

**State of California  
Natural Resources Agency  
Department of Fish and Wildlife  
Wildlife Branch**

**The Western Snowy Plover in Los Angeles and Orange Counties,  
California: July 2015 to June 2016**

**by**

**Thomas Ryan, Stacey Vigallon,  
and Cheryl Egger**

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**Nongame Wildlife Program, 2016-11**

# **Final Report**

To

State of California  
Department of Fish and Wildlife  
South Coast Region  
3883 Ruffin Road  
San Diego, CA 92123

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Thomas Ryan, Stacey Vigallon,  
and Cheryl Egger  
Los Angeles Audubon  
P.O. Box 411301  
Los Angeles, California 90041

December 2016

State of California  
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### **ABSTRACT**

Here we report on monitoring, research, and community outreach activities performed between July 2015 and June 2016. Project biologists and volunteers conducted county-wide surveys of all suitable roosting habitats in September, January, March, and May. Project biologists conducted surveys of the main roost sites and nearby beaches in October, November, and December, February, April, and June. The January and May surveys corresponded to the U.S. Fish and Wildlife Service's (USFWS) winter and breeding season window surveys. The population of Snowy Plovers in coastal Los Angeles County (LAC) has declined from a peak of 326 in 2012 to just 140 in 2015-16. LAC supports 18.8% of Recovery Unit (RU)-6 and 3.5% of the California non-breeding Snowy Plovers. The population in Orange County (OC) declined slightly from 252 in 2013-14 to 208 in 2014-15. OC supports 20% of RU-6 and 3.7% of California non-breeding Snowy Plovers. Overall, declines were detected in LAC and OC. This was also seen in Ventura County.

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<sup>1</sup> Ryan, T. P., S. Vigallon, and C. Egger. 2016. Annual Report: The Western Snowy Plover in Los Angeles and Orange Counties, California: July 2015 to June 2016. California Department of Fish and Wildlife, Wildlife Branch, Nongame Wildlife Program Report, 2016-11. Sacramento, CA. 32 pp + Appendices.

## INTRODUCTION

Here we report on monitoring, research, and community outreach activities performed by the Los Angeles County Snowy Plover Research Team between July 2015 and June 2016. We provide an annual update to the summary of efforts compiled in *The Western Snowy Plover in Los Angeles County* (Ryan et al. 2010). For complete information on the species background, project background, methods, all beach maps, status and distribution prior to 2009, origins and site fidelity, complete recommendations, conservation background, regulatory framework, outreach and education, handouts, and datasheets, please refer to this report. It is available for sale at the Los Angeles Audubon bookstore and can be downloaded free, along with other study materials, from the Los Angeles Audubon website (<http://losangelesaudubon.org/>).

### History

Prior to 1945, the Western Snowy Plover (*Charadrius nivosus nivosus*) (Snowy Plover) nested on beaches throughout Los Angeles and Orange Counties (LAC and OC) (Grinnell and Miller 1944, Western Foundation for Vertebrate Zoology unpubl. Data, Allen et al. 2016). Historically, Snowy Plovers have nested at Redondo, Ballona (Venice/Marina Del Rey), Los Angeles, and Malibu Beaches (Allen et al. 2016). However, increased human use of sandy beaches brought with it disturbance from beachgoers, lifeguards, maintenance staff, introduced predators, and sand grooming, reducing the ability of Snowy Plovers to nest on LAC beaches. In 1949, the last active nest of a Snowy Plover on LAC beaches was reported at Manhattan Beach (Stager 1949 in Page and Stenzel 1981). Since 1949, there have been no documented cases of a Snowy Plover nesting within LAC (Allen et al. 2016), although no systematic survey of suitable LAC beaches were conducted between the 1970s and 2004 (Gary Page pers. comm. 2010, Ryan et al. 2010). Despite the lack of documentation since 1949, Snowy Plovers have continued to overwinter on LAC beaches. The Santa Monica Bay Audubon Society (SMBAS) conducted surveys between 2004 and 2006 and found between 260-334 wintering Snowy Plovers (USFWS unpubl. data, SMBAS unpubl. data). Approximately 7% of Snowy Plovers wintering in California occur on LAC beaches (USFWS unpubl. data).

In Orange County (OC), Snowy Plovers nested at Anaheim Landing, Sunset Beach Bay Fill, Sunset Beach, Bolsa Chica Beach, Bolsa Chica Salt Flats, Newport Beach, and Balboa Beach prior to 1940 (Page and Stenzel 1981). During their 1979-78 survey, Page and Stenzel (1981) found that Orange County supported 2% of the pairs on the mainland coast, all at the Bolsa Chica Oil Fields (previously Bolsa Chica Salt Flats). As in LAC, they concluded that the only other likely nesting location was at the Sunset Aquatic Park and that the lack of nesting Snowy Plovers elsewhere was due to beach raking and heavy human use (Page and Stenzel 1981).

### Status

The Snowy Plover is a species of conservation concern. The Pacific coast population of the Western Snowy Plover was listed as federally threatened in 1993 (USFWS 1993). Critical Habitat for the Snowy Plover was revised in June 2012. The USFWS now lists six beaches in LAC and three beaches (and the Bolsa Chica Reserve - Subunits CA46 B-F) in OC as critical habitat for the Snowy Plover (USFWS 2012). These include Zuma Beach (Unit CA 43), Malibu Beach (Unit CA 44), Santa Monica Beach (Subunit CA 45A), Dockweiler North (Subunit CA 45B), Dockweiler South (Subunit CA 45C), Hermosa State Beach (Subunit CA 45D), Bolsa

Chica State Beach (CA 46A), Santa Ana River Mouth (Subunit CA 47), and Balboa Beach (Subunit 48) (USFWS 2012). All roosts, except for Dockweiler State Beach (DSB) 58 and Hermosa in LAC and Surfside and Salt Creek in OC are now located within designated Critical Habitat (USFWS 2012). These beaches are protected as wintering habitat (USFWS 2012). It should be noted that activities that have a federal nexus are subject to Federal Review. Relevant sections, including Unit/Subunit descriptions and maps can be found in the “Revised Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover” (USFWS 2012).

A Recovery Plan was completed by USFWS in 2007 and LAC and OC are within Recovery Unit 6, whose goals include protecting wintering Snowy Plovers and increasing the breeding population to 500 breeding individuals from the current level of 243 (2005-2009 average) (USFWS unpubl. data, USFWS 2007). The Snowy Plover is also considered a Bird Species of Special Concern by California (Shuford and Gardali 2008).

### **Biology**

For the Pacific coast population of the Snowy Plover, the nesting season extends from February through late September. On the California coast, where breeding tends to occur a few weeks earlier, nests usually appear by the third week of March (Page et al. 2009). ). This has begun to trend earlier with first nests detected on March 10, 2016 and March 14, 2015 (USFWS unpubl. Data). Primary nesting habitats include sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries (Stenzel et al. 1981). Nests generally consist of a shallow scrape lined with beach debris and typically occur in flat, open, sandy areas with little vegetation (Widrig, 1980, Stenzel et al. 1981). Multiple pre-nest scrapes may be dug, with one selected as the nest; these typically begin to appear in late January-early February. Driftwood, kelp, and dune plants provide cover for chicks and harbor invertebrates, an important food source (Page et al. 2009). Nests are usually found within 100 meters (328 feet) of water, whether ocean, lagoon, or river mouth (Page and Stenzel 1981, Page et al. 2009). In addition to nest scrapes, Snowy Plovers build roost scrapes throughout the year; these are typically shallower, with no materials placed inside, and are often made from scraped-out footprints in the sand.

### **Threats**

While several factors contribute to the degradation of winter roosting habitat and the disappearance of nesting Snowy Plovers in LAC and OC, we suggest that the main problems are daily beach grooming in LAC and occasional grooming at Salt Creek, development of upper beach habitats such as dunes, heavy recreational use, vehicular traffic, domestic animals, and predators attracted to human refuse. Daily beach grooming removes many of the favorable nesting habitats described above, harms food resources, and likely destroys nest scrapes and eggs of Snowy Plovers (Page et al. 2009). Because grooming also removes naturally occurring kelp as well as trash, it has been shown to drastically reduce the invertebrate population that has adapted to break down kelp, including prey items favored by Snowy Plovers (Dugan et al. 2003, Page et al. 2009). Dugan and Hubbard (2003) found that Snowy Plover abundance on southern California beaches was positively correlated with the mean cover of wrack and abundance of wrack-associated invertebrates. Further, Dugan and Hubbard (2009) demonstrated that grooming increases rates of beach erosion, increasing the need for beach replenishment. Development of

upper beach habitat removes cover and foraging resources and increases the presence of domestic animals and predators. Vehicular traffic is known to cause mortality, crush foraging resources (kelp, vegetation, and wrack), and regularly flush resting Snowy Plovers from their roosts. There are over 50 million visitors to LAC beaches annually (County of Los Angeles 2009); their activities, including sunbathing, swimming, dog walking, and sports, require support services such as police and lifeguard patrols, water quality monitoring, erosion control, and trash pick-up, which also cause an increase in vehicles on the beach. Furthermore, human activity and local residences attract predators such as cats, dogs, and American Crows by providing food in the form of refuse and outdoor pet food.

### **Outreach and Education**

Public awareness of and support for Snowy Plover conservation in Los Angeles County is essential to species recovery. During both the 2007 and 2008 meetings of the Los Angeles County Snowy Plover Working Group a large part of the dialogue centered on how to combat lack of public awareness. The 3-year report published in early 2010 summarized in detail the volunteer/outreach activities from 2007-2009. In this report, we summarize volunteer/outreach activities completed from July 2015 to June 2016.

### **Summary of Previous Study Findings**

Prior to beginning this study, little was known about the wintering Snowy Plovers in LAC and OC. We summarize the prior data collected in OC in this report. Observations for LAC have been published in reports from 2009, 2010, 2011, 2014, and 2015 (Ryan and Vigallon 2009, 2010 and 2011, Ryan et al. 2014, Ryan et al. 2015). We found that in coastal LAC, the Snowy Plover annually inhabits seven roosting sites at Zuma LT9/Zuma Lagoon, Malibu Lagoon, Santa Monica, Dockweiler State Beach near Tower 47 (DSB LT47), Dockweiler State Beach near Tower 58 (DSB LT58), Hermosa Beach, and Cabrillo Beach. They occasionally use sites at Leo Carrillo State Beach, Paradise Cove, Dan Blocker County Beach, Big Rock Beach, Will Rogers State Beach, Venice Beach, central Dockweiler State Beach, El Segundo Beach, Manhattan Beach, Redondo Beach, Terminal 400 in LA Harbor, and Belmont Shore. We found that 96% of all detections were at the main roosting sites. Of these, six, Zuma LT9, Malibu Lagoon, Santa Monica, DSB LT47, DSB LT58, and Hermosa Beach, consistently support the largest numbers of Snowy Plovers. We suggest that conservation efforts be focused on six locations that make up approximately 1.9 km (1.2 miles) or approximately 1.6% of the linear coastline and 3.4 % of broad, sandy beaches in LAC. We found that they have inhabited roughly the same locations all six years of the study. Historic records find that they have likely been found at these locations for most of the past century (Allen et al. 2016). In Orange County, Ross Griswold has been conducting surveys of the roosts at Bolsa Chica State Beach, Huntington State Beach and Balboa Beach since February 2012.

During the non-breeding season (July-March) between 196 and 334 Snowy Plovers occur in LAC and approximately 119-203 Snowy Plovers occur in OC. This is approximately 45% of wintering Snowy Plovers in RU-6 and 10% of the California population (USFWS unpubl. data 2010). Snowy Plover populations in LAC have declined in recent years. This was mostly due to declines at Zuma LT9 in winter 2005-2006 and all beaches except Malibu in winter 2006-2007. All beaches have appeared to recover except Zuma, which has still seen over a 50% decline during the study period. This is especially significant because this is the largest roost in LAC

with approximately 42% of the population. Winter window surveys indicate that the OC population is either stable or increasing (USFWS unpubl. data).

The Snowy Plovers that roost at LAC beaches create large numbers of scrapes, at least throughout the winter and spring months. These scrapes are used as resting areas and provide protection from wind and aid in hiding Snowy Plovers from predators. Scrapes outside of protected enclosures are destroyed on a regular basis by beach grooming, vehicle traffic, and pedestrians. If nesting attempts are being made, evidence is likely removed by the above disturbances and egg predators prior to discovery. In other areas, protection of winter roosts has led to establishment of nesting areas (Lafferty et al. 2006). We suggest that this would likely occur in LAC if these areas were protected. This would aid in meeting the recovery goals for the Snowy Plover in Recovery Unit 6 (USFWS 2007).

We find that LAC and OC are important non-breeding areas for Snowy Plovers from breeding colonies throughout California and Oregon based on observations of color-banded individuals. We suggest that individuals show high site fidelity and have observed individuals returning to LAC to the same beach for as many as six years (Ryan and Vigallon 2010). There is some movement of individuals among the Zuma LT9, Malibu, and Santa Monica roosts. However, we have not detected intra- or inter-year movements among the northernmost and southernmost roosts. Individuals have been recorded up to seven years old, with an average age of 2.8 years.

We have documented mortality by vehicle strikes and capture by dogs at nearby beaches. We suggest that these may be regular causes of mortality and normally go undocumented due to a lack of observers and the likelihood that Snowy Plover carcasses are scavenged or removed by beach grooming prior to discovery.

