforms primarily by microbial degradation. Under aerobic conditions, the half-life of glyphosate in soil ranges from 1.8 to 5.4 days. Glyphosate metabolism is limited under anaerobic conditions, with a half-life of 7 to 199 days in anaerobic water-sediment systems. Dissipation of half-lives in the field was noted at 2.4 to 160 days. Dissipation appeared to correlate with climate, glyphosate being more persistent in colder climate conditions (U.S. EPA 2008).

According to the USFWS report (White 2007), when using glyphosate in aquatic systems, glyphosate is classified as Class 0; in terrestrial systems, glyphosate is classified as Class 1.

In 2021, U.S. Environmental Protection Agency (EPA) completed a biological evaluation (BE) for glyphosate (EPA 2021a). The BE evaluated whether glyphosate is likely to adversely affect (LAA) almost 1,800 listed species. The BE also characterized the weight of the evidence for each LAA determination as strong, moderate, or weak. The BE addressed the following covered species: SNPL, least tern (not specifically CLTE), CRLF, tidewater goby, La Graciosa thistle, and Nipomo Mesa lupine and determined that for all species there was moderate evidence of a LAA determination. However, LAA determinations are, on their own, not designed to determine how much a pesticide affects each species' conservation

since determinations "focus on whether there are discernible effects to even one individual of a listed species or its designated critical habitat. Thus, EPA must make an LAA finding if it finds any likely adverse effects – regardless of whether the effects may have broader implications for the species' conservation or recovery" (EPA 2021b). The BE determination is a preamble to future consultation with USFWS.

**Imazapyr**

Imazapyr is a systemic, non-selective herbicide used for control of most annual and perennial broadleaf weeds and grasses, woody species, and riparian and floating and emergent aquatic weed species in terrestrial and aquatic environmental settings (U.S. EPA 2007). Aqueous imazapyr formulations may be mixed with surfactants or oils for application as well as mixed with other herbicides and fertilizers. The Oceano Dunes District mixes a one percent solution of Imazapyr with a one percent solution of glyphosate and a surfactant to treat solid stands of Russian wheat grass and European beach grass.

The active ingredient imazapyr is marketed by the trade name Habitat®. Habitat® is an aqueous solution containing 28.7 percent imazapyr in its isopropylamine salt form and contains 71.3 percent inert ingredients. Upon contact, imazapyr can interfere with DNA synthesis and cell growth of plants. Specifically, imazapyr inhibits an enzyme (acetolactate synthase [ALS]) required for the biosynthesis of the three branched-chain aliphatic amino acids valine, leucine, and isoleucine. Because animals do not synthesize branched-chained aliphatic amino acids but rather obtain them from eating plants, the engineered mechanism for plant toxicity (i.e., the interruption of protein synthesis due to a deficiency of the amino acids valine, leucine, and isoleucine) is not generally relevant for birds, mammals, fish, or invertebrates. The U.S. EPA rating of toxicity to aquatic organisms is Category V (practically non-toxic), the lowest level on the scale. Imazapyr is relatively slow-acting, taking several weeks for the plants to show lethal effects. However, plants cease growth within 24 hours of a successful application (Shaner and O'Connor 1991). It normally takes 2 to 4 weeks after treatment to see visible effects such as yellowing of the leaves, and complete plant death can take several months.

Imazapyr acts more quickly and is less toxic than other low-volume herbicides. According to the San Francisco Estuary Invasive Spartina Project's 2005 report, *Use of Imazapyr Herbicide to Control Invasive Cordgrass (Spartina spp.) in the San Francisco Estuary* (Pless 2005), imazapyr is a safe, highly effective treatment for cordgrass eradication that does not result in the degradation of water quality. The report states that a number of field studies demonstrated that imazapyr rapidly dissipated from water within several days, and no detectable residues of imazapyr were found in either water or sediment within two months; in estuarine systems, dilution of imazapyr with the incoming tides contributes to its rapid dissipation, suggesting that imazapyr is not environmentally persistent in the estuarine environment. The report concludes that application of imazapyr herbicides is a highly effective treatment for control and eradication of non-native cordgrass species in the San Francisco Estuary and offers an improved risk scenario over the existing treatment regime with glyphosate herbicides.

According to the USFWS report (White 2007), imazapyr is classified as Class 0.

**Fluazifop-p-butyl (Fusilade)**

Fluazifop-P-butyl is a post-emergent herbicide used to control both annual and perennial grasses (i.e., monocots in the *Poaceae* plant family); however, it is much less toxic to dicots and non-*Poaceae* monocots (Syracuse Environmental Research Associates [SERA] 2014). California Department of Parks

and Recreation (CDPR) does not use Fluazifop-P-butyl near aquatic systems in the HCP area; it is only used for spot treatment when Russian wheatgrass, veldt grass, and European beach grass are intermixed with native plants.

In the USFWS report (White 2007), Fluazifop-P-butyl is classified as Class 0 for avian species; Class 2 for aquatic and terrestrial amphibians and warm water fish; and, Class 1 for cold water fish.

**Triclopyr (Garlon)**

Triclopyr is a systemic non-selective herbicide used to control broadleaf (dicot) weeds and woody plants (U.S. EPA 2009). It is a member of the pyridinyloxyacetic acid chemical family, and the picolinic acid group, whose mode of action is growth regulation (mimics the effects of plant hormones), resulting in abnormal growth of plants (U.S. EPA 2009). Triclopyr breaks down into several other compounds before ultimately breaking down to carbon dioxide ($CO_2$). In water, triclopyr is mainly broken down by exposure to sunlight (U.S. EPA 2009, National Pesticide Information Center [NPIC] 2002). The half-life of triclopyr in water ranges from 1 to 10 days depending on water conditions and has a half-life in soil ranging from 1.1 to 90 days (NPIC 2002). CDPR sprays a 0.5 percent triclopyr concentration mixed with a 0.5 percent glyphosate concentration and a silicon surfactant on Cape ivy infestations.

In the USFWS report (White 2007), Triclopyr has two formulations: amine salt formulations and ester formulations. CDPR uses the amine salt formulation, Garlon 3A. Garlon 3A is classified as Class 1 for avian species and terrestrial amphibians; and, Class 0 for aquatic amphibians and warm and cold water fish.

**Aminocyclopyrachlor**

Aminocyclopyrachlor is a pyrimidine carboxylic acid herbicide developed by DuPont™ that acts by mimicking the activity of plant auxins (a plant hormone produced in the stem tip that promotes cell elongation) and thereby interfering with the normal growth of plants. This is a relatively new herbicide as it was registered in 2010. Aminocyclopyrachlor is used, along with chlorsulfuron, in a product called Perspective. This HCP examines each chemical separately. CDPR only uses Perspective at a 0.5 percent concentration for glyphosate-resistant ice plant. CDPR's current application rates and use patterns for chlorsulfuron pose a negligible risk to wildlife.

The U.S. EPA (2010) classifies aminocyclopyrachlor as Practically Non-toxic or only Slightly Toxic to mammals, birds, fish, and aquatic invertebrates (SERA 2012). As with most ecological risk assessments of herbicides, the largely benign assessment of the hazards or lack of hazards to groups of nontarget species is tempered by the fact that toxicity data are available on only a few species, relative to the numerous species that may be exposed to aminocyclopyrachlor. In addition, the specific lack of data regarding toxicity to terrestrial-phase or aquatic-phase amphibians and the general lack of toxicity data in the open literature further constrain the hazard identification for aminocyclopyrachlor. Most of the data on the potential toxicity of aminocyclopyrachlor to animals is from a limited number of registrant-submitted studies required by the EPA for pesticide registration (SERA 2012).

