

**DRAFT ANNUAL REPORT:
THE WESTERN SNOWY PLOVER IN LOS ANGELES COUNTY, CALIFORNIA:
JULY 2011 TO AUGUST 2012.**

Prepared for:

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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, and the staff of the City of Hermosa Beach for their hard work in helping to protect the Western Snowy Plover. We would like to thank Nan Friedman of the Annenberg Community Beach House for helping us reach a new audience for plover conservation. We would especially like to thank our 2012 Intern Joyce Realegano for her hard work on this project.

INTRODUCTION

Here we report on monitoring, research, and community outreach activities performed by the Los Angeles County Snowy Plover Research Team between Summer 2011 and Summer 2012. 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, 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/>). Additionally, beginning in 2010, we switched from an annual report that goes from January 1 to December 31 to one that goes from July 1 to June 30. This better matches the snowy plover's biology on Los Angeles County beaches, where they tend to arrive in July from their breeding grounds, and then depart in April, with few seen in May and June. It will then also provide us with a better summary of the prior year's population and activities when we meet with beach managers, agency staff, and local biologists in October.

History. Prior to 1945, the Western Snowy Plover (*Charadrius nivosus nivosus*) (Snowy Plover) nested on beaches throughout Los Angeles County (LAC) (Grinnell and Miller 1944, WFVZ unpubl. data). Historically, Snowy Plovers have nested at Redondo, Ballona (Venice/Marina Del Rey), Los Angeles, and Malibu Beaches (LA Breeding Bird Atlas Data, Unpublished). 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, although no systematic survey of suitable LAC beaches had been conducted since the 1970s (Gary Page pers. comm.). 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).

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

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), and Hermosa State Beach (Subunit CA 45D) (USFWS 2012). All roosts, except for Dockweiler State Beach (DSB) 58 and Hermosa are now located within designated Critical Habitat (Figures 2-7, 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 Appendix 4.

A Recovery Plan was completed by USFWS in 2007 and LAC is 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 (2005-09 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). Primary nesting habitats include sand spits, dune-backed beaches, beaches at creek and river mouths, and saltpans 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, we suggest that the main problems are daily beach grooming, 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 Fall 2011 to mid-August 2012 and outline activities scheduled to take place September through December 2012.

Summary of Study Findings. Prior to beginning this study, little was known about the wintering Snowy Plovers in LAC. We found that in coastal Los Angeles County (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, and Terminal 400 in LA Harbor. 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 (WFVZ, LAC Breeding Bird Atlas, Unpubl. data).

Approximately 196 to 334 Snowy Plovers overwinter in LAC each year. This is approximately 28.5% of wintering Snowy Plovers in RU-6 and 7.3% of the California population. Snowy Plover populations in LAC have declined in recent years. This was mostly due to declines at Zuma LT9 in winter 2005-06 and all beaches except Malibu in winter 2006-07. 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.

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 meeting the recovery goals for the Snowy Plover in Recovery Unit 6 (USFWS 2007).

We find that LAC is an important non-breeding area 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. 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 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 believe that public awareness of and support for Snowy Plover conservation in Los Angeles County is essential to species recovery, such that developing 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 over the course of the study. In addition to volunteer participation, initial steps towards establishing a formal docent program have 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 plover enclosures, and development of a beach-driver handout. Maintaining positive relationships with beach management agencies and collaborating with other conservation-oriented organizations will be key in establishing a sustainable outreach program.

In summary, over the past five years the major accomplishments of the project include:

1. The involvement of over 200 community volunteers and an outreach program that has reached hundreds more.
2. Current, up-to-date knowledge of the location and population status of the Western 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 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 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 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, (4) whether Snowy Plovers are currently attempting to nest, and (5) management recommendations for protecting winter roosts and creating conditions by which nesting may return.

METHODS

Population Status at Winter Roosting Sites

Countywide Surveys. From Fall 2011 to Spring 2012, project biologists and volunteers conducted county-wide surveys of all suitable roosting habitat (Ryan et al. 2010) in September 5-16, January 15-24, March 5-11, and May 20-26. 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 (Appendix 2), 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 PRBO Conservation Science, 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 (Appendix 2). 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 ArcView and overlaid on aerial photographs of the beaches.

Roost & Nesting Surveys. Project biologists conducted surveys of just the roost sites and nearby beaches in August, October, November, December, February, April, and June.. 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. This was accomplished by walking the perimeter of the colony at a distance that did not cause disturbance to the birds (typically 30-50 m). 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. If sitting birds or nesting behaviors were detected, the biologist walked the entire roosting area searching for scrapes, nests, eggs, and chicks. This was done as quickly as possible to minimize disturbance to the Snowy Plovers.

Disturbance, Threats, Predation and Mortality

During the County-wide surveys and the roost and nesting surveys, the volunteers and biologists recorded adjacent beach use information (see data sheet, Appendix 2) and recorded any events that occurred near the roosts that could potentially harm the plovers, disturb the plovers, or result in the mortality of plovers. They noted any dead birds found on the beach.

Education and Outreach

During volunteer training sessions, volunteers received training to in both monitoring protocol and in ways of speaking with the public about 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 plover-themed curriculum during field trips.