We find that there are many threats to the wintering Snowy Plovers. These likely threaten the current non-breeding roosting Snowy Plovers and prevent nesting on LAC and OC beaches as well. Threats include:

1. A lack of public awareness of the presence of Snowy Plover roosts and a lack of information about how to avoid disturbing the Snowy Plovers while enjoying the beach;
2. Lack of training and information on locations of Snowy Plover roosts among some staff that drive and operate equipment on the beaches;
3. Regular disturbance, removal of foraging resources, and occasional mortality resulting from beach grooming, operation of heavy equipment, and regular vehicular traffic;
4. Regular disturbance and occasional mortality from off-leash dogs;
5. Beach management practices that remove kelp and associated arthropods;
6. Recreational activities and occasional large events that flush Snowy Plovers from roosts and leave large amounts of refuse near roosts; and
7. Native and non-native predators drawn in unusually large concentrations to human refuse on and near the beach and pet food placed outside at nearby residences.

We suggest that public awareness of and support for Snowy Plover conservation in LAC and OC is essential to species recovery, such that developing ongoing education and outreach strategies has been concurrent with meeting the scientific goals of this study. With outreach initially targeted at colleges and universities, we were able to increase volunteer participation in the

monitoring program from 37 people in 2007 to 158 by the end of 2009, and volunteers contributed 1,681 hours during those years. Since 2009, we have maintained a core of 45-60 community volunteers, with new volunteers joining each year to assist with monitoring, enclosure set-up, and outreach efforts. In addition to volunteer participation, establishing a formal docent program has included a public service announcement video, development of a conservation brochure as well as docent and classroom materials, creation of a website, drafting signage for Snowy Plover enclosures, development and update of a beach-driver handout, guided beachwalks for the public at two different locations, and a field trip program for public school students. Maintaining positive relationships with beach management agencies and collaborating with other conservation-oriented organizations remains key in establishing a sustainable outreach program.

In summary, the major accomplishments of the project since 2007 include:

1. The involvement of over 300 community volunteers and an outreach program that has reached thousands more.
2. Current, up-to-date knowledge of the location and population status of Snowy Plovers.
3. Knowledge of details of their habits and biology, including migration timing, origins, and age structure.
4. Knowledge of the location and area requirements for adequate roosting space on beaches they currently occupy.
5. Detailed recommendations for the restoration of protected areas for roosting, wintering Snowy Plovers and a plan for steps to be taken if breeding occurs.
6. Ongoing outreach to and discussions with local beach management agencies that will allow for greater protection of Snowy Plovers while agencies continue to perform their vital duties.

### **Study Goals**

This study was designed to provide year-round information on the Snowy Plovers on LAC and OC beaches to determine: (1) year-round attendance patterns at the main roosting areas; (2) the size and location of these roosts; (3) the overall population and distribution in LAC and OC; and (4) management recommendations for protecting winter roosts and creating conditions by which nesting may return.



## **METHODS**

### **Population Status at Winter Roosting Sites**

#### **Countywide Surveys**

In September 2015, January 2016, March 2016 and May 2016, project volunteers and biologists conducted county-wide surveys of all suitable roosting habitats (Ryan et al. 2010). The January and May surveys corresponded to the USFWS' winter and breeding season window surveys. All volunteers used a consistent survey method adapted from the Western Snowy Plover Winter Window Survey Protocol (Elliott-Smith and Haig 2006). All Snowy Plover counts were made in a single pass. On broad beaches, surveyors walked alongside each other and/or zigzagged during surveys. Field data were collected on a datasheet, and surveyors marked the presence of Snowy Plovers and the area covered on a map or aerial photograph. Surveyors observed the birds for color bands. These were reported to the Point Blue Conservation Science (formerly Point Reyes Bird Observatory), who then provided information on origin and banding date. Data sheets were submitted to the survey coordinator. Data collected for each survey location included the number, location, and sex of all Snowy Plovers, color band combinations, the time, and weather conditions of each survey, and a general and specific habitat description of each beach and Snowy Plover sighting. Surveyors also observed and recorded the level of human activity at each beach, such as presence of walkers, joggers, and individuals engaged in other recreational activities, the presence of on- and off-leash dogs, as well as the presence of vehicles and beach grooming equipment. In addition, surveyors recorded the presence of potential predators. During the breeding season surveys, volunteers noted breeding behaviors such as copulation, nest construction, incubation, or signs of agitation such as a broken wing display. All detections of Snowy Plovers and their nests were mapped from volunteer drawings and GPS locations using Google Earth.

#### **Roost Surveys**

Project biologists conducted surveys of just the main roost sites and nearby beaches in July, August, October, November, and December 2015, and February, April, and June 2016. Surveys were conducted weekly at the main roost sites from February 15 to April 30, or when the plovers had departed the site for two consecutive weeks. Counts also followed protocols described by Elliott-Smith and Haig (2006). During these surveys, all Snowy Plovers were counted and the roosting area recorded on a GPS and mapped using Trimble Navigator Outdoors (version 5.6.16) or Google Earth. This was accomplished by walking the perimeter of the colony at a distance that did not cause disturbance to the birds (typically 20-30 ft). During and immediately after the roost survey, the biologist scanned the roost to determine if birds were sitting on the sand. Observations of potential breeding behaviors, such as calling, aggressive displays, territorial displays and male-female paired individuals, were also noted. No nest surveys were conducted.

#### **Disturbance, Threats, Predation and Mortality**

During the countywide surveys and the roost and nesting surveys, the volunteers and biologists recorded adjacent beach use information and recorded any events that occurred near the roosts that could potentially harm the Snowy Plovers, disturb the Snowy Plovers, or result in the mortality of Snowy Plovers. They noted any dead birds found on the beach.

## **Education and Outreach**

During volunteer training sessions, volunteers received training in both monitoring protocol and in ways of speaking with the public about Snowy Plover conservation. In addition, Los Angeles Audubon staff worked with the Dockweiler Youth Center and Annenberg Community Beach House to establish a series on beach walks for the public, and collaborated with Los Angeles Unified School District public schools to facilitate in-school presentations and field trips to view Snowy Plovers at Dockweiler Beach. High school students from Los Angeles Audubon's Baldwin Hills Greenhouse Program received docent training and led elementary students through a Snowy Plover-themed curriculum during select field trips. Information about Snowy Plover conservation and volunteer opportunities are also provided to the public during eco-fairs and other tabling events. Additional funding for outreach activities during this report period was provided by the Disney Worldwide Conservation Fund.

## RESULTS AND DISCUSSION

### Population Status: Los Angeles County

<b>Table 1. Results of Countywide Surveys in Los Angeles County 2015-2016.</b>					
<b>No.</b>	<b>Beach Name(s)</b>	<b>Sept 2015</b>	<b>Jan 2016</b>	<b>Mar 2016</b>	<b>May 2016</b>
1	Leo Carrillo State Beach/Nicholas Cyn CB	0	0	0	0
2	El Sol, El Pescador, La Piedra SB	0	0	0	0
3	El Matador, Lechuza Beach	0	0	0	0
4	Zuma Beach	16	10	1	0
5	Zuma Beach (Morning View to Pt Dume)	0	0	0	0
6	Dume Cove, Paradise Cove, Escondido B.	0	0	0	0
7	Dan Blocker CB, Puerco Beach	0	0	0	0
8	Malibu Bluffs SP, Amarillo B, Malibu B.	0	0	0	0
9	Malibu Lagoon, Carbon Beach	32	18	3	0
10	La Costa B., Las Flores B., Big Rock B.	0	0	0	0
11	Las Tunas CB, Topanga CB	0	0	0	0
12	Castle Rock B	0	0	0	0
13	Will Rogers SB North	0	2	0	0
14	Will Rogers SB South	0	2	2	0
15	Santa Monica State Beach North	40	25	27	0
16	Santa Monica State Beach South	0	ns	0	0
17	Venice City Beach North	0	0	0	0
18	Venice City Beach South	0	11	7	0
19	Dockweiler Beach North	42	26	9	0
20	Dockweiler Beach Central	0	0	0	0
21	Dockweiler Beach South	3	1	8	2
22	El Segundo & Manhattan Beach	1	4	1	0
23	Hermosa Beach North	56	34	31	0
24	Hermosa Beach South & King Harbor	0	1	0	0
25	Redondo County Beach North	0	0	0	0
26	Redondo CB South & Torrance CB	0	0	0	0
30	Portuguese Bend	ns	ns	ns	0
32	Point Fermin & Cabrillo Beach	3	6	0	0
35	Alamitos & Junipero Beach	0	0	0	0
36	Belmont Shore & Peninsula Beach	0	0	0	1
	Total Observed	193	140	89	3

<b>Table 2. Annual Detections of Snowy Plovers in Los Angeles County during Winter Window Surveys 2004-16.</b>													
<b>Beach</b>	<b>04</b>	<b>05</b>	<b>06</b>	<b>07</b>	<b>08</b>	<b>09</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
Leo Carrillo State Beach/Nicholas Cyn CB	0	0	0	8	0	0	0	0	0	0	0	0	0
Zuma Beach	130	133	213	52	32	82	80	86	85	80	73	7	10
Zuma Beach South	0	0	0	0	48	0	0	0	0	0	0	0	0
Dume Cove, Paradise Cove, Escondido B.	0	0	0	6	0	0	0	0	0	0	0	0	0
Dan Blocker CB, Puerco Beach	0	0	0	23	0	0	0	0	2	9	0	0	0
Malibu Lagoon, Carbon Beach	33	28	12	34	37	36	67	47	78	60	25	0	18
La Costa B., Las Flores B., Big Rock B.	0	ns	ns	2	0	0	0	0	0	0	0	0	0
Will Rogers SB North	0	0	ns	2	0	0	0	0	0	0	0	0	2
Will Rogers SB South	0	0	ns	0	0	1	0	ns	0	0	0	0	2
Santa Monica State Beach North	32	40	42	16	30	40	41	58	58	47	37	32	25
Venice City Beach North	ns	0	ns	0	0	1	0	0	0	0	0	0	0
Venice City Beach South	ns	0	ns	2	0	0	0	8	4	2	0	9	11
Dockweiler Beach North	12	34	23	9	10	20	6	34	33	29	45	16	26
Dockweiler Beach Central	0	0	0	0	0	4	6	0	0	5	0	0	0
Dockweiler Beach South	13	0	0	4	11	15	16	23	13	3	0	25	1
El Segundo & Manhattan Beach	0	0	0	0	3	0	4	0	0	2	4	9	4
Hermosa Beach North	33	41	36	23	29	26	11	44	49	40	60	46	34
Hermosa Beach South & King Harbor	0	0	0	8	0	2	0	0	0	0	0	3	1
Redondo County Beach North	0	0	0	0	0	ns	0	0	0	0	0	0	0
Point Fermin & Cabrillo Beach	13	9	8	7	0	6	5	2	0	0	7	4	6
<b>Total Observed</b>	<b>266</b>	<b>285</b>	<b>334</b>	<b>196</b>	<b>200</b>	<b>233</b>	<b>244</b>	<b>302</b>	<b>326</b>	<b>277</b>	<b>251</b>	<b>151</b>	<b>140</b>
<b>No. of Sites (N)</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>14</b>	<b>8</b>	<b>11</b>	<b>9</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>12</b>

### Countywide & Window Surveys

From 2012 to 2016 the population of Snowy Plovers in coastal LAC has declined from a peak of 326 in 2012 to 140 in 2016 (Tables 1 and 2). This is a 58% decline and represents the lowest population since comprehensive surveys began in 2004 (Table 2). The largest decline is at Zuma Beach, where numbers have declined 97% from 130-213 plovers in 2004-07 to 80-86 plovers 2009-11 to 7-10 plovers in 2015-16 (Table 2). Plover populations have also declined at Malibu Lagoon since peak counts of 60-78 between 2010 and 2013, to 0-18 plovers in 2015-16. Plover populations at Santa Monica, Dockweiler State Beach and Hermosa Beach are also lower than peak numbers, but within their historic ranges (Table 2). Overall, in 2015-16 mainland LAC supported 18.8% of wintering Snowy Plovers in RU-6 (down from 23% in 2013-14) and 3.5% of California non-breeding Snowy Plovers (down from 6% in 2014) (USFWS unpublished data 2016). This indicates a large decline in the wintering population of Snowy Plovers in LAC.

Interestingly, the plovers were observed at more beaches during the winter window survey in 2016 than in most years. While not statistically significant ( $R^2 = 0.182$ ,  $p = 0.14$ ), there does appear to be a tendency for plovers to be found at more beaches in years where their populations are lower. This may indicate problems with disturbance or a lack of food near their traditional roosting areas. Within California in 2016, there appears to be a general trend of higher than normal numbers of Snowy Plovers in Northern California in Recovery Units 2, 3 and 4. The southern areas consisting of Recovery Unit 5 and Unit 6 declined; there was an overall decline from 4,561 plovers in 2015 to 4,051 plovers in 2016 (USFWS 2016).

### Roost Surveys

The roost surveys indicate that the numbers of plovers present in the summer and fall appeared to be similar to numbers seen since 2012 (Tables 3a – 3d), with 193 plovers present in September and 210 present in October. Between the October and November surveys, numbers declined sharply to only 65 and 79 plovers present in November and December 2015 (Tables 3a – 3d). There was a slight recovery in January to 140 plovers (Table 1), and then numbers declined as they normally do until most plovers had migrated by April. At Malibu Lagoon, 0-2 plovers were detected from December until June.