**Chlorsulfuron**

Chlorsulfuron is an herbicide that controls select broadleaf weeds and undesirable grasses. Chlorsulfuron stops cell division in plant roots and shoots, which in turn causes plants to stop growing.

Chlorsulfuron is used, along with aminocyclopyrachlor, in a product called Perspective. This HCP examines each chemical component separately. CDPR uses Perspective at a 0.5 percent concentration for glyphosate-resistant ice plant.

The half-life for chlorsulfuron ranges from 1 to 3 months in soils with a typical half-life of 40 days. Soil microbes break down chlorsulfuron. Breakdown is faster in moist soils and at higher temperatures. Chlorsulfuron is practically nontoxic to birds. The acute LD50 (i.e., lethal dose or amount of the substance required (usually per body weight) to kill 50 percent of the test population) for mallard ducks and bobwhite quail is greater than 5000 milligrams/kilogram. Chlorsulfuron is practically nontoxic to fish and does not tend to bioaccumulate in fish. Chlorsulfuron is practically nontoxic to aquatic (water) insects and does not tend to bioaccumulate

In the USFWS report (White 2007), Chlorsulfuron is classified as Class 1 for avian species and terrestrial amphibians and Class 0 for aquatic amphibians and warm and cold water fish.

**Aminopyralid (Milestone)**

Aminopyralid is a systemic non-selective herbicide used to control broadleaf (dicot) weeds and woody plants (Dow Chemical Company [DOW] 2008). Its mode of action is growth regulation (mimics the effects of plant hormones), resulting in abnormal growth of plants (DOW 2008). The U.S. EPA has judged that aminopyralid appears to be a reduced risk herbicide and was accepted for review and registration under the Reduced Risk Pesticide Initiative (U.S. EPA 2005). CDPR sprays a 0.5 percent solution mixed with a non-ionic surfactant on Cape ivy infestations.

In aquatic systems, the primary route of degradation is photolysis (the decomposition or separation of molecules by the action of light), where a laboratory experiment yielded a half-life of 0.6 days (U.S. EPA 2005). In addition to $CO_2$, oxamic and malonamic acid were identified as major degradates (U.S. EPA 2005). Aminopyralid was stable to direct hydrolysis (chemical breakdown of a compound due to reaction with water) and in anaerobic sediment-water systems. In aerobic sediment-water systems, degradation proceeded slowly, with observed total system half-lives of 462 to 990 days. The degradation resulted in the formation of non-extractable residues and no other major products. Under aerobic conditions, degradation of aminopyralid in five different soils resulted in the production of $CO_2$ and non-extractable residues. Half-lives ranged from 31.5 to 533.2 days in 5 soils. For risk assessment purposes, EPA used a half-life of 103.5 days. Aminopyralid photolyzed moderately slowly on a soil surface. The half-life was 72 days and CO2, non-extractable residues and small amounts of acidic volatiles were the degradates.

White's 2007 USFWS report does not evaluate aminopyralid for ecotoxicity.

**VectoBac G**

VectoBac G is a granular formulation of spores and endotoxins of *Bacillus thuringiensis* subsp. *israelensis* (Bti; strain AM65-52) for control of mosquito larvae. The potency is 200 International Toxin Units (ITU) per milligram against *Aedes aegypti* larvae. The size, shape, and density of VectoBac granules lessen the potential for off-target application due to aerial drift and enable good penetration of dense vegetation. VectoBac G was the first Bti granule established for public health use in the early 1980s and contains both floating and sinking granules to ensure distribution of the active ingredient throughout the larval feeding zone.

Bti is very target specific with activity largely restricted to mosquitoes and related flies (in the sub-order Nematocera of the order Diptera; Valent BioScience, Accessed September 2017). In addition to Bti's non-toxicity to beneficial insects, numerous toxicology studies have shown Bti to be non-pathogenic and non-toxic to other forms of wildlife (birds, fish, mammals, etc.) and humans. The World Health Organization has approved the use of Bti for drinking water.

Persistence is low in the environment, and efficacy depends on careful timing of application to coincide with periods in the life cycle when larvae are actively feeding. Pupae and late 4th stage larvae do not feed and, therefore, will not be controlled by Bti. Low water temperature inhibits larval feeding behavior, reducing the effectiveness of Bti during very cold periods. High organic conditions also reduce the effectiveness of Bti. Therefore, use of Bti requires frequent inspections of larval sources during periods of larval production and may require frequent applications of material. CDPR applies VectoBac G with aerial spraying (e.g., helicopter).

CDPR uses a contract agricultural application service to provide helicopter treatments. Helicopter operations are done at very low altitude in areas away from people. An advantage of using a helicopter is the high rate of application to large areas without contact with the ground surface (no disturbance of vegetation) at a reasonable per acre cost. A helicopter can treat up to 200 acres per hour. Helicopter treatments occur during daylight hours, typically before noontime when little or no wind occurs, and at an altitude that is less than 40 feet above the surface of the site being treated.

Two potential routes exist for secondary exposure to Bti. First, insect predators may ingest larvae affected by Bti, or second, dead organic matter may be ingested. However, as the mode of action of Bti is so specific, most predators of mosquitos will not be affected (Swedish Chemicals Agency 2015). It is considered that the risk of secondary poisoning and toxic effects on organisms at higher trophic levels is unlikely (Swedish Chemicals Agency 2015).

White's (2007) USFWS report does not evaluate Bti for ecotoxicity.

**Clethodim (Vaquero®)**

Clethodim is a selective post-emergent herbicide used to control annual and perennial grasses (i.e. monocots of the family Poaceae); however, it is less toxic to dicots and non-Poaceae monocots (SERA 2014). Clethodim is also used to control a variety of broad leaf crops. Clethodim is rapidly degraded on the leaf surfaces by an acid-catalyzed reaction and photolysis; remaining clethodim penetrates the cuticle and enters the plant (Cornell et al 1995).

CDPR applies Vaquero® (Wilbur-Ellis Co.), an aqueous solution, with aerial spraying (e.g. helicopter). Aerial application allows a large area to be sprayed in a short amount of time (e.g. 90 acres in about 2.5 hours for veldt grass control), allowing for efficient coverage. CDRP uses Vaquero® in combination with Renegade-EA Activator-Surfectant® (Wilbur-Ellis Co.) and Crosshair Drift Management Agent® (Wilbur-Ellis Co.) to control vedlt grass in and near the Phillips 66 property and Coreopsis Hill.

In the USFWS report (White 2007), clethodim is classified as Class 1 for avian species, terrestrial and aquatic amphibians, and warm and cold water fish.

**Sethoxydim (Poast®)**

Sethoxydim is a selective post-emergent herbicide used to control annual or perennial grasses. Sethoxydim is absorbed rapidly by foliage and moves both upward and downward in plants from the point of absorption. The reported oral LD50s are 3000-6000 mg/kg and 2500-5000 mg/kg in male and female rats, respectively (SERA 2001). CDPR sprays Poast® (BASF), a commercial formulation of sethoxydim and an aqueous solution containing 18 percent sethoxydim and 82 percent inert ingredients (USEPA 2004). CDPR may use Poast® and Vaquero® interchangeably.

In the USFWS report (White 2007), sethoxydim is classified as Class 1 for terrestrial and aquatic amphibians and warm and cold water fish, and Class 0 for avian species.

**Surfactants**

For most foliar applications of herbicide formulations, surfactants must be added to spray solutions to improve the performance and minimize the variability of herbicide efficacy. Surfactants are prepared from petrochemicals, natural vegetable oils, and/or natural animal fats. Surfactants are designed to improve the spreading, dispersing/emulsifying, sticking, absorbing, and/or pest-penetrating properties of the spray mixture (Tu et al. 2001). The pure herbicide formulation mixed with water will stand as a droplet on the leaf surface, and the small area of contact therefore provides little potential for uptake of the active ingredient into the foliage. Water droplets containing a surfactant will spread in a thin layer over a leaf surface and improve herbicide uptake by maximizing herbicide distribution and forcing the fluid into the plant. The aquatic imazapyr formulation of Habitat®, as well as the glyphosate herbicide Roundup Custom®, require the addition of a surfactant for post-emergent applications.