RESULTS AND DISCUSSION

Population Status

Beach No.	Beach Name(s)	Sept	Jan	Mar	May
1	Leo Carillo 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	55	85	78	0
5	Zuma Beach (morning view to pt dume)	47	0	0	0
6	Dume Cove, Paradise Cove, Escondido B.	0	0	0	0
7	Dan Blocker CB, Puerco Beach	0	2	0	0
8	Malibu Bluffs SP, Amarillo B, Malibu B.	0	0	0	0
9	Malibu Lagoon, Carbon Beach	38	78	51	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	ns	0	0	0
13	Will Rogers SB North	0	0	0	0
14	Will Rogers SB South	0	0	0	0
15	Santa Monica State Beach North	34	58	61	0
16	Santa Monica State Beach South	0	0	0	0
17	Venice City Beach North	0	0	0	0
18	Venice City Beach South	0	4	0	0
19	Dockweiler Beach North	38	33	34	0
20	Dockweiler Beach Central	0	0	0	0
21	Dockweiler Beach South	36	13	21	0
22	El Segundo & Manhattan Beach	0	0	0	0
23	Hermosa Beach North	5	49	36	0
24	Hermosa Beach South & King Harbor	0	0	0	0
25	Redondo County Beach North	0	0	0	0
26	Redondo CB South & Torrance CB	0	0	0	0
30	Portuguese Bend	0	0	0	0
32	Point Fermin & Cabrillo Beach	0	4	0	0
35	Alamitos & Junipero Beach	0	0	0	0
36	Belmont Shore & Peninsula Beach	0	0	0	0
	Total Observed	253	326	281	0
	No. of Beaches	29	30	30	0
	Average Roost size	36.1	36.2	46.8	0
	SEM	5.89	10.9	8.44	0
	Standard Dev	15.57	32.7	20.7	0
	sqrtN	2.65	3.00	2.45	0

Countywide Surveys. Countywide surveys detected a peak of 326 plovers in January 2012 (Table 1). This is the highest total since before the population decline observed in 2007 (Table 2). Monthly average detections (Table 3) were higher in all months except December, when there were no plovers at Malibu Lagoon and April. The average roost size is increasing, and nearly back to levels before the 2007 decline (Table 2). We suggest that the population is still recovering from whatever caused the large decline between 2006 and 2007 (Ryan et al. 2010). Roost populations at Malibu, Santa Monica, Dockweiler, and Hermosa have mostly recovered to pre-decline levels. However, Zuma remains just over half its previous size.

Table 2. Annual Detections of Snowy Plovers during Winter Window Surveys 2004-12.

Beach	2004	2005	2006	2007	2008	2009	2010	2011	2012
Leo Carrillo State Beach/Nicholas Cyn CB	0	0	0	8	0	0	0	0	0
Zuma Beach	130	133	213	52	32	82	80	86	85
Zuma Beach South	0	0	0	0	48	0	0	0	0
Dume Cove, Paradise Cove, Escondido B.	0	0	0	6	0	0	0	0	0
Dan Blocker CB, Puerco Beach	0	0	0	23	0	0	0	0	2
Malibu Lagoon, Carbon Beach	33	28	12	34	37	36	67	47	78
La Costa B., Las Flores B., Big Rock B.	0	ns	ns	2	0	0	0	0	0
Will Rogers SB North	0	0	ns	2	0	0	0	0	0
Will Rogers SB South	0	0	ns	0	0	1	0	ns	0
Santa Monica State Beach North	32	40	42	16	30	40	41	58	58
Venice City Beach North	ns	0	ns	0	0	1	0	0	0
Venice City Beach South	ns	0	ns	2	0	0	0	8	4
Dockweiler Beach North	12	34	23	9	10	20	6	34	33
Dockweiler Beach Central	0	0	0	0	0	4	6	0	0
Dockweiler Beach South	13	0	0	4	11	15	16	23	13
El Segundo & Manhattan Beach	0	0	0	0	3	0	4	0	0
Hermosa Beach North	33	41	36	23	29	26	11	44	49
Hermosa Beach South & King Harbor	0	0	0	8	0	2	0	0	0
Redondo County Beach North	0	0	0	0	0	ns	0	0	0
Point Fermin & Cabrillo Beach	13	9	8	7	0	6	5	2	0
Total Observed	266	285	334	196	200	233	244	302	326
No. of Sites (N)	7	6	7	14	8	11	9	8	9
Average Roost Size	38.0	47.5	55.7	14.0	25.0	21.2	27.1	37.8	36.22
Std. Error	15.8	17.8	29.6	3.9	5.5	7.4	10.0	9.68	10.9

Table 3. Monthly detections of Snowy Plovers at roosts 2004-2009; 2010-2011; & 2011-2012.

Month	2004-2009 Average Obs.	SEM	2010-2011 Average Obs.	SEM	2011-2012 Average Obs.	SEM
Jul	9.1	1.29	1	0	17.2	3.0
Aug	24.3	2.95	20.0	3.5	38.3	5.3
Sep	32.8	4.64	31.14	-	36.1	5.9
Oct	42.8	6.3	42.2	14.2	53.0	11.3
Nov	39.5	5.36	39.8	7.84	60.6	15.6
Dec	44.2	6.56	45.7	9.55	30.2	9.1
Jan	31.1	5.59	37.8	9.68	36.2	10.9
Feb	30	6	41.3	8.85	56.6	9.0
Mar	24.3	6.86	25.4	7.44	46.8	8.4
Apr	9.2	1.55	16.5	0	6	0
May	1.7	0.33	1	0	0	0
Jun	0	0	1	0	0	0

Table 4. Snowy Plovers observed at roosts during each survey 2004-2012. *Surveys in 2010 are from January to June.

Year	Average Observed	SEM	Total Counted	# Surveys
2004	42.3	7.9	1014	24
2005	55.6	15.5	778	14
2006	43.2	7.8	1426	35
2007	18.5	2.5	1164	63
2008	21.9	2.4	1619	74
2009	26.0	2.9	1868	71
2010*	23.3	4.1	745	32
2010-2011	32.1	2.6	1859	155
2011-2012	39.4	5.3	2207	167

Roost Surveys. The roost surveys conducted by project biologists agree well with the counts made by volunteers. As was noted in Ryan et al. 2010, most plovers attend the roosts until mid to late-March, departing in late March-early April, with a few plovers remaining into early May. Most are gone by the time the USFWS breeding window is scheduled during the third week of May.