<b>Table 3a. Results of Roost Surveys in 2012-2013.</b>								
<b>Beach Name(s)</b>	<b>Jul 12</b>	<b>Aug 12</b>	<b>Oct 12</b>	<b>Nov 12</b>	<b>Dec 12</b>	<b>Feb 13</b>	<b>Apr 13</b>	<b>Jun 13</b>
Zuma Beach	32	43	53	88	8	75	0	0
Malibu Lagoon	3	34	6	75	64	52	0	0
Santa Monica North	12	32	59	56	54	43	0	0
Dockweiler Beach North	28	4	43	49	62	44	0	0
Dockweiler Beach South	0	6	57	0	12	0	0	0
Hermosa Beach North	0	13	36	6	56	47	0	0
Total Observed	74	132	254	274	256	261	0	0
No. of Beaches	4	6	6	5	6	6	0	0

<b>Table 3b. Results of Roost Surveys in 2013-2014.</b>								
<b>Beach Name(s)</b>	<b>Jul 13</b>	<b>Aug 13</b>	<b>Oct 13</b>	<b>Nov 13</b>	<b>Dec 13</b>	<b>Feb 14</b>	<b>Apr 14</b>	<b>Jun 14</b>
Zuma Beach	0	39	35	5	91	67	ns	0
Malibu Lagoon	1	38	51	0	8	24	0	0
Santa Monica North	0	31	22	74	48	18	8	0
Dockweiler Beach North	53	85	71	61	39	36	0	0
Dockweiler Beach South	0	0	0	0	0	0	0	0
Hermosa Beach North	3	33	79	28	43	40	4	0
Total Observed	57	226	228	254	209	185	12	2*
No. of Beaches	3	5	5	4	5	5	2	1

\*observed in front of the tern enclosure on Venice Beach South.

<b>Table 3c. Results of Roost Surveys in 2014-2015.</b>								
<b>Beach Name(s)</b>	<b>Jul 14</b>	<b>Aug 14</b>	<b>Oct 14</b>	<b>Nov 14</b>	<b>Dec 14</b>	<b>Feb 15</b>	<b>Apr 15</b>	<b>Jun 15</b>
Zuma Beach	ns	ns	24	58	42	0	0	0
Malibu Lagoon	ns	ns	52	60	2	0	0	1
Santa Monica North	ns	ns	41	39	65	39	0	0
Dockweiler Beach North	ns	ns	43	32	6	13	1	0
Dockweiler Beach South	ns	ns	0	0	0	17	0	0
Hermosa Beach North	ns	ns	58	56	42	0	0	0
Total Observed			218	245	157	82	1	1
No. of Beaches			5	5	5	3	1	1

ns-no survey conducted

<b>Table 3d. Results of Roost Surveys in 2015-2016.</b>								
<b>Beach Name(s)</b>	<b>Jul 15</b>	<b>Aug 15</b>	<b>Oct 15</b>	<b>Nov 15</b>	<b>Dec 15</b>	<b>Feb 16</b>	<b>Apr 16</b>	<b>Jun 16</b>
Zuma Beach	0	3	45	37	38	33	0	0
Malibu Lagoon	16	21	26	2	0	0	2	2
Santa Monica North	13	29	48	8	9	19	4	1
Dockweiler Beach North	35	44	36	17	7	0	0	0
Dockweiler Beach South	0	0	0	0	0	ns	ns	0
Hermosa Beach North	32	43	55	1	25	31	0	0
Total Observed	96	140	210	65	79	105	6	3
No. of Beaches	6	6	6	6	6	6	2	2

### **Nesting Surveys**

Nesting surveys were conducted between February 1 and April 30, 2016. No eggs or chicks were detected. However, a male and female plover were detected at Malibu Lagoon and several potential nest scrapes were found on the sand spit. These were monitored weekly but no eggs were ever detected. The symbolic fencing was left in place and the area was provided extra protection through the erection of a second enclosure and the addition of fencing surrounding both areas. No nests, eggs or chicks were detected at other beaches.

**Population Status: Orange County  
Countywide & Window Surveys**

<b>Table 4. County-wide Plover Surveys 2015-16.</b>				
<b>Beach</b>	<b>Sept 2015</b>	<b>Jan 2016</b>	<b>Mar 2016</b>	<b>May 2016</b>
Seal Beach	0	1	0	0
Surfside	1	0	0	0
Sunset	0	0	0	0
Bolsa Chica SB	11	1	34	1
Huntington City Beach	0	0	0	0
Huntington SB	0	15	0	0
Newport Beach	0	0	0	0
Balboa Beach	70	45	37	1
Corona Del Mar	0	0	0	0
Crystal Cove State Park	0	4	0	0
Laguna Beach	0	0	0	0
Salt Creek	52	33	16	0
Doheny SB	0	1	0	0
Capistrano	0	ns	ns	ns
San Clemente City Beach	0	3	0	0
San Clemente SB	0	35 <sup>1</sup>	6	0
<b>Total Observed</b>	<b>134</b>	<b>141</b>	<b>93</b>	<b>2</b>

<sup>1</sup>Plovers detected at San Clemente SB in January 2016 (35) were within the range of the beach segment counted by this project, but were located within San Diego County. In the USFWS range-wide report, these individuals appear within the San Diego County total.

Countywide surveys detected a peak of 141 Snowy Plovers in January, declining to 93 by March, with only two detected in May (Table 4). Fewer plovers were detected in all months compared to both the prior year and annual averages. We observed 134 plovers in September (average = 176, SD = 32), 141 in January (average = 202, SD = 22), 93 in March (average = 116, SD = 30), and 2 in May (average = 2.7, SD = 0.6),

We detected fewer Snowy Plovers present in September 2015 than in 2014 (213) or 2013 (181) (Table 4) (Ryan et al. 2015). This trend continued for the remainder of the non-breeding season, with 141 plovers present in January and 93 in March, both numbers lower than the two prior years, and lower than the average and standard deviation for January (average = 202, SD = 22), and March (average = 116, SD = 30).

Comparing the 2016 winter window survey to prior years is difficult due to incomplete survey data from all beaches prior to 2014. However, there were fewer Snowy Plovers at the Orange County Beaches in 2016 than in either 2015 or 2014 (Table 5). For beaches where surveys have been relatively consistent since 2004, the 2015 numbers appear to be within the normal ranges at the Bolsa Chica Ecological Reserve, Huntington State Beach, and Salt Creek (Table 5). They were lower than previous years at Surfside, Bolsa Chica State Beach, and Balboa (Table 5).

Overall, plover numbers were lower in Orange County in 2016. Overall, Orange County supported approximately 20% of non-breeding Snowy Plovers in RU-6 and 3.7% of non-breeding Snowy Plovers in California.

<b>Table 5. Annual Detections of Snowy Plovers during Rangewide Winter Window Surveys 2004-2016.</b>													
<b>Beach</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Seal Beach	ns	2	ns	0	ns	0	ns	ns	ns	ns	2	0	1
Seal Beach NWS	ns	11	0	0	ns	14	0	0	ns	ns	0*	0*	1*
Surfside	0	0	17	10	11	17	15	4	5	0	10	16	0
Sunset	ns	0	0	0	ns	ns	0	0	ns	7	16*	9	0
Bolsa Chica SB	11	47	43	16	23	9	26	39	44	36	31	55	1
Bolsa Chica ER/Wetlands	0	9	0	34	17	26	0	ns	ns	3	23*	0*	44*
Huntington City Beach	0	0	ns	0	ns	ns	ns	0	0	0	0	0	0
Huntington SB	ns	0	26	23	30	13	13	81	21	20	21	12	15
Newport Beach	0	0	ns	ns	ns	ns	ns	ns	ns	ns	1	3	0
Balboa Beach	ns	12	25	9	24	77	63	40	63	64	125	48	45
Corona Del Mar	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	0	0	0
Crystal Cove State Park	20	19	2	0	ns	0	2	0	10	ns	7	27	4
Laguna Beach	ns	0	0	ns	ns	ns	ns	ns	ns	ns	0	0	0
Salt Creek	38	30	48	0	ns	0	0	0	46	45	16	35	33
Doheny SB	0	0	0	0	ns	0	0	0	0	0	0	3	1
Capistrano	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	0	0	ns
San Clemente City Beach	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	0	0	3
San Clemente SB	0	0	0	0	ns	0	ns	ns	ns	ns	0	0	0 <sup>1</sup>
<b>Total Observed</b>	<b>69</b>	<b>130</b>	<b>161</b>	<b>92</b>	<b>105</b>	<b>156</b>	<b>119</b>	<b>164</b>	<b>189</b>	<b>175</b>	<b>252</b>	<b>208</b>	<b>148</b>
<b>No. of Sites (N)/Surveyed</b>	<b>3/9</b>	<b>7/18</b>	<b>6/12</b>	<b>5/13</b>	<b>5/5</b>	<b>6/11</b>	<b>5/10</b>	<b>4/10</b>	<b>6/8</b>	<b>6/9</b>	<b>9/18</b>	<b>9/18</b>	<b>10/17</b>

\*USFWS unpublished data.

<sup>1</sup>Plovers detected at San Clemente SB in January 2016 (35) were within the range of the beach segment counted by this project, but were located within San Diego County. In the USFWS range-wide report, these individuals appear within the San Diego County total.

## Roost Surveys

Roost Surveys in Orange County detected lower numbers of Snowy Plovers within Orange County in all months compared to surveys in 2014 and 2015 (Tables 6b-6d). The annual pattern was similar to previous years, with plovers returning in July and numbers increasing dramatically by August. This was followed by a slight reduction as migrants passed through. Numbers remained stable as the wintering plovers remain between October and February, with numbers declining in the spring. No nesting was detected on Orange County beaches in 2015-2016.



<b>Table 6a. Results of Roost Surveys in 2012-2013*.</b>								
<b>Beach Name(s)</b>	<b>Jul 12</b>	<b>Aug 12</b>	<b>Oct 12</b>	<b>Nov 12</b>	<b>Dec 12</b>	<b>Feb 13</b>	<b>Apr 13</b>	<b>Jun 13</b>
Surfside	ns	15	18	11	22	ns	ns	ns
Bolsa Chica SB 2	0	29	6	43	12	0	19	3
Huntington SB	0	34	50	81	152	55	10	0
Balboa Beach 2	19	76	106	43	12	71	1	0
Salt Creek	ns	ns	ns	ns	ns	ns	0	0
Trestles	ns	ns	ns	ns	ns	ns	28	0
Total Observed	19	139	162	167	176	126	58 (30)	3 (3)
No. of Beaches	1	4	4	4	4	2	3	1

<b>Table 6b. Results of Roost Surveys in 2013-2014*.</b>								
<b>Beach Name(s)</b>	<b>Jul 13</b>	<b>Aug 13</b>	<b>Oct 13</b>	<b>Nov 13</b>	<b>Dec 13</b>	<b>Feb 14</b>	<b>Apr 14</b>	<b>Jun 14</b>
Surfside	ns	ns	21	16	15	10	0	0
Bolsa Chica SB 2	27	22	47	36	31	42	2	1
Huntington SB	16	17	93	101	25	21	32	0
Balboa Beach 2	65	93	67	72	110	89	1	0
Salt Creek	0	0	0	3	26	0	0	ns
Trestles	0	0	0	39	67	41	0	ns
Total Observed	108 (108)	132 (132)	207 (207)	251 (209)	259 (166)	203 (162)	35 (35)	1 (1)
No. of Beaches	3	3	4	6	6	5	3	1

\*The roosts at Salt Creek and San Clemente State Beach/Trestles were not regularly surveyed until April 2013; counts without these roost numbers are provided below in parenthesis so that population trends can be compared.

<b>Table 6c. Results of Roost Surveys in 2014-2015.</b>								
<b>Beach Name(s)</b>	<b>Jul 14</b>	<b>Aug 14</b>	<b>Oct 14</b>	<b>Nov 14</b>	<b>Dec 14</b>	<b>Feb 15</b>	<b>Apr 15</b>	<b>Jun 15</b>
Surfside	ns	ns	11	1	9	1	0	0
Bolsa Chica SB 2	ns	ns	34	5	34	10	0	0
Huntington SB	ns	ns	21	11	5	18	2	0
Balboa Beach 2	ns	ns	52	63	44	39	8	0
Crystal Cove	ns	ns	8	21	44	39	8	0
Salt Creek	ns	ns	0	30	31	37	4	0
Doheny	ns	ns	0	0	0	0	0	0
Trestles	ns	ns	76	52	63	48	0	0
Total Observed			203	183	211	153	16	0
No. of Beaches			6	6	6	6	3	0

<b>Table 6d. Results of Roost Surveys in 2015-2016.</b>								
<b>Beach Name(s)</b>	<b>Jul 15</b>	<b>Aug 15</b>	<b>Oct 15</b>	<b>Nov 15</b>	<b>Dec 15</b>	<b>Feb 16</b>	<b>Apr 16</b>	<b>Jun 16</b>
Surfside	0	20	0	1	1	0	0	0
Bolsa Chica SB 2	0	9	0	1	3	0	4	0
Huntington SB	9	10	90	6	6	16	6	0
Balboa Beach 2	28	98	4	42	33	25	6	2
Crystal Cove	2	0	0	14	19	6	15	0
Salt Creek	0	0	41	46	33	29	8	0
Doheny	ns	0	0	0	0	0	ns	0
Trestles	0	37	31	26	26	19	3	0
Total Observed	39	174	166	136	121	95	42	2
No. of Beaches	3	5	4	7	7	5	6	1

### **Nesting Surveys**

Nesting surveys were conducted between February 1 and April 30, 2016. No eggs or chicks were detected. Plovers did not nest in the Balboa Beach dunes as they had in previous years. Plovers did nest in Bolsa Chica Ecological Reserve, but this is not within our study area.

### **Roosting Sites – Los Angeles County**

#### **Zuma County Beach**

Zuma was previously the largest roost and supported 41% of the population from 2004-2010 (Ryan et al. 2010). The flock here declined between 2006 and 2007 and remained between 70-90 Snowy Plovers until 2013-14. In 2014-15, this area supported 13.3% of the LAC non-breeding Snowy Plover population, a maximum of 58 Snowy Plovers were detected and they abandoned their traditional roost near Lifeguard Tower 9. This declining trend has continued into 2015-16, with only 10-45 plovers occupying the roost between October and March, or just 7% of the LA County population.