CDPR uses Competitor®, a surfactant labeled for aquatic use, with either imazapyr or glyphosate. Competitor® (Wilbur-Ellis Co.) is a methylated seed oil containing a non-ionic emulsifier system and was recommended for use with imazapyr by the original manufacturer of the herbicide (BASF).

CDPR uses Renegade-EA® with the application of Vaquero® (clethodim) and Crosshair®. Renegade-EA®, a surfactant labeled for aquatic use, is a proprietary blend of methylated seed oil, non-ionic surfactant, and urea-ammonium nitrate (UAN) solution. Crosshair® is a drift and deposition control agent approved for aquatic use.

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# Appendix I. SNPL Breeding Season Window Survey Protocol

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# APPENDIX J[1]

# MONITORING GUIDELINES FOR THE WESTERN SNOWY PLOVER, PACIFIC OOAST P PULATION

## Contents



## Introduction

Western snowy plover populations must be monitored to determine progress toward recovery. Monitoring will be most efficient when its elements relate specifically to recovery objectives. Several types of biological monitoring are expected to provide information that will allow assessment of the recovery effort. However, a single monitoring prescription cannot address the varied research and management needs throughout the western snowy plover range. This protocol provides general guidance so each monitoring effort can be consistent with all others, even when specific methods differ from site to site. These guidelines relate to Federal requirements, but prospective surveyors must also assure that their activities comply with requirements under state law.



[1]Note: These Guidelines are Appendix J from Volume 2 of the 2007 Recovery Plan for the Pacific Coast Population of the Western Snowy Plover

Two types of monitoring relate directly to recovery criteria:

| | |
|---|---|
| Population: | Distribution and abundance. |
| Demographics: | Reproductive success, adult survival, juvenile survival, dispersal. |

Other types of monitoring relate indirectly to recovery criteria:

| | |
|---|---|
| Habitat: | Availability, suitability, enhancements. |
| Disturbance: | People, pets, vehicles, kites, horses, etc. |
| Predators: | Presence and impacts of corvids, gulls, raptors, shrikes, coyotes, foxes, skunks, house cats, opossums, other avian and mammalian predators. |

## Training and Qualifications

Prospective snowy plover surveyors should have good vision, the ability to spend several hours in the sun, and the ability to walk long distances in loose sand. In addition, the U.S. Fish and Wildlife Service has developed minimum training requirements for western snowy plover survey, management, and research activities. Five activity levels are recognized:

Level 1 Winter surveys, or surveys outside known nesting areas.
Level 2 Breeding season surveys and censuses.
Level 3 Erecting exclosures around nests.
Level 4 Breeding season studies or surveys that include handling eggs.
Level 5 Banding and color marking adults or chicks.

While activity levels 1 through 5 are increasingly intrusive, they are not strictly sequential. For example, a field worker may receive training and be certified at level 3, but cannot participate in level 1 or 2 activities without training specific to those levels.

No section 10(a)(1)(A) permit is required for Level 1 activities, but training is encouraged. Level 2, 3, 4, and 5 activities require a section 10(a)(1)(A) permit from the U.S. Fish and Wildlife Service. Field workers must be certified at the appropriate activity level to qualify for a permit, or to work independently under the holder of an existing permit.

Classroom instruction (or equivalent field instruction) will be made available for those involved with snowy plover surveys, management, and research (recovery task 1.1.5). At least 4 hours of instruction are required, on topics including:

1. Biology, ecology, and behavior of snowy plovers;

2. Identification of adult plovers, their young, and their eggs;
3. Threats to plovers and their habitats;
4. Survey objectives, protocols, and techniques;
5. Regulations governing the salvage of carcasses or eggs;
6. Special conditions of the existing Recovery Permit;
7. Other activities (for example: banding, determining incubation stage, erecting exclosures).

In addition, field instruction is required for activity levels 2, 3, 4, or 5. Instruction should take place under the direct supervision of a 10(a)(1)(A) permit holder. Activities for field training include:

1. Locating, identifying, and monitoring nests (levels 2, 4, and 5);
2. Handling eggs and capturing and handling adults or chicks (levels 4 and 5);
3. Erecting exclosures around nests (level 3).
4. Specifics on the target activity for which a permit has been issued;
5. Practical field exercises;
6. Field review of appropriate classroom topics.

Previous experience with snowy plovers, piping plovers, or other closely-related species will not substitute for the training described above. Further detail on obtaining permits, or becoming certified to work under an existing permit, is available through these offices:

CALIFORNIA

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825
(916) 414-6600

U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003
(805) 644-1766

U.S. Fish and Wildlife Service
Arcata Fish and Wildlife Office
1125 16th Street, Room 209
Arcata, California 95521-5582
(707) 822-7201

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011
(760) 431-9440

OREGON

U.S. Fish and Wildlife Service
Newport Fish and Wildlife Office
2127 S.E. OSU Drive
Newport, Oregon 97365-5258
(541) 867-4550

U.S. Fish and Wildlife Service
Oregon State Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179

WASHINGTON

U.S. Fish and Wildlife Service
Western Washington Office
510 Desmond Dr SE, Suite 102
Lacey, Washington 98503
(360) 753-9440

## Responsibilities

For effective rangewide monitoring, the network of participants must understand their roles and responsibilities. The following framework is suggested.

The *recovery leader* (recovery task 7) facilitates the work of recovery unit working groups to ensure comparable and consistent monitoring is undertaken throughout the Pacific coast range of the western snowy plover. The recovery leader also produces an annual report that describes results of monitoring throughout the population's range.

*Recovery unit working groups* (recovery task 3.1.1) should ensure thorough coverage of important sites in their units. They should collate data, prepare summary reports, and ensure appropriate data are submitted to the recovery leader.

*Coordinators* are landowners, land managers, wildlife managers, or other individuals responsible for monitoring activities at one or more sites. They recruit and train observers for their site(s) and ensure data are reported to recovery unit working groups. They coordinate with recovery unit working groups, beach managers, enforcement leaders, and other affected people to ensure an effective, responsive, and safe survey and management effort. Coordinators may also be observers.

*Observers* are field workers responsible for completing surveys and reporting results promptly to coordinators.

## Population Monitoring

Population monitoring will provide information on distribution and abundance at all breeding and wintering locations listed in Appendix B. Results will be used to assess progress toward recovery criterion 1 and to guide local management, protection assessments, and planning.

The primary source of population data will be two annual, rangewide "window surveys" using the methods outlined below. The breeding season window survey should take place between late May and mid-June. The winter season window survey should take place between December 1 and January 31. Breeding season surveys sample the coastal population of the western snowy plover, while winter season surveys also include individuals from the inland population that winter on Pacific beaches intermingled with coastal population birds. Surveys at adjacent

sites should occur on or near the same date, to avoid double-counting individuals moving among sites. All sites occupied in recent years should be surveyed within the window period. Unoccupied sites with suitable habitat should be surveyed as time permits.

Although not all plovers are detected during window surveys, an index of abundance will be obtained for each surveyed site. To relate population indices to recovery criteria, site-specific correction factors will need to be determined. Recovery task 4.3.1 will guide the effort to produce correction factors that will improve abundance estimate accuracy and usefulness.