Beach	Beach Name(s)	Jul	Aug	Oct	Nov	Dec	Feb	Apr	Jun
4	Zuma Beach	18	49	94	118	14	83	0	0
9	Malibu Lagoon,	27	57	52	43	0	65	0	0
15	Santa Monica North	12	39	54	63	45	58	0	0
19	Dockweiler Beach North	24	35	42	53	41	48	6	6
21	Dockweiler Beach South	8	22	0	0	3	0	0	0
23	Hermosa Beach North	14	28	23	26	48	29	0	0
	Total Observed	103	230	265	303	151	283	6	6
	No. of Beaches	6	6	5	5	5	5	1	1
	Average Roost size	17.2	38.3	44.2	50.5	25.2	47.2	0.6	.6
	SEM	2.4	5.3	13.0	16.2	9.0	11.9	0	0

Roosting Sites

Zuma County Beach. Zuma is the largest roost and supports approximately 30% of the county population in 2011-12. However, it supported 41% of the population from 2004-2010 (Ryan et al. 2010) and the flock here has still not recovered but is remaining stable. At Zuma, the flock remained north of Lifeguard Tower 9, and as in 2011, frequently the flock would spread to the north along the top of the beach slope following beach grooming at their main roosting location (Figure 2). The winter survey window showed that their numbers remain similar to counts made in 2009-2011 (Table 2). Their population fluctuated more than normal in 2011-12, increasing until November, with very few individuals counted in December, returning to their typical count in December and February (Tables 1 and 5). This roost is not protected and is regularly groomed and driven through. Heavy equipment was observed removing sand berms within 100 ft of the roosting birds in February.

Malibu Lagoon. Malibu is the second largest roost and typically supports about 16% of the county population (Ryan et al. 2010). In 2011-12, it supported 18% of the population. The population fluctuated from 51 to 78 plovers throughout the non-breeding season. In Spring, plovers roosted at this beach until at least April 18 and returned by June 23. This is the first recent June record for Snowy Plover at Malibu Lagoon that we are aware of. Overall, the population appears stable or increasing at this site. As was done in the early spring of 2008-2011, an enclosure was installed on March 15, 2011. The plovers used the enclosure area intermittently, preferring to use an area of the sand bar near the point (Figure 3). The enclosure was well respected, although several sections were cut in August, but were repaired. This beach is not groomed and there was a large accumulation of kelp following several large wave events. The sand bar was breached in September 2011 and October 2012 beginning on the west end of the bar. In 2012, it breached on October 16. The enclosure had been left up after Labor Day and was partially destroyed by the breach.

Construction on the Malibu Lagoon Restoration Project began during the summer and was noted by observers in July. The construction area does not include the sand bar, however, the chain link fence and containment boom are adjacent to the northwest corner of the enclosure. We have not identified or suspected any impacts from the restoration project on the Snowy Plovers and their population in the summer-fall 2012 was similar to that in summer-fall 2011 prior to the restoration work. This should continue to be monitored throughout the restoration process.

Santa Monica State Beach. The roost at Santa Monica usually supports about 8% of the countywide wintering population of plovers (Ryan et al. 2010), but supported 18.5% of the population in 2012. We observed between 45 and 63 plovers here between September and March. This is more than was detected here during the 2004-09 surveys (Ryan et al. 2010, Table 2). In Spring, plovers roosted at this beach until at least April 17 and returned by July 15. This was the earliest date that the volunteer had noted them returning to this location (Lu Plauzoles pers. comm.). As in 2011, the plover flock was typically located south of the existing enclosure, (Figure 4). In 2012, the enclosure was remained smaller, and was approximately 125 ft long (Figure 4). As a result, it was rarely used by the plovers. We recommend that the enclosure be at least 100 ft x 300 ft and placed around the location being used by the plovers as determined by late summer/early fall surveys. Figure 4 shows that they are still roosting within the 320 ft area covered by the enclosure in 2009 (Imagery is from 11-14-2009).

Venice Beach. In 2011-12, the snowy plovers were again observed on a small point at Venice Beach. Four were there in January. With a lack of reports in other months, it was decided that this site does not yet warrant being considered a regular roosting site. Later in the season, volunteers reported plovers roosting near the least tern enclosure near the Ballona Creek canal on July 4, 2012.

Dockweiler State Beach. In 2011-12 the northern roost near **Lifeguard Tower 47 (LT 47)** supported between 33-53 plovers from September to April (Table 1 and 5), with the last plovers observed here on May 1, 2012. Overall 16% of the Los Angeles County winter roosting

population overwintered here. We attribute these increases to the presence of an enclosure that has protected the core roosting area since 2009. On August 14, 2010 a wooden-slat fence replaced the snow fencing and it remained in place through the entire 2011-2012 season (Figure 5).

Los Angeles Audubon, USFWS, and LACBH have all worked as a team to maintain the fence and pick up trash. There was no vandalism to the fence and during most clean-up visits, only a few pieces of trash are recovered. 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 verbena], *Ambrosia chamissonis* [silver beachweed or silver beach burr], and *Camissonia cheiranthifolia* [beach primrose].