In October 2014 observers noted the presence of a new volleyball court installed by Los Angeles County Beaches and Harbors within the area that had previously supported the main roost of Snowy Plovers at Zuma Beach (Appendix 1: Figure 1) (Ryan et al. 2015). As was done the previous year, heavy equipment placed a large berm within the previous main roosting area at Zuma. In past years heavy equipment was used to place this berm both north and south of the main roosting area, but avoided the roosting area itself. On February 23, 2016, the biologist noted, bulldozers and loaders were working on a berm south of the Special Protection Zone (SPZ), but did not appear to have any biological monitor present. Fresh tracks of bulldozers were observed on the berm within the Zuma SPZ, likely from earlier that day.

During the summers of 2014 and 2015 as many as three beach camps were placed within and adjacent to the SPZ for the Snowy Plovers (Appendix 1: Figure 1). These camps are regularly attended by large numbers of children. A Google Earth image taken on May 1, 2015 clearly shows as many as 21 surfboards and three large easy ups placed within the recommended SPZ at Zuma (Ryan et al. 2015).

Beach grooming and lifeguard vehicles were observed throughout the year, including after the USFWS letter was sent in January 2016. A large film shoot that appeared to include large outdoor lighting was observed immediately adjacent to the traditional roost site in March.

The beach grooming, non-emergency transit by vehicles, film shoot, camps, volleyball court and the berm are all contrary to recommendations made in past reports (Ryan et al. 2014) and modified here (see below) and by the USFWS in a letter sent to the Los Angeles County Department of Beaches and Harbors (LACBH) by Chris Dellith of the USFWS on September 26, 2013 (Appendix 3) and responded to by LACBH staff on January 23, 2014, as well as the discussion that occurred between USFWS agents, State Parks, LA County Fire, and LACBH during their meeting at Malibu Lagoon on September 16, 2013. These recommendations specifically state that efforts to protect wintering Snowy Plovers on LAC beaches should be implemented between July and April-May within an area 250 x 500 ft. from the known roost location and within SPZs (Appendix 1: Figure 1). Recommendations include avoiding recreational events in these areas and limiting the use of vehicles and heavy machinery in these areas.

Here we recommend: 1) requesting the surf camps operate outside the SPZ shown in Figure 1; 2) moving the volleyball court outside of the SPZ; and 3) only creating berms at locations where they were placed in previous years, using data provided in this and previous reports to determine potential Snowy Plover roosting areas and avoiding them, as well as the use of monitors and best management practices to avoid harassing the Snowy Plovers during the installation and removal of these berms.

### **Malibu Lagoon**

Malibu is the fourth largest roost and typically supports about 16% of the county population (Ryan et al. 2010), and in 2014-15, it supported 12.8% during the winter window survey in January. However, following the January 2016 count, the plovers disappeared. A few individuals were detected by local birdwatchers in February and early March (ebird 2016). However, none were detected by surveyors until mid-March, when 3 were observed. From April 2016 to June 2016, a male and female were present. Courtship was observed and scrapes, including potential nest scrapes were found. No eggs or young were detected. Because of the presence of this potential pair, the enclosure was left standing and an additional enclosure was installed in the area where scrapes were observed.

Heavy beach erosion was noted here in September and October, the sand bar breached in November and the beach became much wider than normal. There were also more reports of people within the enclosure throughout the fall and winter, including people with unleashed and leashed dogs. This included a person who set up a tent in July, a photographer in August, and an apparently homeless individual who was observed camped within the enclosure in March and April 2016. In April 2016, two sets of heavy equipment tracks were observed within 50 ft of the enclosures and scrapes. The enclosure was set up in March 2016 in collaboration with California State Parks; it was maintained by staff and volunteers throughout the summer months and was removed in mid-November.

For Malibu Lagoon, we recommend: 1) requesting the surf camps and large surfing events operate outside the SPZ (Appendix 1: Figure 2); or given the configuration remain outside of State Park jurisdiction; 2) that there be increased enforcement of dog regulations; and 3) increased outreach by State Parks staff and rangers to keep people out of the enclosures, particularly those who set up informal camps within the enclosure.

### **Santa Monica State Beach**

The roost at Santa Monica usually supports about 8% of the countywide wintering population of Snowy Plovers (Ryan et al. 2010), but supported 18% of the population in 2015-16, with 8-27 Snowy Plovers observed during the peak non-breeding months. This is lower than the 54-59 Snowy Plovers here in 2012-2013 and 22-74 in 2013-2014 (Ryan et al. 2014).

The City of Santa Monica installed the protective enclosure earlier than they had in the past, prior to the August 2015 survey. The enclosure initially was 300 x 90 feet in 2015-16 and located 800 ft south of its original location. However, as Figure 3 shows, as in the previous two years, the Snowy Plovers have often been found outside of the current enclosed area, but within and adjacent to the previous enclosed area. We continue to recommend at that the City of Santa Monica consider increasing the size of the enclosure to it's previous dimensions of 600 x 100 ft. and shift it north, closer to it's original location to cover areas frequented by the Snowy Plover (Appendix 1: Figure 3).

We are also concerned about the placement of the Surf Camps each summer. This year a camp was placed immediately north of the enclosure site prior to its construction. We strongly suggest that any permits issued for these camps place them outside the SPZ as recommended by the USFWS. The Snowy Plovers return in July and the camps run through August.

In December 2015, February 2016 and March 2016, a trash truck was observed operating immediately adjacent to the enclosure, it regularly drove through the roosting plovers, flushing them. In both March and April vehicle tracks were observed in front of and within the enclosure. Biologists observed several speeding vehicles (>15 mph). In September 2015, a lifeguard truck 1423326 was observed speeding. On March 1, 2016, a trash truck was observed speeding; on March 8, 2016, a lifeguard vehicle 1423377 was estimated at over 30 mph and it's tracks were measured at 15 ft from roosting plovers.

On November 20, 2015, volunteer Lu Plauzoles found a fresh dead snowy plover approximately 40 m north of the enclosure within the area shown on the attached map (Appendix 1: Figure 3). It was found within 4-5 inches of fresh tire track. The carcass was collected and provided to the California Department of Fish and Wildlife's Wildlife Investigations Laboratory in Rancho Cordova, California, where staff attempted to necropsy the carcass, but it was too decayed to be necropsied.

### **Venice Beach**

In 2015-16, 7-13 Snowy Plovers were again observed at Venice Beach during beachwide surveys in January, March, and September. We recommend that this site be included in future roost surveys and that a Special Protection Zone be created for this site between Privateer and Lighthouse (Appendix 1: Figure 4).

## Dockweiler State Beach

In 2015-16, the northern roost near **Lifeguard Tower 47 (LT 47)** (Appendix 1: Figure 5), was the second largest Snowy Plover roost in LAC. It supported 18.5% of the LAC population, and ranged between 7-35 plovers, a lower percentage than previous surveys (Ryan et al. 2010, Ryan et al. 2014, Table 2). Los Angeles Audubon, USFWS, and LACBH have all worked as a team to maintain the fence and pick up trash. We replaced the snow fencing with the wooden-slat fence and it remained in place through the entire 2015-2016 season (Appendix 1: Figure 5). There was no vandalism to the fence and during most clean-up visits trash has been minimal and invasive plant removal (sea rocket [*Cakile maritima*]) and iceplant [*Carpobrotus edulis*]) was easily completed. There are four native coastal strand/dune plant species that are voluntarily colonizing the enclosure area. These include *Atriplex leucophylla* [beach saltbush], *Abronia maritima* [red sand verbenal], *Ambrosia chamissonis* [silver beachweed or silver beach burr], and *Camissonia cheiranthifolia* [beach primrose]. In spring 2016, LACBH requested that all vegetation, both native and non-native, be removed from the enclosure. During the summer of 2016, after photo-documenting the site, vegetation was removed by hand, and sections of the fence with heavy sand deposits were dug out by hand as well. Evidence of fossorial small mammals was observed repeatedly, as well as the presence of active ant colonies, and numerous other unidentified invertebrate species.

Vehicles were more of a problem at Dockweiler State Beach (SB) this year than in past years. Speeding vehicles (>15 mph) were observed at Dockweiler at LT 47. In September, a lifeguard truck (1443206) and a red lifeguard pick-up truck (no plate read) were reported. ATV tracks were observed inside the enclosure in October. In February, a lifeguard truck was observed and video was taken of it driving in front of the enclosure and through the roosting flock, causing them to flush. Observers also noted the presence of vehicle tracks in front of the enclosure in other months, including fresh vehicle tracks in December, February, and on March 8, 15, 22, and 29. We recommend that vehicles avoid this area to the extent possible because the Snowy Plovers are often located between the enclosure and top of the beach slope. We also observed dog tracks in the enclosure and support enforcement of existing dog regulations on this beach.

At the southern roost, north of **Lifeguard Tower 58 (LT 58)** (Appendix 1: Figure 6), we detected 0-8 Snowy Plovers in 2015-16. They were detected only in September, January, March, and May. Previously, this site supported 5.6% of the LAC population (Ryan et al. 2014). These individuals may move between here and the LT 47 roost site, accounting for some of the reduction in the number of Snowy Plovers there.

This roost is not protected and is regularly groomed and driven through. A berm to protect nearby infrastructure and fire pits placed in front of the adjacent RV park is installed and removed annually north of the Snowy Plover roosting area. The berm was installed in the same location in 2015-16. We recommend that an enclosure be considered for this location as it is between the Dockweiler Youth Center and the RV Park in an area not often used by the beach-going public. This roost site also has great educational value, as it is the focus of the beach walks jointly coordinated by Los Angeles Audubon and Dockweiler Youth Center.

## **Hermosa Beach**

In 2014-15, we detected between 1-34 Snowy Plovers from November to March, or 24% of the LAC non-breeding population. This is somewhat lower than past years (Ryan et al. 2010). As in past years, the location of the roost was variable (Appendix 1: Figures 7 and 8). There appears to be two distinct clusters of activity, one between 18<sup>th</sup> to 22<sup>nd</sup> Streets, and another between 26<sup>th</sup> and 28<sup>th</sup> Streets. There is likely movement between the two roosts, but both areas are used regularly enough and have been active in the past that we recommend two SPZs at Hermosa Beach, protecting both roosts.

LAC lifeguard trucks were observed driving through the plover roost at >15 mph causing the plovers to flush on February 23 and March 15. An LACBH truck was observed speeding 15 ft from roosting plovers on March 8. Roosts are regularly groomed, patrolling vehicles regularly pass through it, and dog tracks are regularly observed in the area. We have also seen movements like this at Zuma, another beach with heavy disturbance at the roost site (Ryan et al. 2010).

## **Other Beaches**

Snowy Plovers were also reported from Will Rogers SB, El Segundo & Manhattan Beach, Hermosa Beach South, King Harbor, Cabrillo Beach, and Belmont Shore (Table 1, ebird 2016).

## **Roosting Sites – Orange County**

### **Surfside**

Surfside Beach normally supports a small roost of 1-16 or about 4% of Snowy Plovers in Orange County. In 2015-16, 20 plovers were observed during migration in August, but only one was observed until December, then none after that (Appendix 1: Figure 9). This beach is not formally groomed, but the local homeowners remove kelp from the beach. This beach also has a large number of off-leash dogs. In 2009, a dog captured a Snowy Plover and it was brought to a wildlife rehabilitation facility (P. Knapp pers. comm. *in* Ryan and Hamilton 2009). A berm was installed in November 2015.

### **Bolsa Chica State Beach**

Bolsa Chica SB typically supports the third largest roost in the county and is immediately adjacent to the main nesting area in OC, the Bolsa Chica Ecological Reserve. In 2015-16, there were only 0-3 plovers between October and February, and during the second week of March, a flock of 20-37 plovers remained for about three weeks. Most Snowy Plovers were observed on the broad beach north of the Bolsa Chica tidal inlet (Appendix 1: Figure 10).

This is a broad sandy beach, with fire pits and a public parking lot backing it. It is very popular with beachgoers during the summer months. Surf camps are regularly set up within the SPZ. A large surfing event was held here in September. Off-leash dogs were regularly observed, flushing the plover flock on March 16 and 23.

### **Huntington State Beach**

Formerly the second largest roost in Orange County, this roost only supported 7% of non-breeding plovers in 2014-15, and 11% in 2015-16. After 90 were observed here in migration during October, only 4-16 were observed for the rest of the non-breeding season. The Snowy

Plovers were observed at the southern end of this beach, between Magnolia and the Santa Ana River outlet (Appendix 1: Figure 11).

This is a broad sandy beach, with fire pits and a public parking lot backing it. It is very popular with beachgoers during the summer months. During the course of the year this area hosts music festivals, one occurred in September 2015, another in April-May 2016. It is also a popular beach for commercial filming. Speeding vehicles were observed here in September (State Parks truck 148811) and March (Jeep 1044683 drove through the roosting plovers). Off-leash dogs were frequently observed here.

In September on the adjacent Huntington City Beach, the Wetlands and Wildlife Care Center received two sanderlings and one juvenile Snowy Plover with observed symptoms similar to avian botulism. The Snowy Plover was found at the Dog Beach at Huntington City Beach. The Snowy Plover and one of the sanderlings died, the other sanderling recovered and was released. Autopsies were inconclusive.

Given the recent decline at this roost, we would suggest that State Parks consider moving these types of events outside the recommended SPZ (Appendix 1: Figure 11) at the main roosting location. If this is not possible, then we suggest that a monitor observes the Snowy Plovers during these events and documents any changes in behaviors, observing the roost 3-5 days prior to the set-up of the event, during set-up operations, during the event itself, and then 3-5 days following the event. We suggest that the observers should record roost numbers and locations hourly, the number, duration, and if necessary, distance of flushing events and observed causes (if any). These data should be analyzed and recommendations made regarding minimizing disturbance to roosting Snowy Plovers on the beach.