## Methods for Window Surveys

The current survey protocol for the breeding season window survey is reproduced below (Attachment J-1). The protocol for winter window surveys (see Attachment J-2) is generally similar, but during this period no nesting activity is in progress and surveyors collect data on habitat type where plovers are seen in order to assess habitat associations in the nonbreeding season. Sample field survey forms (Attachments J-3 and J-4) are also included below.

## Demographic Monitoring

Population demographic monitoring will provide information on reproductive success, adult and juvenile survival, and dispersal. Results will be used to assess progress toward recovery (criterion 2) and to refine the Population Viability Analysis.

Precise data on productivity, survival, and dispersal will require most plovers within the studied population to be uniquely identifiable by color bands. Recovery task 4.3.2 will guide the effort to establish appropriate sampling methods for annually estimating reproductive success.

While the duration and intensity of monitoring required to obtain precise demographic data will be impractical at some plover nesting sites, coarse data are valuable and should be collected. Such data may be obtained through nest searches, nest monitoring, and careful population monitoring. At sites with limited resources, monitors should focus on accurate population monitoring, as described above, but should also attempt to record these breeding parameters:

Egg-laying dates
Number of nests
Number of eggs per nest
Egg-loss dates and causes

Hatching dates
Number of eggs hatched
Hatching success = number of eggs hatched/total number of eggs laid
Clutch success = number of clutches with at least 1 egg hatched/total number of nests
Age (in days) of chicks or juveniles at last observation
Fledging success = number of juveniles capable of flight or reaching age 28 days/number of eggs hatched
Reproductive success = number of chicks fledged/number of males
Causes of chick loss

## Reporting

A repository for survey data has been established within the U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office. Initially, only window survey data will be deposited. Other information (demographic data, for example) should be retained by coordinators and shared with recovery unit working groups. As survey procedures are developed and refined, additional data will be centralized by the recovery leader.

Reports of window survey data should include:

Location and location code (Appendix B, or assigned by Arcata Fish and Wildlife Office for new locations);
Survey date, start time, end time, high tide time, tidal stage, wind speed;
Survey coordinator and observers;
Number of adult males, adult females, unsexed adults, and chicks and juveniles.

Standard field survey forms have been developed (Attachments J-2 and J-3). Winter window survey data should be reported before February 15; summer window survey data should be reported before July 1. Data should be submitted to coordinators and/or recovery unit working groups for compilation and submittal to the recovery leader at the U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office.

Each year, the recovery leader will tabulate, summarize, and share window survey results with participants and other interested parties.

## Reporting Color Bands

Color band reports should be submitted to the recovery unit working group, the Point Reyes Bird Observatory, or the Bird Banding Laboratory. Standard U.S.

Fish and Wildlife Service aluminum band numbers should be reported to the Bird Banding Laboratory.

USGS Biological Resources Division
Bird Banding Laboratory
12100 Beech Forest Road, Suite 4037
Laurel MD 20708
1-800-327-2263
bbl@usgs.gov

Point Reyes Bird Observatory
4990 Shoreline Hwy
Stinson Beach CA 94970

### Coordinating with Other Projects

Snowy plovers share some of their breeding and wintering sites with other sensitive species, such as least terns or marine mammals. Where these species are found in, or adjacent to, snowy plover sites, survey coordinators, researchers, and land managers should plan ahead to avoid conflicts and should consult with recovery unit working groups.

## Public Interactions

Snowy plover observers often encounter members of the public while in the field. When responding to public questions or complaints, field workers are distracted from the task at hand, which can compromise the accuracy and safety of surveys.

Observers should carry educational pamphlets for distribution to curious members of the public, but should refrain from conversing at length about plovers or other issues until surveys are complete.

Field workers observing illegal, prohibited, or unauthorized activities should notify law enforcement authorities as soon as possible. Observers should carry a contact list and a communication device (e.g., 2-way radio, cellular phone) for this purpose.

## Habitat Monitoring

Habitat is an important factor limiting snowy plover abundance, distribution, and productivity. Careful assessment of habitat characters include determining

substrate characteristics and composition of vegetation in both managed and unmanaged areas. These must be the topic of specific habitat monitoring and research. Field workers are encouraged, however, to describe in general terms any changes in the quality or quantity of snowy plover habitat in monitored areas.

## Disturbance Monitoring

Human-related activities directly and indirectly affect snowy plover abundance, distribution, and productivity. Effects of various types (e.g., people, pets, vehicles, kites, horses) and levels of disturbance must be determined through dedicated research. Field workers are encouraged, however, to describe in general terms the nature and extent of human-related disturbances in monitored areas.

## Predator Monitoring

Observing predation on snowy plovers, or their eggs or chicks, is a rare event. However, some sign of predator identity is often available at plundered nests and should be noted by observers. Predator presence in monitored areas should also be noted (e.g., corvids, gulls, raptors, other avian predators, coyotes, foxes, house cats, opossums, other mammalian predators). Extensive predator monitoring is beyond the scope of snowy plover surveys, but should be undertaken when predator removal is considered, or when specific detail on predators is needed.

## Suggested Readings

The preceding sections are necessarily abbreviated. Further information and guidance will be obtained during certification training sessions. In addition, the following reading should contribute to a better understanding of plover monitoring methods.

Blodget, B. G., and S. M. Melvin. 1996. Massachusetts tern and piping plover handbook: A manual for stewards (first edition). Massachusetts Division of Fisheries and Wildlife, Westborough. ~100 pp.

*Although this document pertains to least terns and piping plovers, it contains instructive material on census techniques (8 pages), form instructions (3 pages), nest-finding procedures, and addressing enforcement issues.*

Goldin, M. R. 1994. Recommended monitoring and management methodology and techniques for piping plovers (*Charadrius melodus*). Unpublished report to U.S. Fish and Wildlife Service, Hadley, Massachusetts. The Nature Conservancy, Providence, Rhode Island. 15 pp + attachments.

*Personable instructions for field workers in the piping plover range. Includes "The Three Plover Commandments: I. Thou shalt be very, very patient and never disturb or harass a plover intentionally; II. Thou shalt never, ever walk through a plover nesting area without first looking wherest thou places each and every foot, each and every step of the way; III. Thou shalt record data simply and meticulously."*

*ATTACHMENT J-1*

**WESTERN SNOWY PLOVER BREEDING WINDOW SURVEY PROTOCOL - FINAL DRAFT**

03/05/07

ELISE ELLIOTT-SMITH, USGS Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA. email: eelliott-smith@usgs.gov Phone: (541)-758-7390 Fax: (541)758-8806
SUSAN M. HAIG, USGS Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA.

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In particular we would like to thank Kathleen Castelein and David Lauten from the Oregon Natural Heritage Information Center, Mark Stern from The Nature Conservancy, Ron LeValley from Mad River Biologists, and Gary Page from Point Reyes Bird Observatory for sharing their expert knowledge of Snowy Plover breeding biology and monitoring in Oregon and California.

BACKGROUND AND INTRODUCTION

The Pacific Coast population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*) was listed as threatened in 1993 under the U.S. Endangered Species Act. Since then, population recovery status has been assessed annually through range-wide breeding and winter season window surveys. The primary purpose of the breeding survey is to obtain a minimum estimate of the number of breeding plovers at current, historic, and potential breeding sites over time. An auxiliary purpose is to re-sight banded individuals. The breeding window survey provides information on the regional distribution and abundance of Snowy Plovers. Surveys are conducted during non-migratory periods, over a narrow time frame to minimize the chance of recounting birds moving between sites.