Observers did note the presence of vehicle tracks in front of the enclosure and we recommend that vehicles avoid this area to the extent possible. 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)**, (Figure 6) we detected 36 in September, then no or very few plovers between October and March when we observed 21. It only supported 4% of the population and declined from previous years (Ryan et al. 2010, Table 2). This roost is not protected and is regularly groomed and driven through. A berm was installed in February 2012. 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 2011-12 we detected between 23 and 49 plovers at these roosting areas from October to March and supported 11% of the non-breeding population in Los Angeles County (Tables 1 and 5). This is an increase over 2010-11, but similar to numbers observed here from 2004 and 2009 when between 23 and 41 plovers were present (Ryan et al. 2010). They also departed early in 2010. As in past years, the location of the roost was highly variable (Figure 7). They moved regularly they were observed adjacent to 19th to 22nd Streets in both the spring and fall months and from 26th to 28th Streets in the fall. The reason for this movement is unknown. However, this roost is 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. There was one snowy plover reported from Long Beach in September, a first for this project. Although this species is occasionally detected within the Ports of Los Angeles and Long Beach.

Nesting

During the monthly roost surveys, as usual we detected scrapes at sites that had not recently been groomed. In March we observed increased scraping activity as we have in past years at all

sites. This included several well developed scrapes that we identified as having the potential to become nest scrapes at the enclosures at Santa Monica and DSB LT 47. At Malibu no scrapes were detected within the enclosure, but the plover mostly roosted outside of the enclosure in an areas that was overwashed by high tides, thus removing scrapes. Scraping and courtship behaviors continued to be observed through the end of April. We did not detect any eggs or chicks in 2011. We noted nesting behaviors including calling, aggressive displays, and male-female pairings as we had in past years. Additionally, there were larger numbers later in the Spring than had been observed in past years, with six snowy plovers remaining at the enclosure at DSB 47 until at least May 1, 2012

Disturbance, Threats, Predation and Mortality

For complete summary as well as complete recommendations, please refer to Ryan et al. 2010.

Lack of Public Awareness. In Fall 2011 through Fall 2012, our community outreach program continued to reach Los Angeles County beachgoers of all ages. However, the majority of beach users are completely unaware that snowy plovers are present and are unaware of things that they can do to minimize their impact on plovers. We plan to continue our volunteer recruitment and training and to sustain, and hopefully expand, our docent program, classroom visitations, and other public outreach events.

Sand Grooming/Beach Raking. We have not been informed of, or observed, any changes in the LACBH beach grooming policy. We were told that grooming is taking place earlier in the morning than it had previously. Grooming equipment continues to pass through plover roosts, flushing plovers and removing roosting scrapes between February and April at Zuma, Dockweiler LT 58, and Hermosa Beach. We did note that, as in 2010-2011, the groomer operator on Santa Monica State Beach attempted to avoid the area that the plovers relocated to south of the enclosure on most days. We recommend that the beach groomers avoid plover roosting areas at these other beaches as well.

Vehicles Driving on Beaches. As in 2010 and 2011, most vehicles we observe on the beaches near the roosts are moving considerably slower than they had in the past. Both slow-moving and fast-moving vehicles continue to drive through the roosting areas, flushing plovers, and removing roosting scrapes. In 2011-12, we did observe some vehicles exceeding the recommended speeds, but this has become increasingly rare due to efforts by LA County Lifeguards and LACBH. Our County-wide survey volunteers counted 190 vehicles/equipment on the beach. Of these 9 vehicles were noted as exceeding 15 mph, a decrease. This is down from 13 of 121 vehicles/equipment in 2010-11. We recommend continued training of new beach drivers and reminders to all beach drivers by all agencies that drive on the beach and to maintain the increased enforcement by supervisory staff.

Dogs. We continue to observe off-leash dogs near all roosting areas. Beachwide surveys conducted by volunteers reported an average of 19 dogs off leash and 7 dogs on-leash per survey. We suspect that one reason the plovers may not be using the enclosure at Malibu is

because of dog owners who arrive early in the morning prior to rangers and lifeguards. We regularly observed dog tracks within the enclosure and on the beach. However, this is true of all beaches and continues to be an on-going problem. We recommend increased public outreach and the enforcement of existing dog regulations at public beaches.

Camps & Planned Recreational Events. We have noted an increase in the number of exercise, surf and volleyball camps. Additionally, numerous one-time events are held near existing roosts. Because these camps and many of the special events occur during the summer, and the plovers begin to migrate back into the area in July, the presence of these large groups of people may disturb their settlement patterns, forcing them to alternate locations. We recommend that the roost maps contained in this report and in *The Western Snowy Plover in Los Angeles County, California* (Ryan et al. 2010) be consulted when issuing permits for these camps and events and the events be held at least 500 ft away from known roosting areas. When this distance is not practicable, we recommend that a monitor be present to direct participants away from the roosting area.

Predators. We did not detect any direct predation on plovers in 2011. However, numerous potential predators were observed. These include red-tailed hawks, peregrine falcon, American kestrel, western gull, American crow, common raven, raccoon, domestic dogs, and domestic cats. It appears that numbers of American crows are increasing on sandy beaches across the county. This year we observed an average of 83.4 crows during the beach-wide surveys. We recommend putting lids on all trash cans.

Education and Outreach

Volunteer participation in the Snowy Plover monitoring program. From September 2011 to September 2012 38 individuals volunteered to monitor plovers in Los Angeles County, contributing over 340 person-hours to the project.

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 is currently working with Dockweiler Youth Center (LACBH) and the Annenberg Community Beach House to lead a series of plover-focused beach walks for the general public, and to coordinate public school visits to observe plovers (Table 6). From Fall 2011 to Fall 2012, nine volunteers collectively spent 26 hours either working directly with the public field trips, walks and presentations or by meeting with Los Angeles Audubon staff and working independently to strategize on expanding outreach. Through outreach activities, we have worked to establish community connections that will provide volunteers for both data collection and docent activities.