### **Balboa Beach**

Balboa Beach supports the largest roost in the county and is immediately adjacent to a large residential area on the Balboa Peninsula (Appendix 1: Figure 12). In 2014-15, 29% of non-breeding Snowy Plovers in OC were here. In 2015-16, as was observed throughout OC, larger numbers were present during fall migration (66-89) plovers, declining to 4-45 between October and March. With 32% of the plovers, this is still the largest roost in the County, but the peak count is much lower than the consistent 90-125 detected here in previous years.

This roost had the highest numbers of speeding vehicles in 2015-16, a City of Newport Fire Department vehicle was observed in September and two City of Newport trucks in October. Off-leash dogs we reported here from every survey, including dogs flushing the plovers. This beach, including the SPZ is groomed regularly.

In the fall of 2014, the City of Newport Beach constructed a 300 foot long sidewalk adjacent to the fence at the Balboa Beach Snowy Plover roost, extending from E Street (Ryan et al. 2015). This ran immediately adjacent to a fenced Snowy Plover area and directly into one of the main Snowy Plover roosting areas from 2014 (Ryan et al. 2014). This disturbance likely flushed the Snowy Plovers from this roosting area in 2015 and likely contributed to the reduced numbers here in 2014-15. It appears that this effect has continued into 2015-16. Additionally, this beach became narrower during the fall months due to beach erosion from late summer/fall hurricanes in the central Eastern Pacific. This is a broad sandy beach, with residential homes backing it. It is very popular with beachgoers during the summer months. It also supports a 1.24 hectare dune

restoration area where a pair of Snowy Plovers has nested in recent years. This is the only known beach nesting Snowy Plover pair on the mainland in LAC or OC, although they did not nest here in 2015 or 2016.

### **Crystal Cove State Park**

The Snowy Plover had been listed as “occasional” during the fall, winter and spring months on the park’s bird checklist (Bales, unknown date). We included Crystal Cove State Park in the 2014-2015 roost surveys. That year, we detected 0-31 Snowy Plovers here between September 2014 and April 2015, representing 9% of the OC nonbreeding population (Ryan et al. 2015). In 2015-16, we detected between 4 and 19 plovers here from their arrival in November until their departure the third week of March (Appendix 1, Figure 13). This beach is a relatively small and narrow pocket beach, there is no grooming, but it is subject to wave erosion and there are maintenance and lifeguard vehicles that patrol it. No speeding vehicles were reported while plovers were present.

### **Salt Creek**

Salt Creek typically is the 4<sup>th</sup> largest roost in OC, with 15-18 plovers present (Appendix 1: Figure 14). In 2015-16, it was the second largest, with 23% of the OC population of plovers. Between 25 and 46 plovers were detected between October and March. This beach is very popular throughout the year. It is visited by guests at the adjacent Ritz Carlton Hotel and the Monarch Bay Club, as well as public access through the Salt Creek Beach Park. It is well-patrolled. Part of the beach is regularly groomed and the outlet of Salt Creek is occasionally opened using machinery. Though not speeding, twice in March lifeguard vehicles drove through the roost, flushing plovers and parked in the middle of the roost. A maintenance vehicle was observed speeding and flushing plovers in March. Off-leash dogs were reported here in March and April. There is a large surf camp/junior lifeguard program here during the summer months.

### **San Clemente State Beach/Trestles**

The plover roost at Trestles/San Clemente State Beach, typically supports 26-76 plovers (Appendix 1: Figure 15). In 2015-16, was the second largest roost, with 15-35 plovers present between October and March, representing 25% of the OC population. These birds appear to shift their roosting area during the year and sometimes move south of our survey area and onto Marine Corps Base Camp Pendleton’s Green Beach near Lower Trestles.

This beach is heavily used by surfers throughout the year. However, most of the year the surfers tend to transit the area used by roosting Snowy Plovers, minimally disturbing them. During the summer months it can fill-up with beachgoers. A speeding State Park vehicle (1448925) was observed in September. In February 2016, a boat washed ashore and was placed on the sandy beach. Recreational use at the beach was also higher than normal in February, likely due to unseasonably warm weather. Off-leash dogs were reported here in March.

### **Other Beaches**

Snowy Plovers were also reported from Seal Beach (1 in January 2016), Doheny State Beach (1 in January 2016), and San Clemente City Beach (3 in January 2016).

### **Nesting**

No nesting was detected on LAC or OC beaches in 2015-16.



### **USFWS Guidance for Special Protection Zones**

In the 2009 summary report, we recommend that all non-breeding Snowy Plover roosts in LAC and OC be considered as SPZs and suggested measures be implemented within these zones to better protect the plovers and reduce the potential for non-permitted take by local beach agencies (Ryan et al. 2010). Subsequent to these recommendations, there was one confirmed vehicle strike in Malibu in 2014 and a second potential strike in Santa Monica in November 2015. Vehicles are regularly reported exceeding their agencies' recommended speed of 10 mph. Beach grooming has continued to remove valuable foraging resources adjacent to known roosts at all but the Malibu Lagoon roost in LAC and at the Surfrider, Balboa and Salt Creek roosts in OC. Off-leash dogs are regularly observed and reports of them flushing plovers are regular as well. We have suggested that the flushing or driving of plovers from their winter roosts represents harm and harassment as defined by the federal Endangered Species Act (ESA) and violated California's Fish and Game Code (Ryan et al. 2010). Agencies have been reminded of this as part of our annual reports and at beach managers meetings.

On January 19, 2015, the Ventura Fish and Wildlife Office (Ventura FWO) issued guidance to beach managers regarding avoiding the "Take" through "Harm" and "Harassment" of Snowy Plovers protected as a Threatened species by the ESA (Appendix 3). The Ventura FWO recommends that the agencies consider applying for a Habitat Conservation Plan (HCP) in order to permit activities that they consider to be "Take" under the ESA. These activities include beach driving, mechanical raking (beach grooming), recreational use, presence of domestic animals (i.e. dogs), and human refuse that attracts predators (Appendix 3). They recommend that efforts be implemented within 500 feet of the central roost locations. These measures should be implemented from the arrival of the plovers (typically July) to their departure (typically April or May), with measures at Surfrider Beach in Malibu (Malibu Lagoon) implemented year-round. They refer to these areas as SPZs and recommend that they be managed differently until an HCP can be implemented.

These recommendations include the training of all beach drivers, avoidance of SPZs by all drivers, with exception of essential patrols, which should remain below 10 mph and back up and avoid plovers when encountered, and emergency response activities. It recommends that regular sand grooming be discontinued in SPZs, and if needed, trash should be removed by trained individuals. Wrack should be left in place. The SPZ's should be marked with signage. Within the SPZs "refuge areas" should be created in a suitable configuration, but approximately 300 feet in diameter using symbolic fencing or other suitable barrier during periods of high beach use. Additionally, large scale recreational activities and camps should not be permitted by agencies within SPZs.

In Appendix 1, we provide maps of each Snowy Plover roost in both LAC and OC. We have provided recommended SPZs based on mapped roost locations from 2007 to present in LAC and 2014 to present in OC (Ryan et al. 2010, 2011, 2012, 2014, 2015). We did this by measuring the center point based on these maps, and then measuring 500 ft from the center point linearly along the beach. Inland, we placed the boundaries based on physical barriers such as recreational areas, beach trails, cliffs, or housing that Snowy Plovers are not known to use and appear to avoid. We recommend that these be used as a starting point, but that they may be modified depending on annual plover movements.

## **Education and Outreach**

### **Volunteer participation in the Snowy Plover monitoring program**

From September 2015 through May 2016, 52 individuals volunteered to monitor Snowy Plovers in LAC, contributing over 301 person-hours to the project. Of these 52 people, 65% participated in more than one survey and 29% participated in all 4 surveys. Between March and July 2016, six volunteers collectively contributed over eight hours to installing and maintaining symbolic fencing at Malibu Lagoon.

In OC, 62 individuals volunteered to monitor Snowy Plovers, contributing over 370 person-hours to the project. Of these 62 people, over 64% participated in more than one survey, and 26% participated in all 4 surveys. Sea and Sage Audubon in OC trained 14 new volunteers, conducting in-classroom training on September 9, 2015 and March 12, 2016. Field training, as needed, was provided to supplement in-classroom training or when in-classroom training was not available.

### **Formalized Docent Program**

The project team secured funding in 2008 to develop a Snowy Plover docent program, and brochures and interpretive materials aimed at the general public have been created. The project team continues to work with Dockweiler Youth Center (LACBH) and the Annenberg Community Beach House to lead a series of Snowy Plover-focused beach walks for the general public, and to coordinate public school presentations and visits to observe Snowy Plovers (Table 7). From fall 2015 to summer 2016, 9 volunteers collectively spent 80 hours working directly with the public through field trips, walks, and presentations (Table 7). Through outreach activities, we have worked to establish community connections that will provide volunteers for both data collection and docent activities.

### **Orange County Outreach**

In OC in 2015-2016, team leaders volunteered over 150 person hours to complete administrative tasks, surveys, volunteer training and appreciation, and outreach. Outreach was aimed at recruitment of surveyors and public awareness of the survey and Snowy Plovers. The survey was announced at every Sea and Sage Audubon General Meeting (9 per year), every 4<sup>th</sup> Tuesday Conservation Lecture (7 per year), and various events throughout the year. Sea and Sage Audubon's Science Committee Chair contacted nearby universities and colleges to recruit students to the program and our Facebook Chair posts every survey multiple times. Flyers, posters, and business cards are placed at various venues and email announcements are sent to science/conservation interest lists. Announcements are included in the chapter newsletter, with a circulation of over 3000 members, and on the chapter website. In January 2016, volunteers were recruited at a community program in Dana Point. Each year in conjunction with the May 4<sup>th</sup> Tuesday Conservation Lecture, Sea and Sage Audubon pays tribute to the OC Snowy Plover Survey volunteers. In May 2016, 78 specially designed Certificates of Appreciation were distributed to volunteers and key personnel assisting in the OC Snowy Plover Survey Project.

Sea and Sage Audubon gave a 15 minute illustrated outreach and recruitment talk at two Audubon chapters' general meetings: on September 10, 2015 at Laguna Hills Audubon, there were 48 attendees; and on September 18, 2015 at Sea and Sage Audubon, there were 58

attendees. The talk, which is aimed at adults, described the OC survey and provided information about the Snowy Plover.

Sea and Sage Audubon conducted a Snowy Plover themed field trip on Balboa Peninsula and Huntington State Beach on October 17, 2015. The trip provided information about how and when Snowy Plovers use OC beaches to rest, feed, and breed. More than 19 people attended, including local Balboa residents and a junior high student collecting information for a school science report.

In the summer of 2015, 24 campers, ages 11 to 17 years, participated in the Snowy Plover youth presentation at Sea and Sage's Marsh Coastal Camp Program. The posters made at camp are being used in Sea and Sage Audubon's OC Snowy Plover promotional and outreach materials. This program has been adapted to present at other opportunities. Sea and Sage Audubon has expanded its networking to develop these opportunities. The youth program includes 30 minutes interpretive and informative material on biology and status, followed by a period of hands-on activity creating posters on "How to protect and save".

### **Orange County Outreach, Future Plans**

Sea and Sage Audubon developed a full length program from the 15-minute program. Two full-length presentations were made at the Huntington Beach Wetlands and Wildlife Care Center on September 8, 2016 with 19 attendees, and a second presentation was made on September 15, 2016 at El Dorado Audubon with 33 attendees. A North County Snowy Plover field trip was conducted on October 8, 2016 at Balboa Peninsula, with 21 attendees. A South County field trip is scheduled for Salt Creek on February 11, 2017. Sea and Sage Audubon will complete and provide the youth outreach program to the California Department of Fish and Wildlife (CDFW) in January 2017.

### **Los Angeles County School Outreach Program**

We explored multidisciplinary ways to engage young, inner-city students in Snowy Plover conservation. In 2008, we worked with Dorsey High School to create a public service announcement about Snowy Plover conservation. Since its creation, it has been viewed 4,300 times on youtube.com and is also being used as part of the Ventura Audubon chapter's outreach efforts. Snowy Plover conservation posters created by elementary school students in the spring 2010 continue to draw viewers to Los Angeles Audubon's online gallery (<http://losangelesaudubon.org/education-mainmenu-194/science-illustration-mainmenu-244/624-snowy-plover-gallery>), and these signs have been used at both the Malibu Lagoon seasonal enclosure and the Dockweiler Youth Center display case. Our online gallery has garnered over 7,800 web hits since it was posted in the summer of 2010.

Since August 2010, the Snowy Plover enclosure at Dockweiler Beach near LT 47 has proven to be an outstanding resource for education/outreach as well as conservation. However, during the winter and spring of 2016 we shifted the location of our field trips to Dockweiler 58, due to construction projects near Dockweiler 47. This new site served equally well logistically, though there were fewer opportunities for students to view plovers. Los Angeles Audubon has also integrated coastal issues, like Snowy Plover conservation, into its education programs at upland sites within the Los Angeles basin. Dorsey High School students in Los Angeles Audubon's Baldwin Hills Greenhouse Program developed a Snowy Plover-themed environmental science

curriculum, received docent training, and subsequently led elementary school students on field trips to Dockweiler Beach. This same group of students was also responsible for setting up and implementing a bilingual Snowy Plover and California Least Tern information table at public school events in April 2016 that drew hundreds of community members. Through a grant from the Disney Worldwide Conservation Fund in 2014-2015 and 2015-2016, we were able to expand our field trip and presentation outreach programming, serving students from 11 schools within Los Angeles Unified School District during the school year. See Table 7 for a complete list of all outreach activities conducted.