Since all plovers are not detected on a single survey, window surveys do not represent a total count, but give an index of population size. This protocol aims to standardize breeding season survey methodology to minimize geographic and annual disparity in the quality of the count. Despite all attempts to standardize survey methodology, it must be stressed that window survey results are only an index. Underlying any comparison of indices is the assumption that detection rate does not vary from one count to the next. However, there is likely some annual variability in the proportion of plovers detected during the window survey. Thus, comparisons of survey results across the population range and between years should be limited. Assuming this

protocol is followed strictly every year and assuming no unusual weather events, disturbance, or change in habitat or management actions, these window survey results should successfully identify a major change in Snowy Plover abundance or distribution.

Should there be any range-wide or extensive change in nest monitoring, habitat, or habitat management, it will be essential to assess detectability in conjunction with this window survey. If detection rates change greatly, comparison of indices would be rendered meaningless. For example, currently many sites are surveyed during the window survey by nest monitors. However, if nesting was no longer being monitored, the window survey would be conducted entirely by "naïve" observers (those unfamiliar with the number of pairs at a site and their specific nest locations). We would expect that a "naïve" observer might detect a lower proportion of birds than someone with prior knowledge of the birds and nest locations. Hence, this "naïve" count is likely to be lower than prior counts, not due to a negative trend in plover population size, but rather due to a decline in detection rate. Only by assessing detectability can we conclusively determine whether such a change represents an actual decline in population size.

Incorporating methods to assess detectability might also be useful in determining whether these methodologies are sufficient to detect small changes in population size and in accurately interpreting trends. In the past, banding observations and results from intensive nest monitoring have been used to interpret window survey indices and determine a correction factor. It may also be possible to get a statistical measure of detectability and error on past window surveys using a "double sampling" or "repeated measures" approach, assuming additional site surveys were conducted around the time of the window survey. In the future, a "double sampling" approach should be considered as a method to assess detectability, since unlike other methods (i.e., distance sampling, double observer) it would not require any change in the survey methodology. It would only require that at least two surveys be conducted within a short time frame, according to the methodology described in this protocol. If this approach is chosen, but it is not possible to conduct multiple surveys at all sites, it is important that the subset of sites be randomly selected.

## TIMING AND METHODOLOGY

The survey window is one week long and specific dates are chosen each year by the U. S. Fish and Wildlife Service (FWS), to fall sometime between May 24 and June 7. Survey coordinators for each designated survey area should provide survey protocol and maps to trained surveyors. For each survey site, the amount of area covered should be standardized in addition to the site name. The most appropriate survey conditions and number of surveyors should be decided by field tests and be consistent from year to year. It is important to cover a site with the same number of surveyors each year to make consecutive counts as comparable as possible. Surveying at high tide is optimal as it will allow for more thorough coverage. Do not attempt to survey during a high or rising tide if there is any chance that surveyor's safety will be jeopardized (i.e., difficult passage through a narrow or rocky region during incoming tide). To maximize detection surveys should be conducted during good weather and high visibility. On sunny days, visibility is best early in the morning or in the evening; visibility may be good at any hour on an overcast day. Rainy, foggy, or excessively windy conditions (15 mph or greater) are not suitable for surveying, however a slight drizzle or strong breeze (5-10 mph) is acceptable.

At most sites, a minimum of two surveyors is recommended to complete each

survey; one surveyor will suffice at very narrow beaches (less than 50 m wide). Reading band combinations should be attempted AFTER the birds encountered have been tallied and recorded, and ONLY if band-reading does not detract from the accuracy of the bird count. The following methodology should be used:

1. **All beaches should be covered in the same manner - in one pass.** There should be one very careful pass to tally the number of birds on each beach segment, as this is the most consistent approach over long periods of time.
2. **Surveyors should walk in unison along the entire length of the beach as designated on map(s) provided by the survey coordinator.** One surveyor should walk along the wrackline (high tide line) while the second surveyor walks along the base of the foredune. The person closest to the foredune should always walk slightly ahead of the other surveyor (approximately 25 m). If only one person is conducting the survey, they should walk the wrackline along the survey length and in a zig-zag pattern through wider portions of route, to ensure complete coverage.
3. **On mud flats, salt pans, and other non-beach habitats, surveyors should cover habitat in a similar manner - in one pass, walking in unison.** If habitat is relatively linear, it should be covered as described for beach surveys. If habitat is very broad, surveyors should simultaneously walk as many parallel transects as is necessary to cover all habitat, with transects no more than 50 m apart. These transects should run parallel to any shoreline. If there are not enough surveyors to accomplish this, then surveyors may zig-zag instead of walking a straight transect line. Remember that the number of surveyors and methodology used must remain constant from one year to the next.
4. **Surveyors should alternate between walking and scanning for Snowy Plovers with binoculars.** While walking, surveyors should scan the area 20 m ahead and to either side. Every 50 m, surveyors should stop and scan at least 100 m ahead of them with binoculars (distance may be shorter based on site-specific conditions). This way habitat is searched at least twice and from different angles increasing the chances of detecting birds. If one observer has a spotting scope, they should follow the binocular scan with a scan through the scope as far ahead as possible. If a bird is sighted far ahead, look for distinguishing landmarks that will enable finding its location. Birds may hide as they are approached, making them difficult to see.
5. **Surveyors closest to the foredune should watch the ground carefully for plover tracks, nests, and chicks while walking.** Their ability to search with the naked eye for plovers is much more constrained than the person's at the wrack line. Consequently, the pace of the survey needs to be slow enough to allow the person closest to the foredune to watch the ground and make frequent short stops to look ahead for plovers. Surveyors risk trampling chicks which are much harder to detect than nests. If surveyors detect males or females performing distraction displays, they should recognize they are probably very close to chicks and should move away with extreme caution, looking very carefully where each foot is placed.
6. **If there is a very broad area of beach, the person walking near the foredune should walk in a zig-zag pattern through that location.**

Alternatively, two or more observers could walk parallel through the area. There is a risk of stepping on a nest or chick in either instance, and surveyors should be as careful about this as when they walk at the base of the foredune, as described earlier. If the foredune is low and/or gently sloping, hummocky areas with little or no vegetation should also be checked for plovers.

7. **In certain situations it may be necessary to drive all or a portion of the length of the survey route**. If this is necessary, the survey must be conducted in the same manner every year (driving the same portions each year). Clearly delineate the portions driven on the map and the portions covered by foot. Also make a note of the time spent surveying by vehicle and by foot. Drive slow enough not to flush plovers or other shorebirds **(5-10 mph)**. The survey will not be considered complete unless all suitable habitat is surveyed. In order to do this it may be necessary to walk some portions of the route that are not accessible by vehicle. An example would be a spit with a large amount of logs, or wide, hummocky section of beach.
8. **A one-way pass of the survey route is considered sufficient, and surveyors may either exit the beach at the same access point or at a different access point from the one used to enter beach**.

The surveyor(s) may attempt to read bands ONLY after birds at a given location on the survey route have been accurately counted and recorded. When reading color bands, the following methodology should be used:

1. When a plover is sighted at close range, check for color bands and record combination if present before notifying other observers (See *Reading color bands*). If a plover is seen at too great a distance for reading color bands, notify other team members immediately by radio, hand signals, voice, or by walking towards them. While keeping track of plover, coordinate with team members and try to approach the bird from different angles; this will increase the likelihood of color bands being visible to at least one observer.
2. Unless the surveyor is very experienced in reading color bands and familiar with the specific color banded individuals at their survey site, other surveyor(s) on the team should try to read each birds band combination; this is an important accuracy check. This may be done be using a spotting scope if available, or by approaching birds closely and using binoculars.
3. In certain circumstances, it may be desirable to approach birds in order to read the bands (i.e., make roosting birds stand up), but in others it is desirable not to try and read bands at all (i.e., birds performing distraction displays). Simply avoiding birds whose bands can not be read, and returning to the site a second time to attempt to read bands could lead to further disturbance. If it is permissible to approach roosting birds by making them stand, great care must be taken not to cause them to fly ahead of the observer as it will confound the count going forward. DO NOT APPROACH a bird on a nest or an adult with chicks. DO NOT APPROACH a female head-bobbing, a male tail-dragging, birds copulating, nest scraping, birds performing a broken wing display, or an adult with chicks. These are strong indicators that birds are breeding in the area or will breed soon and it is very important that you DO NOT DISTURB them; leave the area quickly and carefully.