School Outreach Program. We explored multidisciplinary ways to engage young, inner-city students in 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 over 2,900 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 2,000 web hits since it was posted in the summer of 2012. We hope to continue working with Dockweiler Youth Center to find other venues for this student artwork.

From the Fall of 2011 to the Fall of 2012, we have worked closely with two Los Angeles Unified public schools at the elementary and high school level to provide them with in-class presentations and field trips to view plovers in their native habitat at Dockweiler Beach (Table 6). Since August 2010, the plover enclosure at Dockweiler Beach 19 has proven to be an outstanding resource for education/outreach as well as conservation. Access to restrooms and parking is conveniently located nearby, offering a safe and spacious staging area before volunteers lead students on a short walk to view plovers at the enclosure. Los Angeles Audubon has also begun to integrate 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 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 plover and tern information table at public school events in the May 2011 and May 2012 that drew hundreds of community members. In addition to their participation in the field trip program, Politi Elementary enlisted the help of Los Angeles Audubon to incorporate plover conservation imagery and information into a school site mural and the field guide they created for their school.

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 a variety of eco-fairs and meetings from Fall of 2011 to Fall of 2012 to provide the public with information about plover conservation in Los Angeles County (Table 6). 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 March through October 2012, and we aim to move forward to establish a small site-specific core of volunteers to help monitor this site and establish permanent interpretive signage.

Table 6. Outreach and education conducted (and pending) from September 2011 through December 2012, including presentations, tabling events, beach walks, and fieldtrips.

Activity	Date	Location	Demographic	No. Attending
Dockweiler Youth Center Programming (<i>beach walks</i>)	2011: Sept 17, Sept 24, Oct 9, Oct 16, Nov 13, Nov 20, Dec 11 2012: Jan 28, Feb 11, Feb 26, Mar 3, Mar 31, Oct 21, Oct 28, Nov 17, Dec 1	Dockweiler Beach	General public	13
Annenberg Community Beach House (<i>beach walks</i>)	Feb 12, 2012 Apr 9, 2012 Dec 9, 2012	Santa Monica Beach	General Public	31
Public School Field Trips	Nov 5, 2011 Oct 20, 2012	Dockweiler State Beach	Inner-city public school students	143
In-school presentations	Nov 17, 2011 Mar 5, 2012 Oct 15, 2012 Oct 18, 2012	Dorsey High School, Politi Elementary School, Camino Nuevo Charter School	Inner-city public school students	~120

Activity	Date	Location	Demographic	No. Attending
Public Presentations	Feb 7, 2012 Sept 8, 2012	Beach Ecology Coalition Meeting (Pepperdine University); Southern California Audubon Chapters Meeting (Torrance, CA)	Beach management professionals; Audubon staff, board members, and volunteers	~80
Eco-fairs and other tabling events	Spring 2012	Cabrillo Aquarium, Toyota Corporate Headquarters, Green City Fair, Conservation Art Show, Santa Monica College, Los Angeles Valley College, Santiago Canyon College	General public	collectively thousands

Creation of public displays. As mentioned above, we worked with elementary school students to create Snowy Plover conservation posters. The public may view this artwork online at the Los Angeles Audubon website. We will continue to collaborate with other organizations to provide venues in which to display interpretive information about plover conservation on both a temporary and permanent basis.

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 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 4,400 page views, and our gallery of student conservation posters received over 2000 page views since 2010.

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 and were used again at the seasonal enclosure at Malibu Lagoon March through October 2012.

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 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.

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 docent and outreach programs. Expansion to more public schools and interested groups throughout Los Angeles County is an ultimate goal. However, the project team feels that it is extremely important that the immediate goal of the next two to three years be to first establish 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. Recent outreach presentations have addressed 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 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 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. We hope to learn from Heal The Bay's process and potentially propose a similar collaborative project to address plover conservation.

- Continue to establish organizational partnerships. In Los Angeles County, 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 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 plover beaches. The packet should include a dvd of the public service announcement as well as resources regarding dogs on the beach and general plover conservation awareness.

LITERATURE CITED

- County of Los Angeles, Department of Beaches and Harbors. 2009. Beach History. Accessed at: <http://beaches.co.la.ca.us/BandH/Beaches/BeachHistory100708.pdf>. Accessed August 13, 2009.
- Dugan, Jennifer. 2003. *Ecological Impacts of Beach Grooming on Exposed Sand Beaches*. Coastal Ocean Research October 2003.
- Dugan, J. and D. M. Hubbard. 2009. Loss of Coastal Strand Habitat in Southern California: The Role of Beach Grooming. *Estuaries and Coasts*. DOI 10.1007/s12237-009-9239-8
- Elliott-Smith, E. and S.M. Haig. 2006. Western Snowy Plover Recovery Plan: Appendix J: Monitoring Guidelines for the Western Snowy Plover, Pacific Coast Population. California/Nevada Operations Office, U.S. Fish and Wildlife Service, Sacramento, California.
- Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna. No. 27. Berkeley, California.
- Lafferty, K. D., D. Goodman, and C. P. Sandoval. 2006. Restoration of breeding by Snowy Plovers following protection from disturbance. *Biodiversity and Conservation* 15(7):2217-2230.
- Los Angeles Breeding Bird Atlas. Unpublished. Los Angeles Audubon.
- Page, G. W., and L. E. Stenzel. 1981. The breeding status of the Snowy Plover in California. *Western Birds* 12: 1-40.
- Page, Gary W., Lynne E. Stenzel, G. W. Page, J. S. Warriner, J. C. Warriner and P. W. Paton. 2009. Snowy Plover (*Charadrius alexandrinus*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/154>
- Ryan, T. P., S. Vigallon, L. Plauzoles, C. Almdale, R. Montijo, and S. Magier. 2010. The Western Snowy Plover in Los Angeles County, California. Prepared for the California Department of Fish and Wildlife, Sacramento, CA. Prepared by Ryan Ecological Consulting, Pasadena, CA. 56 pp + appendices.
- Santa Monica Bay Audubon Society. Unpubl. data. Santa Monica Bay Audubon Society.
- Stenzel, L.E., S.C. Peaslee, and G.W. Page. 1981. II. Mainland Coast. Pages 6-16 in Page, G.W. and L.E. Stenzel, (eds.). *The breeding status of the Snowy Plover in California*. *Western Birds* 12(1):1-40.