### **Los Angeles County General Public Outreach**

Since the fall of 2010, we have coordinated with the Dockweiler Youth Center to provide a series of guided beach walks for the public. In February of 2012, we began collaborating with the Annenberg Community Beach House in Santa Monica to provide a similar program at their facility. We participated in eco-fairs and meetings from fall 2015 to summer 2016 to provide the public with information about Snowy Plover conservation in Los Angeles County (Table 7). Capitalizing on our strong partnership with California State Parks at Malibu Lagoon, we collaborated with this agency to provide an enclosure of symbolic fencing with interpretive signage from April through October 2016, and we aim to continue coordinating a small site-specific core of volunteers to help monitor this site and establish permanent interpretive signage.

**Table 7. Outreach and education activities in Los Angeles County conducted from summer 2015 through summer 2016, including presentations, tabling events, beach walks, and field trips.**

<b>Activity</b>	<b>Date</b>	<b>Location</b>	<b>Demographic</b>	<b>No. Attending</b>
Dockweiler Youth Center (beach walks)	21-Nov-15 13-Dec-15 9-Jan-16	Dockweiler Beach	General public	7
Annenberg Community Beach House (beach walks)	20-Dec-15 24-Jan-16	Santa Monica Beach	General Public	62
Public School Field Trips	15-Jan-16 22-Jan-16 29-Jan-16 5-Feb-16 11-Feb-16 18-Feb-16 19-Feb-16 27-Feb-16 3-Mar-16	Dockweiler State Beach	Los Angeles Unified Public School students	448

Activity	Date	Location	Demographic	No. Attending
Public school Presentations	2-Oct-15 20-Jan-16 23-May-16 3-Feb-16 27-Jan-16 25-Feb-16 25-Feb-16 1-Feb-16 8-Feb-16 17-Feb-16 13-Jan-16 29-Feb-16	Various Los Angeles Unified School District campuses ( <i>many of the same students attended the field trips as well</i> )	Public school students	593
Professional Presentations	13-Jan-16 26-Jan-16 17-Nov-16	Range-wide Meeting Beach Ecology Coalition Meeting Recovery Unit 6 Meeting	Science professionals; Beach management professionals; Upper division college students	Est. over 150
Eco-fairs and other tabling events	12-Mar-16 2-Apr-16 16-Apr-16 21-Apr-16 28-Apr-16 29-Apr-16 7-May-16 19-May-16 21-May-16 25/26-Jun-16	Los Angeles Arboretum Education Fair, Debs Park Audubon Earth Day, Cabrillo Aquarium Earth Day event, LA Air Force Earth Day, West LA College Eco Fair, Politi Conservation Art Show Bird Day LA, Santa Monica College Job Fair, Carthay School Science Fair, LACo NHM LA Urban Nature Fest	General public	Estimated at over 1700

### Creation of public displays

As mentioned above, we worked with elementary school students to create Snowy Plover conservation posters in 2010. The public may view this artwork online at the Los Angeles Audubon website. During the 2013-2014 and 2014-2015 school years, we collaborated with Los Angeles Unified School District schools to create and display Snowy Plover-themed artwork. We will continue to collaborate with other organizations to provide venues in which to display interpretive information about Snowy Plover conservation on both a temporary and permanent basis. We have submitted to California State Parks a draft design for a permanent interpretive sign at Malibu Lagoon, which is currently pending review by the agency.

### Creation and maintenance of a website

Los Angeles Audubon currently hosts a Snowy Plover website within its general website (losangelesaudubon.org). Volunteer materials, annual reports, updates, maps of Snowy Plover locations from volunteer observations, and student conservation posters have been posted to this site. Since we set it up in 2008, the main webpage containing Snowy Plover conservation information received over 10,900 page views, and our gallery of student conservation posters received over 7,800 page views since 2010.

Sea and Sage Audubon hosts a Snowy Plover webpage for Orange County within its general website ([seaandsageaudubon.org](http://seaandsageaudubon.org)), created and maintained by volunteer staff. General Snowy Plover information is available as well as information about this survey. All volunteer materials are available for download including a list of beach segments with downloadable maps. In the weeks before and after a survey, this site becomes the active place for volunteer surveyors to select their beach segment. It displays which segments are available. It also displays which segments have completed their survey and turned in their data.

### **Create signage for the winter and breeding season fencing**

The project team secured funding for the creation of signage for the enclosure at Dockweiler, and signs were installed in August 2010. In addition, conservation posters created by elementary school students were printed on durable plastic as well as in laminated form and are routinely used at Malibu Lagoon enclosures.

### **Create and implement a beach driver-training program**

The project team created an informational handout to be provided to all lifeguards and included in their training program. It covers information about identifying, detecting and avoiding Snowy Plovers and provides maps to the Snowy Plover roosting areas. This was also provided to LACBH for inclusion in their training program. The project team has offered to provide presentations to both groups upon request, and we have provided materials to California State Parks and Sea and Sage Audubon, as well. In 2016, we updated the beach driver handout to reflect information provided in the January 2016 USFWS letter to beach managers (Appendix 3). The handout is available for download on the Los Angeles Audubon website.

### **Recommendations for Future Education and Outreach**

The following recommendations range from sustaining existing programming to greatly expanding aspects of outreach and education. All are contingent on future funding opportunities and staff availability. Opportunities to seek collaborative funding with colleges and universities, beach management agencies, beach-oriented non-profit organizations, and other coastal Audubon chapters appear to be the best way to move forward with these ideas.

- Continue to work towards sustainability in monitoring and outreach programs. Expansion to more public schools and interested groups throughout LAC and OC is an ultimate goal. However, the project team feels that it is extremely important to maintain a solid, consistent training program for volunteers and develop strong, sustainable relationships with the agencies charged with managing sites where the docent program will be conducted.
- Continue to link Snowy Plover outreach efforts to other conservation programs. Los Angeles Audubon also coordinates volunteers for monitoring and habitat restoration of the Venice Beach Least Tern colony. Outreach presentations address the similar conservation needs of both species, and a concerted effort to link volunteer recruitment between the two programs could greatly benefit both. In addition, connecting these avian programs to grunion conservation efforts could help promote sandy beach conservation in general.
- Create a questionnaire for beachgoers at sites in need of additional protections. Questionnaires should be provided to local residents and tourists during both the winter “off season” and “peak use” summer months, inquiring about feelings on sharing the beach with Snowy Plovers, types of beach use, what part of the beach is used by the public and when

(time of day and time of year), and preferences for different types and placement of protections for the Snowy Plover. The answers gathered could then be considered in the design and placement of protective measures, including enclosures, and could also help direct and refine outreach efforts. The project team believes that to develop a public survey with genuine scientific credibility it will be important to partner with a university graduate program or other professional organization with expertise in the social sciences to design and implement the questionnaire. A similar survey was conducted by Heal the Bay (Stevenson et al. 2011) to gain insight into subsistence angler opinions about Marine Protected Areas.

- Continue to establish organizational partnerships. In LAC, a large number of government and non-profit organizations maintain sites or conduct events at or near the beach. Establishing positive collaborations with organizations like California State Parks, the Annenberg Community Beach House, the Dockweiler Youth Center, local aquaria, and Heal The Bay to develop public displays and events will help integrate Snowy Plover conservation outreach into a broader ecological context, give it a wider audience, and provide greater funding opportunities.
- Continue to establish academic partnerships. The project team should continue to find ways to integrate undergraduate students from local colleges and universities in community-based science and docent programs. In addition, securing funding to attract graduate students to the project would be an excellent way to expand the ecological and sociological aspects of the study while maintaining the core efforts of monitoring and outreach.
- Continue to improve signage and place signage near enclosures and Snowy Plover roost sites, when possible. This is needed to inform the public about the enclosures and why protecting the Snowy Plover is important.
- Create a media packet for local business and homeowner associations that operate near Snowy Plover beaches. The packet should include a DVD of the public service announcement, as well as resources regarding dogs on the beach and general Snowy Plover conservation awareness.

## ACKNOWLEDGEMENTS

We first wish to thank each of our volunteers who participated in the monitoring and docent programs. This study would never have happened without the generous donation of their time and effort. We thank CDFW for funding this study. We thank Sandy Vissman, and Katy Kughen of the Carlsbad USFWS Office and Chris Dellith of the Ventura USFWS Office for their assistance with study design, execution, permits, and assistance with understanding federal regulations pertaining to Snowy Plovers. We thank Jamie King, Danielle LeFer, and California State Parks staff for invaluable assistance in setting up and removing the Malibu Lagoon enclosure. We wish to thank Ken Foreman and the staff of Los Angeles County Beaches and Harbors, the Dockweiler Youth Center, the staff of the Los Angeles County Lifeguards, the California Coastal Commission, California State Parks, Dean Kubani, Paul Davis and the staff of the City of Santa Monica for their hard work in helping to protect the Western Snowy Plover. We thank Nan Friedman of the Annenberg Community Beach House for helping us reach a new audience each year for Snowy Plover conservation. We thank Orange County Parks and Lana Nguyen of California State Parks for their assistance with studies at their facilities. We thank Susan Sheakley and the volunteers and staff of Sea & Sage Audubon for their assistance and support. We thank educators and students at Los Angeles Unified School District high schools, middle schools, and elementary schools. We would especially like to thank our 2016 Environment for the Americas intern, Joyce Realegeno, for her hard work on this project.

### 2015-2016 Snowy Plover Volunteers

Los Angeles County Volunteers		
Adriana Baltazar	Izzy Carrol	Montse Plascencia
Alex Garrison	Jamie Lowry	Olivia Le Sage
Alice Hsieh	Jane Beseda	R. Brody
Allison Brandin	Janie Russell	Rich Waters
Amber Lessing	Jess Morton	Richard Philibosian
Brenda Ramirez	Jimmy Perez	Robert Jeffers
Catalina Brody	John Rowden	Ron Melin
Charlotte Maddela	Jose Bacallao	Sandy Summer
Chris Lord	Joyce Realegeno	Sara Jane Bacallao
Christina van Oosten	Judith Thompson	Shirley Imsand
Daniel Perez	Karen Martin	Sofia Pizer
Dorothy Steinicke	Kat Bacallao	Sofia Prenter
Duly Gonzales	Kei-Lwun Yee	Stacia Hassett
Eleanor Osgood	Laurel Jones	Susan Considine
Erica Gaeta	Lu Plauzoles	Tara Treiber
Grace Murayama	Mara Thompson	Tommye Hite
Greg Gladkov	Martha Balkan	Victoria Rosenfield
Felisha Wong	Mary Cruz	Walter Lamb
Hank Borenstein	Michelle Black	Zehava Purin-Adimor
Isabella Bacallao		



Orange County Volunteers		
Adam Levitan Amanda Alvarado Amber Heredia Babs Levitan Bettina Eastman Bob Holcomb Brian Sandstrom Bruce Aird Cheryl Egger Christina Van Oosten Christine Stoughton Chuck George Claire Grozinger Cris Whetstone Dana Lee Debbie Koken Denise Gellene Don Yeutter Doug Lithgow Elisa Yang Eva Lydick Hal Sheakley Holly Fuhrer Jahan Kahlili James Stacy	Janet Yeutter Jeanette Bates Joseph Vu Julie Hall Karine Parry Kelly Morgan Kelsi Black Keyan Kahlili Kim DiPasquale Kim King Lana Nguyen Lauren Dorough Lauren Singleton Linda Swift Lori Caldwell Luiz Gonzales Maia Nguyen Marchia Morey Maria Nguyen Marissa Andaloro Mary Joseph Maureen Myers Melissa Schlothman	Michael Lester Mike King Nancy Kappelmann Nancy Kenyon Pat Albers Pat Knight Paul Klahr Peter Fuhrer Portia Bryant Richard Luellen Ryan Villanueva Sean Vogt Shirley Reynolds Star Howard Susan Kaveggia Susan Sheakley Theresa Hyde Trude Hurd Vic Leipzig Vivian Valenzuela Zehava Purim-Adimor

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## **APPENDIX 1: ROOST MAPS**

### **Legend for Roost Maps**

Recommended 500 ft Special Protection Zones (SPZ): black polygon

Enclosures: 3 sided black lines

July 2015: Pea green

August 2015: Yellow

October 2015: Sky Blue

November 2015: Orange

December 2015: Brown

February 2016:

March 2016:

Week 1: Blue

Week 2: Light Blue

Week 3: Purple

Week 4: Powder Blue

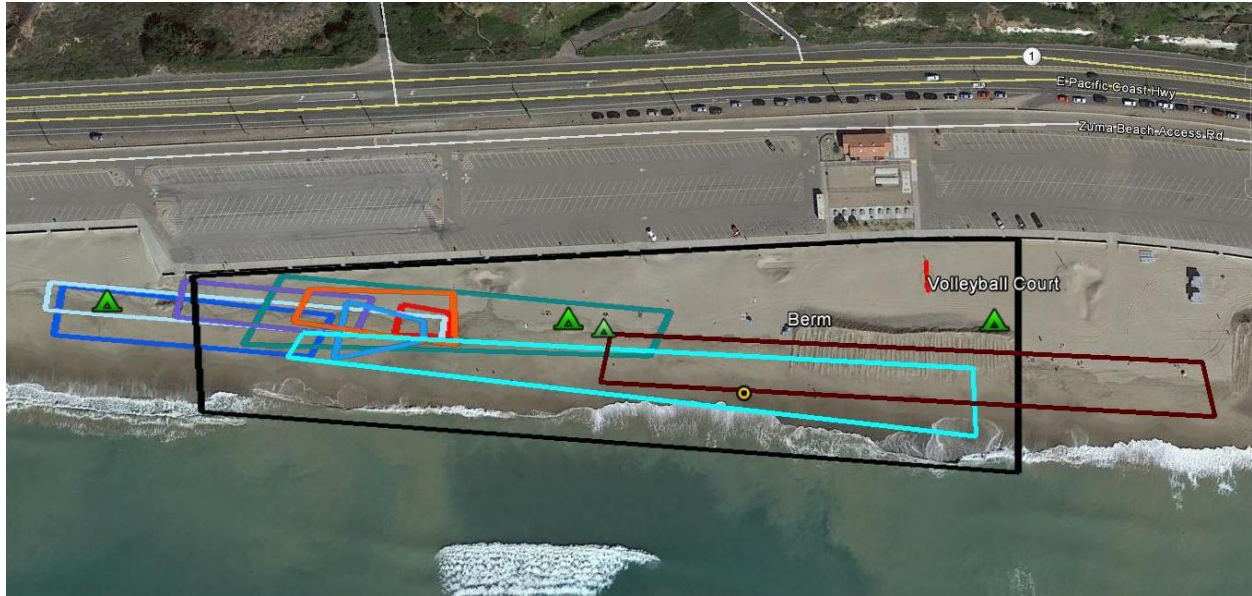
April 2016:

Week 1: Red-orange

Week 2: Mustard

June 2016: Pink

**Figure 1. Zuma Beach Roost Map.**



**Figure 2. Malibu Beach Roost Map.**





**Figure 3. Santa Monica Roost Map.**



**Figure 4. Venice Beach Roost Map.** Pink dots are sightings in 2015, red in 2016.



**Figure 5. Dockweiler LT 47 Roost Map.**



**Figure 6. Dockweiler LT 58 Roost Map.**

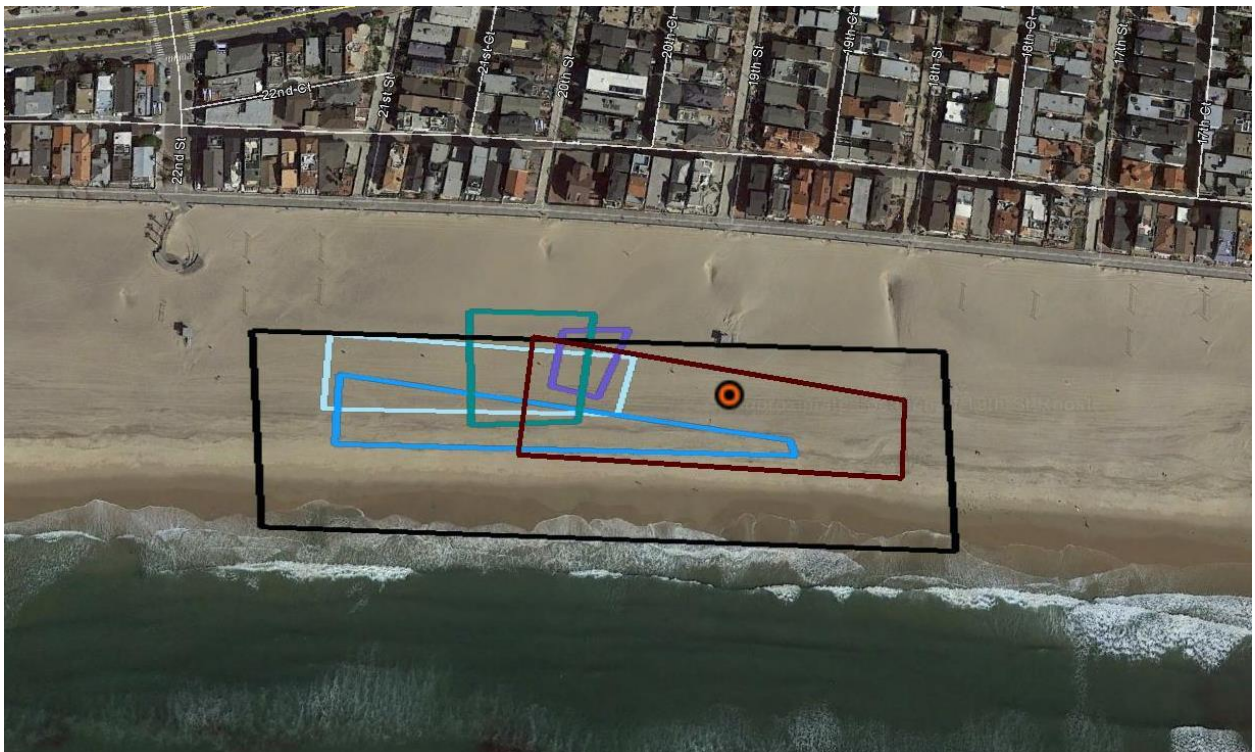




**Figure 7. Hermosa Beach 26-28<sup>th</sup> Street Roost Map.**



**Figure 8. Hermosa Beach 18-22<sup>nd</sup> Street Roost Map.**

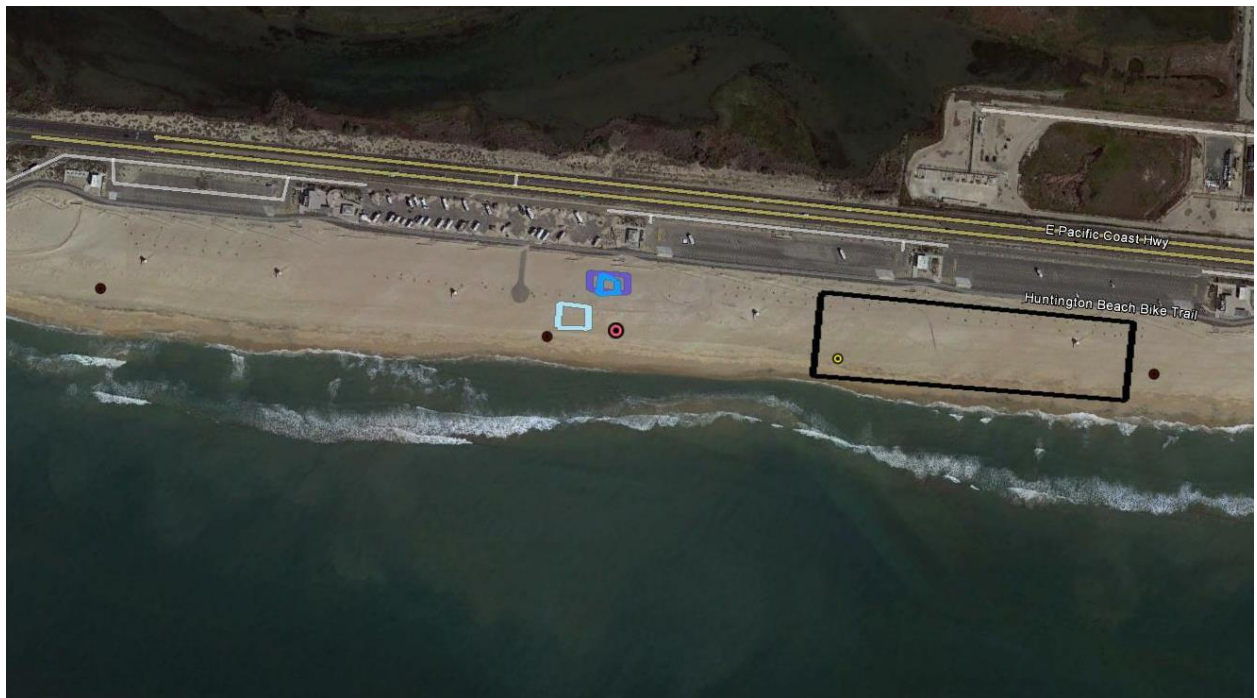




**Figure 9. Surfside/Sunset Roost Map.**



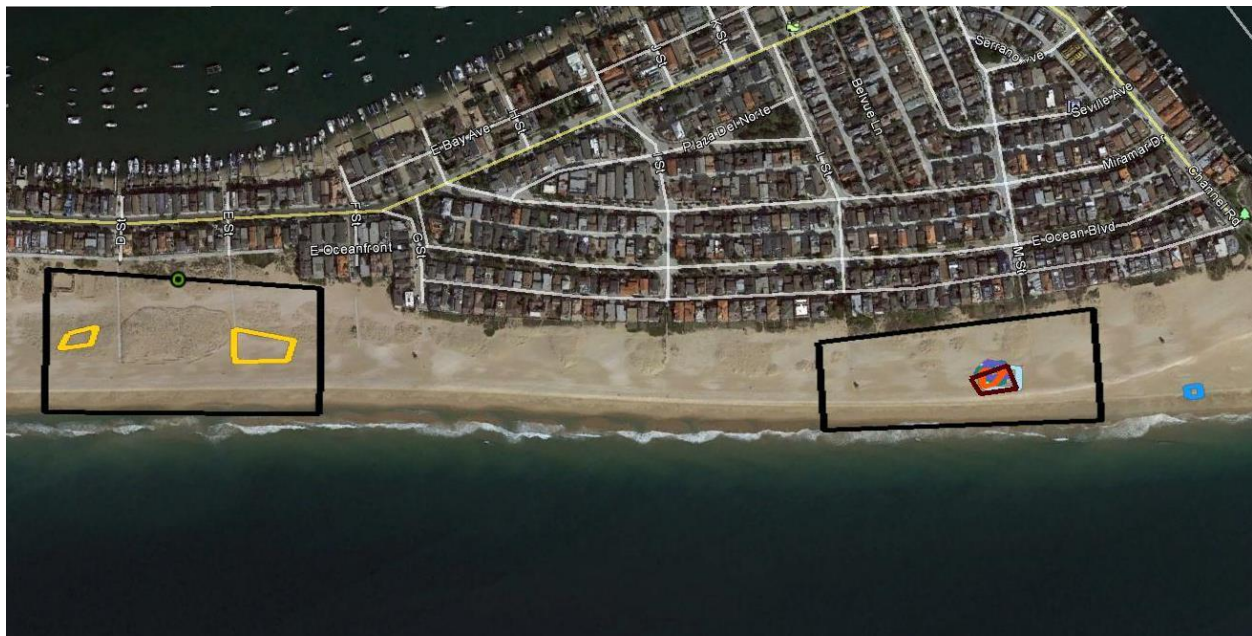
**Figure 10. Bolsa Chica State Beach Roost Map.**



**Figure 11. Huntington State Beach Roost Map.**



**Figure 12. Balboa Beach Roost Map.**





**Figure 13. Crystal Cove State Park Roost Map.**



**Figure 14. Salt Creek Roost Map.**



**Figure 15. San Clemente State Beach Roost Map.**





## APPENDIX 2. PHOTOS FROM OUTREACH EVENTS IN 2015-2016

Photo1. Set-up for an in-class presentation at a Los Angeles Unified public school during winter/spring 2016.

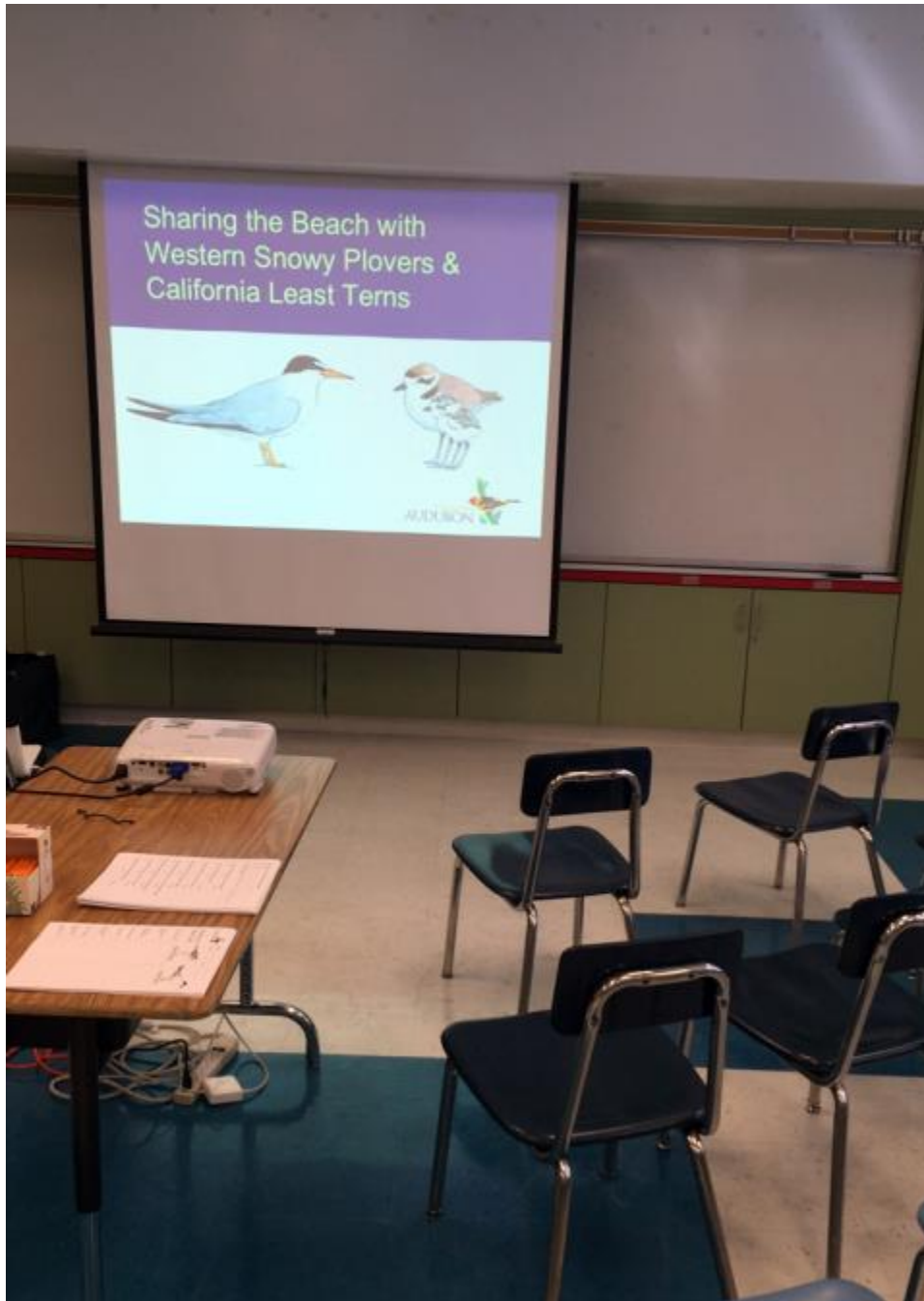


Photo 2. A public school field trip to Dockweiler Beach during winter/spring 2016.