4. Spend no more than 5 minutes obtaining any single color band combination and if there are multiple color-banded individuals in an area, limit the time spent band reading to no more than 15 minutes. This limitation is necessary because spending long amounts of time in any one area may result in an increased detection rate (relative to other areas and relative to past and future surveys). After determining color band combinations, carefully walk around birds and continue the survey.

Data collection must be standardized for all surveys and for all sites. The following methodology should be used at all beach segments:

1. Field data should be collected on a datasheet, and location of plovers and area covered should be marked on a map.
2. At the beginning of the survey the recorder should fill out preliminary portions of the data sheet or within their notebook record: date, survey location, observers, start time, weather, and tides (See Appendix A).
3. While it is best for one member of the team to act as official recorder, all members of the team must have a pencil and data sheet or field notebook so that they can record sex, age, and color combination, if applicable, for each bird.
4. Record the sex as male (M), female (F), or unknown/uncertain (U). Report the age as Adult (A), Juvenile (J) (similar to adult but edges of back feathers and wing coverts are pale), Chick (C) (incapable of flight) or Unknown (U).
5. If two or more birds are seen, record any birds that are seen standing less than 3 m apart as a possible pair. Also record any nests or breeding behavior (See *Notifications*).
6. Where there are relatively few birds observed, make note of plumage characteristics (i.e., very pale neck band) so that it may be distinguished from other unbanded birds. Plumage differences between some males and females are difficult to discern, particularly if birds are not seen together. Collection of this data may be time-consuming if there are a lot of plovers and should not be done if it detracts from the accuracy of the bird count.
7. Record end time upon leaving the beach, or leaving the portion of beach within survey route.
8. Indicate on a map the area of coverage in addition to the location of plovers seen. If driving, indicate the section that was driven, and what section, if any, was surveyed on foot. Also make a note on the data sheet of the time spent surveying by vehicle and the time spent surveying by foot.
9. Submit a data sheet and map with specific locations to the FWS within a week after the survey.

ADDITIONAL DATA COLLECTION AND NOTIFICATIONS

*Human use/recreational activities*: Note information such as presence of beachwalkers, number of dogs (on-leash and off-leash), number of horses, number of all-terrain vehicle/off-road vehicles, street legal vehicles, and activities such as surf-fishing, kite-flying, clamming, camping, etc.

*Predator monitoring*: Egg and chick predators are one of the primary threats to Snowy Plovers on the Oregon Coast, and to the persistence of the entire Pacific Coast

population. Therefore, during all surveys it is important to collect information on predator presence in the survey area. The most common and visible nest predators are corvids (crows and ravens). Periodically count the total number of corvids seen in the survey area while scanning with binoculars. To avoid recounting the same bird twice, do not sum the number of corvids seen from different places along the survey route unless you are relatively certain that they are different birds. Usually this means the surveyor will record the maximum corvids seen from any one point along the survey route.

Record any additional predators or evidence seen. Record owls, hawks, foxes, skunks, racoons, opossums, coyotes or other predators. If a surveyor is familiar with mammal tracks, predator tracks can also be reported.

*Notifications*: Report immediately: 1) any illegal activity to law enforcement; or 2) any illegal activity to the appropriate state or federal agency if the activity is in violation of any state or federal laws concerning protected species (i.e., Migratory Bird Treaty Act, Endangered Species Act).

Report to the FWS immediately after the survey (providing band combination if known): 1) any dead or injured bird; 2) any birds observed at unoccupied beaches or in areas where they haven't been seen in recent years; 3) any nests with eggs or adults with chicks; or 4) any females head-bobbing, males tail-dragging, or birds copulating or nest scraping. These are strong indicators that birds are breeding in the area or will breed soon and the reproductive status of individuals may not be known by officials.

Report birds with bands and/or uncertain band status immediately after the survey to the lead person designated as the one to whom observers report color bands combinations in each survey region. This should be the most knowledgeable person about the likely band combinations that could be seen and the importance of the particular combinations should they be reported. It may be necessary to reschedule a visit to the site to check or re-check bands.

SURVEYOR EDUCATION AND PREPAREDNESS

*Equipment*: Required equipment includes a good pair of binoculars (suggested magnification 8-10x and aperture of at least 40 mm.), waterproof field notebook or clipboard and data sheets, site map, pencil, and timepiece. A spotting scope is recommended. If a spotting scope and tripod are needed, please contact the FWS as soon as possible. Suggested equipment includes a cell phone, contact list, rain jacket, and rain pants. Optional equipment includes a global positioning devise (GPS unit).

*Qualifications and training*: Required qualifications for Snowy Plover surveyors are the ability to walk several miles in dry sand, have good vision, and be familiar with identification of Snowy Plovers and other similar species Semipalmated Plovers, Sanderling, Killdeer). The following suggested training complies with recommendations and regulations set forth in the Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Given funding limitations, it may not be possible to adhere to all of the following suggestions. However, at the very least, four hours of field instruction should be required for every individual that searches for or monitors nests.

Based on the Draft Recovery Plan, four hours of classroom instruction is strongly recommended for individuals conducting Breeding Window Surveys. Topics to be covered during classroom instruction are taken directly or adapted from the Draft Recovery Plan and may include:

1. Biology, ecology, and behavior of Snowy Plovers.
2. Identification of adult plovers, their young, and their eggs.
3. Threats to plovers and their habitats.
4. Survey objectives, protocols, and techniques.
5. Regulations governing the salvage of carcasses or eggs.
6. Special conditions of the existing recovery permit.
7. Other activities (for example: reading color bands, tracking, predator identification, determining incubation stage, erecting exclosures).

It is strongly recommended that surveyors receive field instruction if:

1. They have never previously participated in any type of Snowy Plover survey,
2. They do not have extensive field experience distinguishing between Snowy Plovers and other shorebird species (for example: killdeer, semipalmated sandpipers, sanderlings),
3. They have little or no experience around nesting plovers, or,
4. They have no experience reading color bands

Inexperienced surveyors should partner with experienced surveyors regardless of training until they are comfortable with snowy plover identification and survey methods.

*Reading color bands*: Throughout the plovers range, all sites have the potential to have color banded birds. Color bands allow biologists to keep track of productivity, movement patterns, and survivorship. Aluminum bands, provided by the U.S. Fish and Wildlife Service, are used in addition to plastic bands; both are usually covered with colored tape.

Most birds have two color bands on each lower leg. Both the bands on a leg may be the same or different colors. Birds sometimes lose bands so that they could have only one band on one leg and two on another, or only one band on either leg. Some birds have a single band of two colors on one leg. These are created by wrapping a thin strip of tape that is different in color from the underlying band on the top, bottom, or center of the color band. Thus a single band could be described as white over red or if the red tape were in the middle as white/red/white (W/R/W).

Colors frequently seen are aqua (A, light blue), dark blue (B), dark green (G), lime (L, light green), red (R), yellow (Y), and white (W). Other colors used on the Pacific Coast but not as frequently seen in Oregon are: orange (O), violet (V), pink (P), brown (N), and black (K). Tape occasionally peels off revealing metallic (silver) band (S).