- Stevenson, C., S. Abramson Sikich, and M. Gold. 2011. Engaging Los Angeles County subsistence anglers in the California marine protected area planning process. Article In Press. Currently available online at <http://www.sciencedirect.com/science/article/pii/S0308597X11001369>.
- Tingco, L. In Prep. Impact of Disturbance on Roosting Behavior of *Charadrius alexandrinus nivosus*. Master of Science Thesis. California State University, Los Angeles.
- U.S. Fish and Wildlife Service [USFWS]. 1993. Endangered and threatened wildlife and plants: determination of threatened status for the Pacific coast population of the western Snowy Plover; final rule. Fed Regist. 58(42):12864-12874.
- U.S. Fish and Wildlife Service [USFWS]. 2005. Endangered and threatened wildlife and plants: designation of critical habitat for the Pacific coast population of the Western Snowy Plover; final rule. Fed Regist. 70: 56970 - 57119.
- U.S. Fish and Wildlife Service [USFWS]. 2007. Recovery plan for the Pacific coast population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*): Vol. I, Recovery plan. U.S. Fish and Wildlife Service, Sacramento, California. 274 pp.
- U.S. Fish and Wildlife Service [USFWS]. 2012. Endangered and threatened wildlife and plants: revised designation of critical habitat for the Pacific coast population of the Western Snowy Plover; final rule. Fed Register 77 (118): 36728-36869
- Widrig, R. S. 1980. Snowy Plovers at Leadbetter Point. Willapa National Wildlife Refuge, U.S. Fish and Wildlife Services, Ilwaco, WA.

APPENDIX 1: ROOST MAPS

Figure 1. Map of Study Area.