Photo 3. Los Angeles Audubon's outreach table at an eco-fair event during the spring/summer 2016.



## APPENDIX 3. USFWS LETTER JANUARY 19, 2016



### United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003



IN REPLY REFER TO:  
08EVEN00-2015-CPA-0067

January 19, 2016

Jamie King, Environmental Scientist  
California Department of Parks and Recreation, Angeles District  
1925 Las Virgenes Road  
Calabasas, California 91302

Subject: Protective Measures for Western Snowy Plovers on Beaches in Los Angeles  
County, California

Dear Ms. King:

We, the U.S. Fish and Wildlife Service (Service), are contacting you and other beach administrators and stakeholders who have an interest in western snowy plovers (*Charadrius nivosus nivosus*), recreation, management, and operations on beaches in Los Angeles County. Western snowy plovers are known to winter on beaches in Los Angeles County and have attempted to nest at Surfrider Beach in Malibu. After a series of discussions, meetings, and electronic mail exchanges with beach administrators, stakeholders, and western snowy plover experts, we have developed some measures we recommend to help protect this species on beaches in Los Angeles County and not interfere with continued recreation activities, and beach management operations.

The Service's responsibilities include administering the Endangered Species Act of 1973, as amended (Act), including sections 7, 9, and 10. Section 9 of the Act and its implementing regulations prohibit the taking of any federally listed endangered or threatened species. Section 3(19) of the Act defines take to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Service regulations (50 CFR 17.3) define harm to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Exemptions to the prohibitions against take in the Act may be obtained through coordination with the Service in two ways. If a project is to be funded, authorized, or carried out by a Federal agency and may affect a listed species, the Federal agency must consult with the Service, pursuant to section 7(a)(2) of the Act. If the proposed project does not involve a Federal agency, but may result in the take of a listed animal species, the project proponent should apply to the Service for an incidental take permit, pursuant to section 10(a)(1)(B) of the Act. To



qualify for the permit, a project proponent would need to submit an application to the Service together with a habitat conservation plan (HCP) that describes, among other things, how the impacts of the proposed taking of federally listed species would be minimized and mitigated and how the plan would be funded. A complete description of the requirements for a HCP can be found at 50 CFR 17.32 or our website (<http://www.fws.gov/ventura>).

The Pacific coast population of the western snowy plover was listed as threatened on March 5, 1993 (58 Federal Register (FR) 12864) under the authorities of the Act. Critical habitat for the species, which includes Zuma Beach (Unit CA 43), Malibu Beach (Unit CA 44), Santa Monica Beach (Subunit CA 45A), Dockweiler North (Subunit CA 45B), Dockweiler South (Subunit CA 45C), and Hermosa State Beach (Subunit 45D), was designated on June 19, 2012 (77 FR 36728).

Ryan et al. (2014) determined that western snowy plovers in Los Angeles County overwinter at seven primary spots. These overwintering sites are within critical habitat for the subspecies and include locations at Zuma Beach (near Lifeguard Tower 9 and Zuma Lagoon), Malibu Lagoon (Surfrider Beach), Santa Monica Beach, Dockweiler State Beach (near Lifeguard Tower 58), Hermosa Beach, and Cabrillo Beach. Ryan et al. (2014) also reported that western snowy plovers occasionally overwinter at sites at Leo Carrillo State Beach, Paradise Cove, Dan Blocker County Beach, Big Rock Beach, Will Rogers State Beach, Venice Beach, central Dockweiler State Beach, El Segundo Beach, Manhattan Beach, Redondo Beach, and Terminal 400 in Los Angeles Harbor.

Western snowy plovers exhibit strong fidelity to overwintering sites, returning to the same beaches every year after nesting elsewhere and migrating. Overwintering habitat is important for western snowy plovers and other migratory shorebirds because the time spent at these sites is when these birds build fat reserves for spring migration and the upcoming breeding season. Overwintering sites also provide connectivity for dispersal between breeding sites. Furthermore, with appropriate management, sites that currently support only wintering western snowy plovers have the potential to attract new nesting western snowy plovers with appropriate management. This has been demonstrated at Coal Oil Point, Santa Barbara County, and Hollywood Beach, Ventura County. Western snowy plovers also made a nesting attempt at Surfrider Beach, Malibu, Los Angeles County, after overwintering there. The importance of overwintering beaches to the western snowy plover tends to be overlooked and discounted when it comes to conservation of the subspecies, with more attention being given to known breeding locations. However, the Service acknowledged the importance of overwintering habitat for the western snowy plover by including such areas in the critical habitat designated for the subspecies in June 19, 2012 (77 FR 36728).

We understand that beaches in Los Angeles County, including the seven aforementioned overwintering sites, experience disturbance from mechanical raking (i.e., beach grooming) for removal of garbage, kelp, and other debris. Dugan et al. (2003) reports that over 160 kilometers of southern California sandy beaches are groomed regularly and that grooming decreases the species richness, abundance, and biomass of wrack-associated invertebrates that are likely important western snowy plover prey resources. Beach grooming also removes favorable nesting habitats and likely destroys nest scrapes and eggs.

Other activities occurring on Los Angeles County beaches that could lead to the disturbance of overwintering western snowy plovers include recreational use, vehicular traffic (e.g., lifeguard patrols), domestic animals (i.e., dogs), and predators attracted to human refuse (i.e., trash). Recreational activities such as sunbathing, swimming, dog walking, and sports, require support services such as police and lifeguard patrols, water quality monitoring, erosion control, and trash pick-up, which increase the presence of vehicles on the beach. Vehicles driven on the beach have struck and killed western snowy plovers, as well as other shorebirds, in Los Angeles County. For example, on January 9, 2007, a western snowy plover was found dead by volunteer monitors on Zuma Beach in a fresh tire track due to a vehicle strike. The only vehicle observed on the beach that morning was a Lifeguard truck conducting routine patrols. On, August 19, 2013, a California State Park monitor witnessed another western snowy plover being struck by a Lifeguard vehicle during routine patrols. In this particular case, the western snowy plover initially survived the strike with a crushed head and was transported to a rehab center in Los Angeles; however, the plover died from the injury. Other instances have also been documented of black-bellied plovers (*Pluvialis squatarola*) being struck by vehicles at Dockweiler State Beach on March 17, 2009, and November 24, 2009.

The mere presence of dogs on the beach is harmful to western snowy plovers, causing them to flush frequently, unnecessarily expending energy reserves, as well as spending less time foraging (Lafferty 2001). In addition to expending more energy evading dogs and spending less time foraging, there are instances when dogs actually capture and kill or injure western snowy plovers. For example, at Surfside Beach, Orange County, California, a western snowy plover was captured by a dog in September 2009, but was recovered, rehabilitated and released (Ryan and Hamilton 2009). Also at Coal Oil Point, Santa Barbara County, California, one western snowy plover chick was killed by an unleashed dog (Lafferty et al. 2006).

Because monitoring of overwintering western snowy plovers is extremely limited at some locations, if it occurs at all, we believe the impacts to western snowy plovers from beach grooming, recreational activities, vehicular traffic, dogs, and predators attracted to food and trash to beaches is much greater than what we observe. Furthermore, the discovery of a dead or injured western snowy plover is unlikely because the bodies of these birds are taken by scavengers or removed by the daily beach grooming activities.

Efforts to protect wintering western snowy plovers on Los Angeles County Beaches should be implemented within 500 feet of the central roost location. The following measures should be implemented from the arrival of the first returning western snowy plovers in July until they depart in April to May each year. Specifically, at Surfrider Beach in Malibu these measures should be implemented year-round for the entirety of California Department of Parks and Recreation (State Parks) property. For all beaches in Los Angeles County, these areas should be referred to as "Special Protection Zones" and managed and maintained differently from adjacent areas of beaches without roosting western snowy plovers.

### Recommendations for Special Protection Zones.

#### Routine Operation of Vehicles and Heavy Machinery

- All drivers of vehicles and machinery that are operated on sections of beach where western snowy plovers occur should receive annual training per a Service approved program to avoid western snowy plovers. Training logs should be kept for all staff. State Parks staff should have successfully completed the Beach Driving Operations Training Course and annual refresher courses.
- Vehicles should avoid operating within Special Protection Zones, with the exception of activities such as essential patrols, trash pick-up and other activities agreed to by wildlife agencies as being essential. Vehicles simply transiting between points should not be allowed within these areas. For Surfrider Beach specifically, the following measures should be implemented: 1) All beach vehicle operation will be limited to emergency response activities (e.g., Code "R" responses; rescue preventions, including boat warnings; urgent law enforcement issues; and emergency medical service calls); and 2) If heavy equipment is needed onsite for emergency activities (boat rescue, structure protection) or other projects consistent with State Park's mission, State Parks resource staff will be contacted for approval prior to accessing the site, and as needed, to provide monitoring for vehicles at all times when onsite.
- Visible markers, possibly with signage should be placed within 100 feet of the top of the beach slope and at the inland corners of the Special Protection Zones to remind vehicle operators of their presence. (This is not applicable at State Park's section of Surfrider Beach because the entire area is within a Special Protection Zone).
- When essential activities must occur, vehicles should remain below a maximum 10 miles per hour speed limit and if western snowy plovers are encountered, the driver should back up at least 50 feet and/or alter their route to avoid flushing plovers.

#### Beach Maintenance and Clean up

- Regular sand grooming should be discontinued within Special Protection Zones. This activity both flushes the birds and removes important foraging resources (e.g. surf-cast kelp). These small areas should be cleaned by hand crews, trained in western snowy plover avoidance. If mechanical clean-up is necessary, it should be done in the presence of a qualified western snowy plover monitor who will locate the roosting plovers and ensure that machinery does not flush or disturb them.
- For Surfrider Beach, as agreed to by State Parks and Los Angeles County, sand grooming is not permitted at Surfrider Beach on State Park's property. Wrack is to be left in place and trash removed by hand.

#### Recreational Activities

- "Refuge Areas" should be created using symbolic fencing or another barrier deemed suitable for this use during periods of high beach use at popular beaches in July, August, and September. These should be erected in a 300-foot diameter (or other configuration suitable for the beach, but roughly 300 feet long) around the traditional center of the plover's roosting

areas on popular beaches such as Zuma, Dockweiler State Beach 58, and Hermosa Beach. Signage should be placed on the barrier such as has been done at Surfrider Beach in Malibu (which used signs made by local school children).

- Large-scale recreational activities such as triathlons, surf camps, beach volleyball camps, etc. should not be permitted within the Special Protection Zones. Docents should visit camps adjacent to the Special Protection Zones to talk to participants about western snowy plovers.
- Enforcement of existing regulations for off-leash dogs should be increased within the Zones.

#### Western Snowy Plover Awareness Training

Any staff personnel that operate motorized vehicles on Los Angeles County beaches should be required to attend annual training to increase their awareness of western snowy plovers. This training should include a short instructional tutorial that describes the biology of the western snowy plover, its habitat and life history, its legal status, and the consequences of violating the Act. The tutorial slide show (e.g., power point type presentation) or informational hand-out would be developed by the Service with input from your respective agencies, California Department of Fish and Wildlife, and the Los Angeles Audubon Society. In addition to the tutorial, staff should view a video provided by the Service that demonstrates safe driving techniques on beaches with sensitive wildlife. Staff members should be required to sign a statement acknowledging they have viewed and understand the tutorial and video. The signed statement would be kept on file with the respective agencies in the employee's record.

Although these measures should help reduce the potential for take of western snowy plovers, take, as defined earlier, is still likely to occur. And any take of listed species that would result from activities on your beaches would require either (a) exemption from the prohibitions against take in section 9 of the Act pursuant to section 7 or (b) take authorization pursuant to section 10(a)(1)(B) of the Act. Unless a Federal nexus exists that could cover the entire action area under an interagency consultation pursuant to section 7, we recommend that you seek an incidental take permit through the habitat conservation planning process, pursuant to section 10(a)(1)(B) of the Act.

With your cooperation, we can help conserve the western snowy plover on public beaches while still providing recreational opportunities for tourists and the people of Los Angeles County. We suggest revisiting these recommended measures at least annually to ensure they continue to benefit the western snowy plover on public beaches in Los Angeles County while minimizing the impact on residents and beachgoers; however, we are available any time to discuss this program.

As a reminder, this implementation of these recommended avoidance measures do not constitute authorization from us to take federally listed species in any manner. In the event that federally listed species are detected anywhere where activities could result in take, you should contact us to assess any potential effects to listed species and the possible need for other avoidance measures.

If you have any questions regarding the western snowy plover or other federally listed species on public beaches in Los Angeles County, please contact Chris Dellith or Bill Standley of my staff at (805) 644-1766, extensions 227 or 315, respectively.

Sincerely,



Stephen P. Henry  
Field Supervisor

Identical Letter to:

Fernando Boiteux, Los Angeles County Fire Department  
Charlotte Miyamoto, Los Angeles County Beaches and Harbors  
Ioannice Lee, City of Los Angeles  
Dean Kubani, City of Santa Monica

cc:

Jim Watkins, U.S. Fish and Wildlife Service, Arcata Office  
Jonathan Snyder, U.S. Fish and Wildlife Service, Carlsbad Office  
Erin Dean, U.S. Fish and Wildlife Service, Law Enforcement Office  
Dan Swenson, U.S. Army Corps of Engineers  
Nancy Frost, California Department of Fish and Wildlife  
Stacey Vigallon, Los Angeles Audubon Society