Color bands are read top down from the belly to the foot of the bird (Figure 1). Colors on the birds left leg are read first, then the colors on the right leg are read. For example, if a bird has two aqua bands on its right leg and a white band on top of a red band on its left, its combination would be: white, red, aqua, aqua. This combination would be recorded WR:AA

*ATTACHMENT J-2*

**WESTERN SNOWY PLOVER WINTER WINDOW SURVEY PROTOCOL**
**FINAL DRAFT**
03/05/07

ELISE ELLIOTT-SMITH, USGS Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA. email: eelliott-smith@usgs.gov Phone: (541)-758-7390 Fax: (541)758-8806
SUSAN M. HAIG, USGS Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA.

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In particular we would like to thank Kathleen Castelein and David Lauten from the Oregon Natural Heritage Information Center, Mark Stern from The Nature Conservancy, Ron LeValley from Mad River Biologists, and Gary Page from Point Reyes Bird Observatory for sharing their expert knowledge of Snowy Plover breeding biology and monitoring in Oregon and California.

BACKGROUND AND INTRODUCTION

The Pacific Coast population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*) was listed as threatened in 1993 under the U.S. Endangered Species Act. Since then, population recovery status has been assessed annually through range-wide breeding and winter season window surveys. The primary purpose of the winter survey is to obtain a minimum estimate of the number of wintering plovers at current, historic, or potential wintering sites over time. An auxiliary purpose is to re-sight banded individuals. The winter survey is conducted during a migratory period, when inland and coastal plovers can overlap in distribution and can not be distinguished visually. Therefore, the winter survey does not represent a count of the Pacific Coast population, but a minimum count of coastal and inland birds combined.

Since all plovers are not detected on a single survey, window surveys do not represent a total count, but give an index of population size. This protocol aims to standardize winter season survey methodology to minimize geographic and annual disparity in the quality of the count. Despite all attempts to standardize survey methodology, it must be stressed that window survey results are only an index. Underlying any comparison of indices is the assumption that detection rate does not vary from one count to the next. However, there is likely to be some annual variability in the proportion of plovers detected during the window survey. This may be particularly true during winter, since cold, wet, and windy weather are associated with low detectability

and yet such conditions may be unavoidable. Furthermore, double counting is likely to be a larger problem during winter, because birds may be in larger aggregations and may move more frequently or over a larger geographic area than during the nesting season. Thus, the window survey may be useful in identifying occupied sites, tracking banded populations, and possibly detecting large shifts in distribution. However, comparisons of survey results across the population range and between years should be limited.

TIMING AND METHODOLOGY

Surveys are conducted sometime between December 1 and January 31, during a one week window chosen by the U.S. Fish and Wildlife Service (FWS). Survey coordinators for each designated survey area should provide survey protocol and maps to trained surveyors. For each survey site, the amount of area covered should be standardized in addition to the site name. The most appropriate survey conditions and number of surveyors should be decided by field tests and be consistent from year to year. It is important to cover a site with the same number of surveyors each year whenever possible to make consecutive counts as comparable as possible. Most sites are extremely difficult to access during winter high tides as waves often beat against the foredune create dangerous situations. Therefore, surveys should not be attempted if the surveyor's safety is in jeopardy (i.e., difficult passage through a narrow or rocky region during incoming tide). To maximize detection, surveys should be conducted during good weather and high visibility. On sunny days, visibility is best early in the morning or late evening; visibility may be good at any hour on an overcast day. Cold, foggy, rainy, or excessively windy (15 mph or greater) conditions are not suitable for surveying, however a light drizzle or strong breeze (5-10 mph) is acceptable.

At most sites, a minimum of two surveyors is recommended to complete each survey; one surveyor will suffice at very narrow beaches (less than 50 m wide). Reading band combinations should be attempted AFTER the birds encountered have been tallied and recorded, and ONLY if band-reading does not detract from the accuracy of the bird count. The following methodology should be applied:

1. **All beaches should be covered in the same manner - in one pass.** There should be one very careful pass to tally the number of birds on each beach segment as this is the most consistent approach over long periods of time.
2. **Surveyors should walk in unison along the entire length of site as designated on the survey map.** One surveyor should walk along the wrackline (high tide line) while the second surveyor walks along the base of the foredune. The person closest to the foredune should always walk ahead of the surveyor at the wrackline (approximately 25 m). If only one person is conducting the survey, walk the wrackline along the survey length and in a zig-zag pattern through wider portions of route, to ensure complete coverage.
3. **Surveyors should alternate between walking and scanning for Snowy Plovers with binoculars.** While walking, surveyors should scan the area 20 m ahead and to either side. Every 50 m surveyors should stop and scan at least 100 m ahead of them with binoculars (distance may be shorter based on site-specific conditions). This way habitat is searched at least twice and from different angles increasing the chances of detecting birds. If one observer has a spotting scope, they should follow the binocular scan with a scan through the scope as far ahead as possible. If a bird is sighted far ahead, look for distinguishing landmarks that will enable finding its location. Birds may

hide as they are approached, making them difficult to see.

4. **Surveyors closest to the foredune should watch the ground carefully for plover tracks while walking.** Their ability to search is much more constrained than the person's at the wrack line. Consequently, the pace of the survey needs to be slow enough to allow the person closest to the foredune to watch the ground and make frequent short stops to look ahead for plovers.
5. **If there is a very broad area of beach, the person walking near the foredune should walk in a zig-zag pattern through that location.** Alternatively, two or more observers could walk parallel through the area. If the foredune is low and/or gently sloping, hummocky areas with little or no vegetation should also be checked for plovers.
6. **In certain situations it may be necessary to drive all or a portion of the length of the survey route.** If this is necessary, the survey must be conducted in the same manner every year (driving the same portions each year). Clearly delineate the portions driven on the map and the portions covered by foot. Also make a note of the time spent surveying by vehicle and by foot. Drive slow enough not to flush plovers or other shorebirds **(5-10 mph)**. The survey will not be considered complete unless all suitable habitat is surveyed. In order to do this it may be necessary to walk some portions of the route that are not accessible by vehicle. An example would be a spit with a large amount of logs, or wide, hummocky section of beach.
7. **A one-way pass of the survey route is considered sufficient, and surveyors may either exit the beach at the same access point or at a different access point from the one used to enter beach.**

The surveyor(s) may attempt to read bands ONLY after birds at a given location on the survey route have been accurately counted and recorded. When reading color bands, the following methodology should be used:

1. When a plover is sighted at close range, check for color bands and record combination if present before notifying other observers (See *Reading color bands*). If a plover is seen at too great a distance for reading color bands, notify other team members immediately by radio, hand signals, voice, or by walking towards them. While keeping track of plover, coordinate with team members and try to approach the bird from different angles; this will increase the likelihood of color bands being visible to at least one observer.
2. Unless the surveyor is very experienced in reading color bands and familiar with the specific color-banded individuals at their survey site , the other surveyor(s) on the team should try to read each birds band combination; this is an important accuracy check. This may be done be using a spotting scope if available, or by approaching birds closely and using binoculars.
3. In certain circumstances, it may be desirable to approach birds in order to read the bands (i.e., make roosting birds stand up). This is more desirable than avoiding the birds and returning to the site a second time to attempt to read bands as this would lead to further disturbance. If it is permissible to approach roosting birds by making them stand, great care must be taken not to cause them to fly ahead of the observer as it will confound the count going forward.
4. Spend no more than 5 minutes obtaining any single color band combination

and if there are multiple color-banded individuals in an area, limit the time spent band reading to no more than 15 minutes. This limitation is necessary because spending long amounts of time in any one area may result in an increased detection rate (relative to other areas and relative to past and future surveys). After determining color band combinations, carefully walk around birds and continue the survey.

Data collection must be standardized for all surveys and for all sites. The following methodology should be used at all beach segments:

1. Field data should be collected on a datasheet, and location of plovers and area covered should be marked on a map.
2. At the beginning of the survey the recorder should fill out preliminary portions of the data sheet or within their notebook record: date, site, start time, weather, high tide time, approximate wind direction and speed, and observers (See Appendix A).
3. While it is best for one member of the team to act as official recorder, all members of the team must have a pencil and data sheet or field notebook so that they can record sex for each bird.
4. Record the sex as male (M), female (F), Hatch Year (HY; chick or juvenile, appearing similar to adult but edges of back feathers and wing coverts are pale), or unknown (U). Hatch year birds reach adult status by Jan 1. Unless the surveyor is confident they can make the determination between hatch year or adult status based on plumage, it is not necessary to distinguish adult from hatch year and record on data sheets.
5. Mark the location of bird(s) on the map and record coordinates if a GPS unit is available. If two or more birds are seen, record which birds were seen together.
6. Record end time upon leaving the beach, or leaving the portion of beach within survey route.
7. Indicate on a map the area of coverage in addition to locations or birds seen. If driving, indicate the section that was driven, and what section, if any, was surveyed on foot. Also make a note on the data sheet of the time spent surveying by vehicle and the time spent surveying by foot.
8. Submit data sheet to the FWS by February 15th

ADDITIONAL DATA COLLECTION AND NOTIFICATIONS

*Habitat information*: To increase understanding of Snowy Plover winter habitat associations, winter window surveyors should record the specific habitat where plovers are seen and the general beach habitat in the vicinity of plover sightings (See Appendix A). Record plover location as: wet sand, wrackline, mid-beach (above wrackline but below the base of foredune), or foredune (at the base of a foredune, on a foredune, or at a break in the foredune). Record general habitat type as: linear beach, estuary mouth, overwash area (break in foredune), restoration plot, or barrier island/peninsula

General site information is necessary to compare use and availability, and to evaluate the potential habitat at sites where birds are not detected. Please estimate the percentage of survey beach that is greater than 50 m in width (from high tide line to foredune). If all habitat is less than 50 m in width, estimate the maximum beach width. Record the general types of beach habitat found at the survey site (as described above).

*Human use/recreational activities*: Note information such as presence of beachwalkers, number of dogs (on-leash and off-leash), number of horses, number of all-terrain vehicle/off-road vehicles, street legal vehicles, and activities such as surf-fishing, kite-flying, clamming, camping, etc.

*Predator monitoring*: Egg and chick predators are one of the primary threats to Snowy Plovers on the Oregon Coast, and to the persistence of the entire Pacific Coast population. Therefore, during all surveys it is important to collect information on predator presence in the survey area. The most common and visible nest predators are corvids (crows and ravens). Periodically count the total number of corvids seen in the survey area while scanning with binoculars. To avoid recounting the same bird twice, do not sum the number of corvids seen from different places along the survey route unless you are relatively certain that they are different birds. Usually this means the surveyor will record the maximum corvids seen from any one point along the survey route.

Record any additional predators or evidence seen. Record owls, hawks, foxes, skunks, racoons, opossums, coyotes, or other predators. If a surveyor is familiar with mammal tracks, predator tracks can also be reported.

*Notifications*: Report immediately: 1) any illegal activity to law enforcement; or 2) any illegal activity to the appropriate state or federal agency if the activity is in violation of any state or federal laws concerning protected species (i.e., Migratory Bird Treaty Act, Endangered Species Act).

Report to the FWS immediately after the survey if you see a dead bird, one that appears injured, or if you observe a bird in an area where they haven't been seen in recent years. Report birds with bands and/or uncertain band status immediately after the survey to the lead person designated as the one to whom observers report color bands combinations in each survey region. This should be the most knowledgeable person about the likely band combinations that could be seen and the importance of the particular combinations should they be reported. It may be necessary to reschedule a visit to the site to check or re-check bands.

SURVEYOR EDUCATION AND PREPAREDNESS

*Equipment*: Required equipment includes a good pair of binoculars (suggested magnification 8-10x and aperture of at least 40 mm.), waterproof field notebook or clipboard and data sheets, site map, pencil, and timepiece. A spotting scope is recommended. If a spotting scope and tripod are needed please contact the FWS as soon as possible. Suggested equipment includes a cell phone, contact list, rain jacket, and rain pants. Optional equipment includes a global positioning devise (GPS unit).

*Qualifications and training*: Required qualifications for Snowy Plover surveyors are the ability to walk several miles in dry sand, have good vision, and be familiar with identification of Snowy Plovers and other similar species Semipalmated Plovers, Sanderling, Killdeer). The following suggested training complies with recommendations and regulations set forth in the Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Given funding limitations, it may not be possible to adhere to all of the suggestions listed below. Based on the Draft Recovery Plan, four hours of classroom instruction is strongly recommended for individuals conducting Winter Window Surveys. Topics to be covered during classroom instruction are taken directly or adapted from the Draft Recovery Plan and may include:

1. Biology, ecology, and behavior of Snowy Plovers.
2. Identification of adult plovers.

3. Threats to plovers and their habitats.
4. Survey objectives, protocols, and techniques.
5. Regulations governing the salvage of carcasses.
6. Special conditions of the existing recovery permit.
7. Other activities (for example: reading color bands, tracking, predator identification, determining incubation stage, erecting exclosures).

It is strongly recommended that surveyors receive field instruction if:

1. They have never previously participated in any type of Snowy Plover survey,
2. They do not have extensive field experience distinguishing between Snowy Plovers and other shorebird species (for example: killdeer, semipalmated sandpipers, sanderlings), or,
3. They have no experience reading color bands

Inexperienced surveyors should partner with experienced surveyors regardless of training until they are comfortable with snowy plover identification and survey methods.

*Reading color bands*: Throughout the plovers range, all sites have the potential to have color banded birds. Color bands allow biologists to keep track of population numbers, productivity, movement patterns, and survivorship. Aluminum bands, provided by the U.S. Fish and Wildlife Service, are used in addition to plastic bands; both are usually covered with colored tape.

Most birds have two color bands on each lower leg. Both the bands on a leg may be the same or different colors. Birds sometimes lose bands so that they could have only one band on one leg and two on another, or only one band on either leg. Some birds have a single band of two colors on one leg. These are created by wrapping a thin strip of tape that is different in color from the underlying band on the top, bottom, or center of the color band. Thus a single band could be described as white over red or if the red tape were in the middle as white/red/white (W/R/W).

Colors frequently seen are lime (L, light green), aqua (A, light blue), red (R), yellow (Y), dark blue (B), dark green (G), and white (W). Other colors used on the Pacific Coast but not as frequently seen in Oregon are: orange (O), violet (V), pink (P), brown (N), and black (K). Tape occasionally peels off revealing metallic (silver) band (S).

Color bands are read top down from the belly to the foot of the bird (Figure 1). Colors on the birds left leg are read first, then the colors on the right leg are read. For example, if a bird has two aqua bands on its right leg and a white band on top of a red band on its left, its combination would be: white, red, aqua, aqua. This combination would be recorded WR:AA

# Appendix J. Declining Amphibian Task Force Fieldwork Code of Practice

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# The Declining Amphibian Task Force Fieldwork Code of Practice

A code of practice, prepared by the Declining Amphibian Task Force (DAPTF) to provide guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires and all other surfaces. Rinse cleaned items with sterilized (e.g. boiled or treated) water before leaving each study site.

2. Boots, nets, traps, etc., should then be scrubbed with 70% ethanol solution (or sodium hypochlorite 3 to 6%) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.

3. In remote locations, clean all equipment as described above upon return to the lab or "base camp". Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolates species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately and the end of each field day.

5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g. via handling, reuse of containers) or with other captive animals. Isolation from un-sterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials (liquids, etc.) should be disposed of safely and if necessary taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.