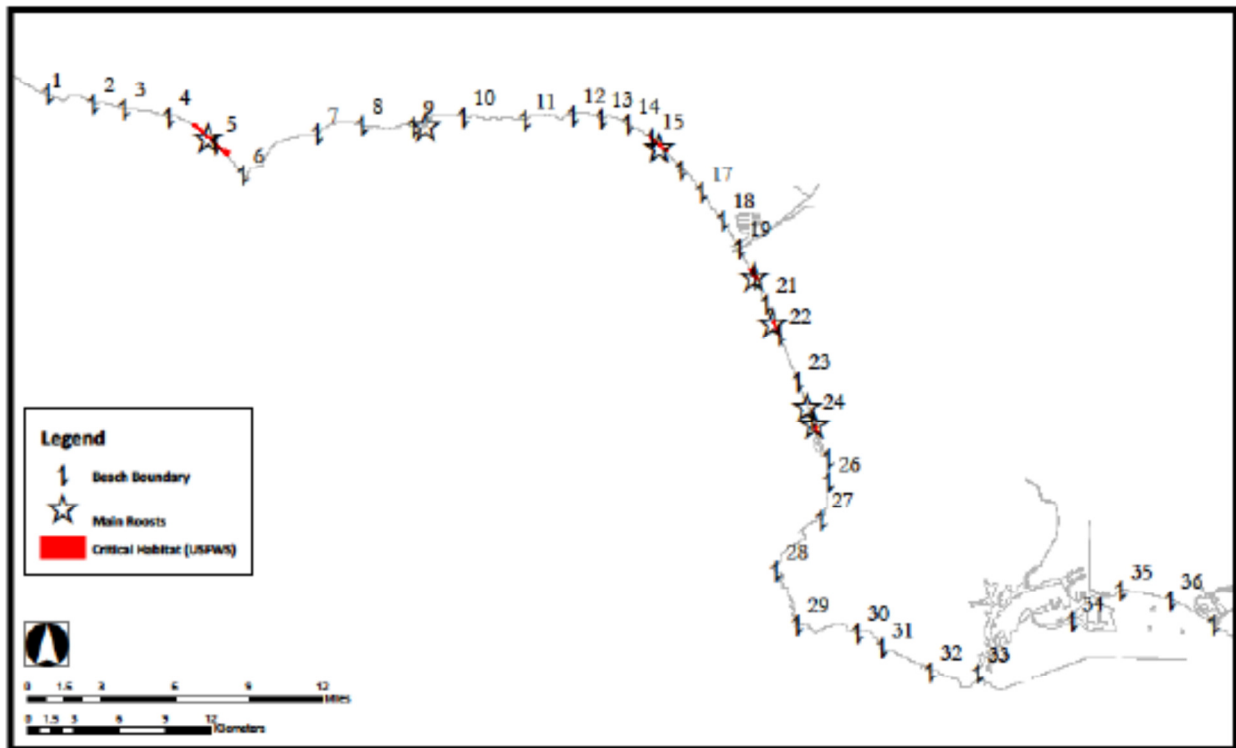
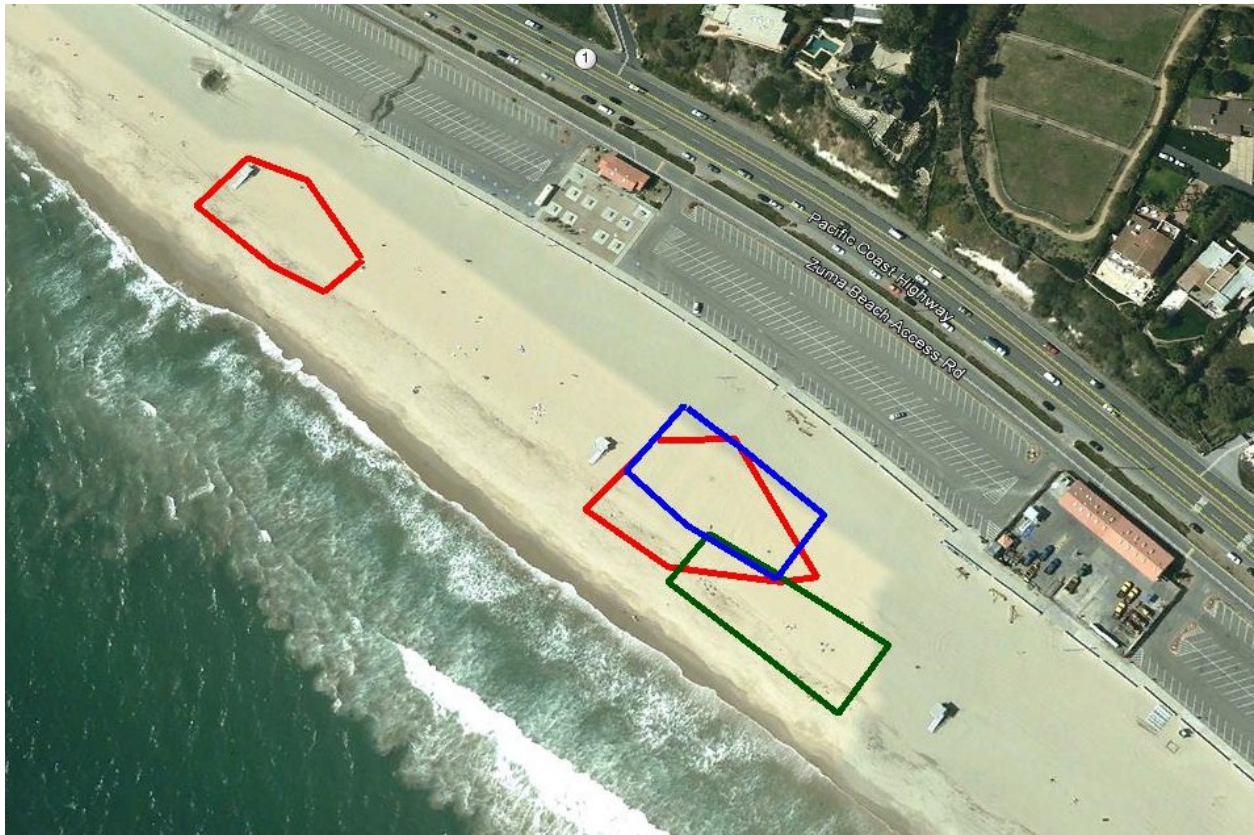


Figure 2. Zuma Beach Roost Survey Results.



Legend:

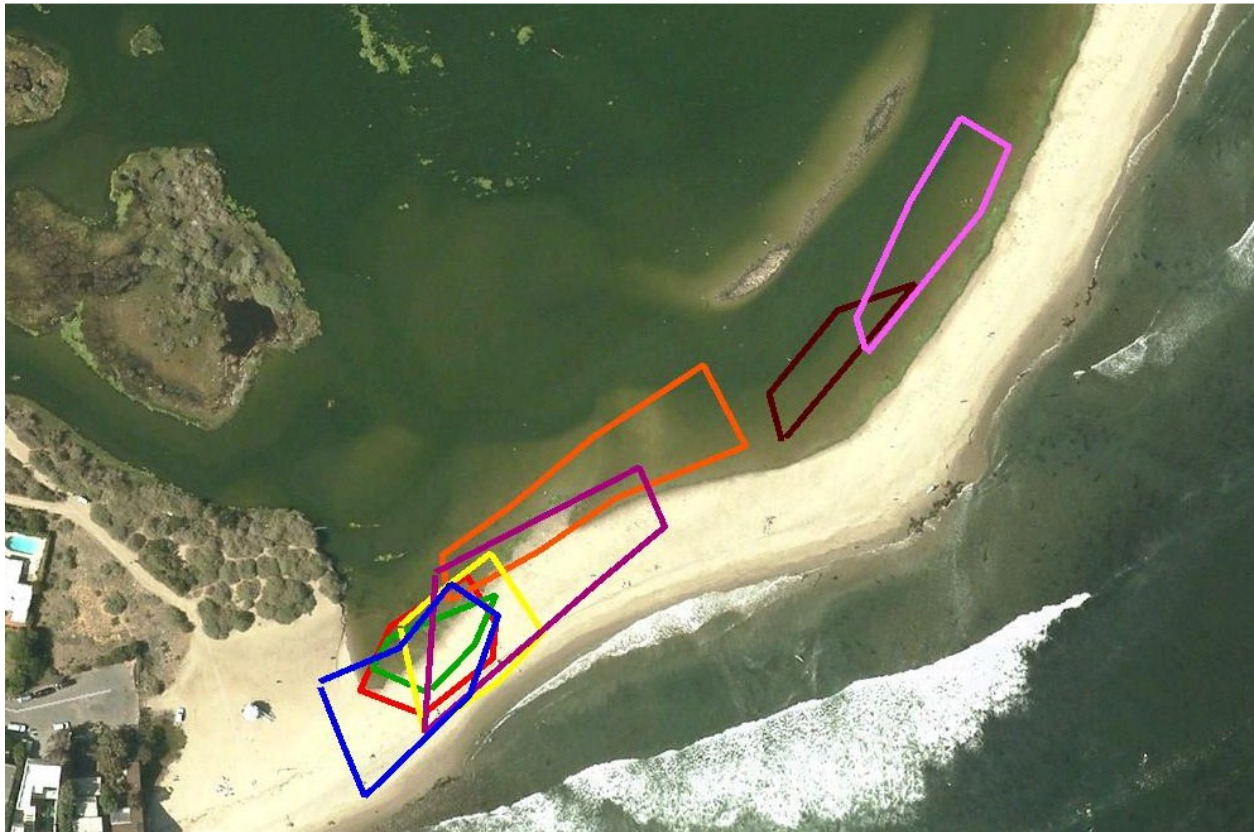
Red: 2-14-2012

Green: 2-23-2012

Blue: 2-28-2012

Imagery Date: 10-22-2007 (GoogleEarth 2012)

Figure 3. Malibu Beach Roost Survey Results.



Legend:

Red: 2-14-2012

Green: 2-23-2012

Blue: 2-28-2012

Orange: 3-6-2012

Yellow: 3-20-2012

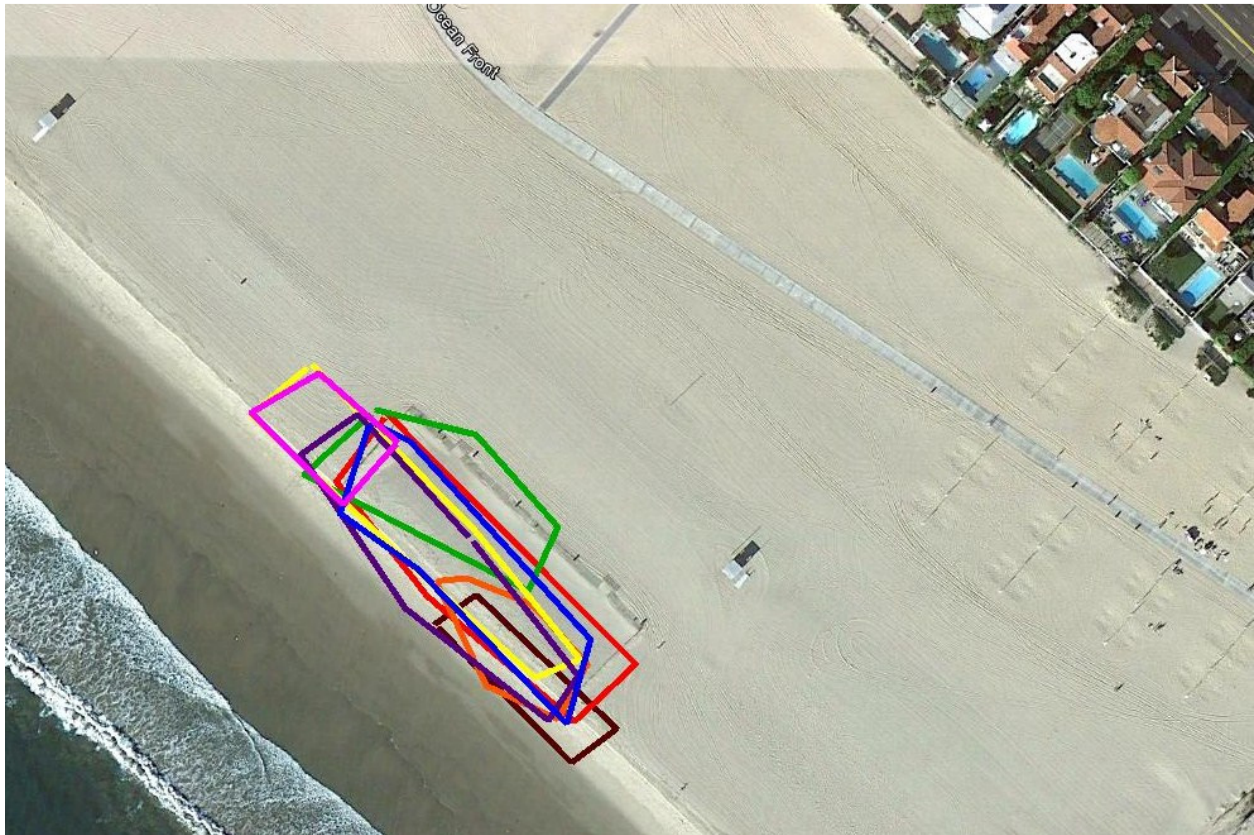
Purple: 3-27-2012

Pink: 4-3-2012

Brown: 8-22-2012

Imagery Date: 10-22-2007 (GoogleEarth 2012)

Figure 4. Santa Monica Roost Survey Results.



Legend:

Red: 2-14-2012

Green: 2-23-2012

Blue: 2-28-2012

Orange: 3-6-2012

Yellow: 3-20-2012

Purple: 3-27-2012

Pink: 4-17-2012

Brown: 8-22-2012

Imagery Date: 11-14-2009 (GoogleEarth 2012)

Figure 5. Dockweiler LT 47 Roost Survey Results.



Legend:

Red: 2-23-2012

Green: 2-28-2012

Blue: 3-6-2012

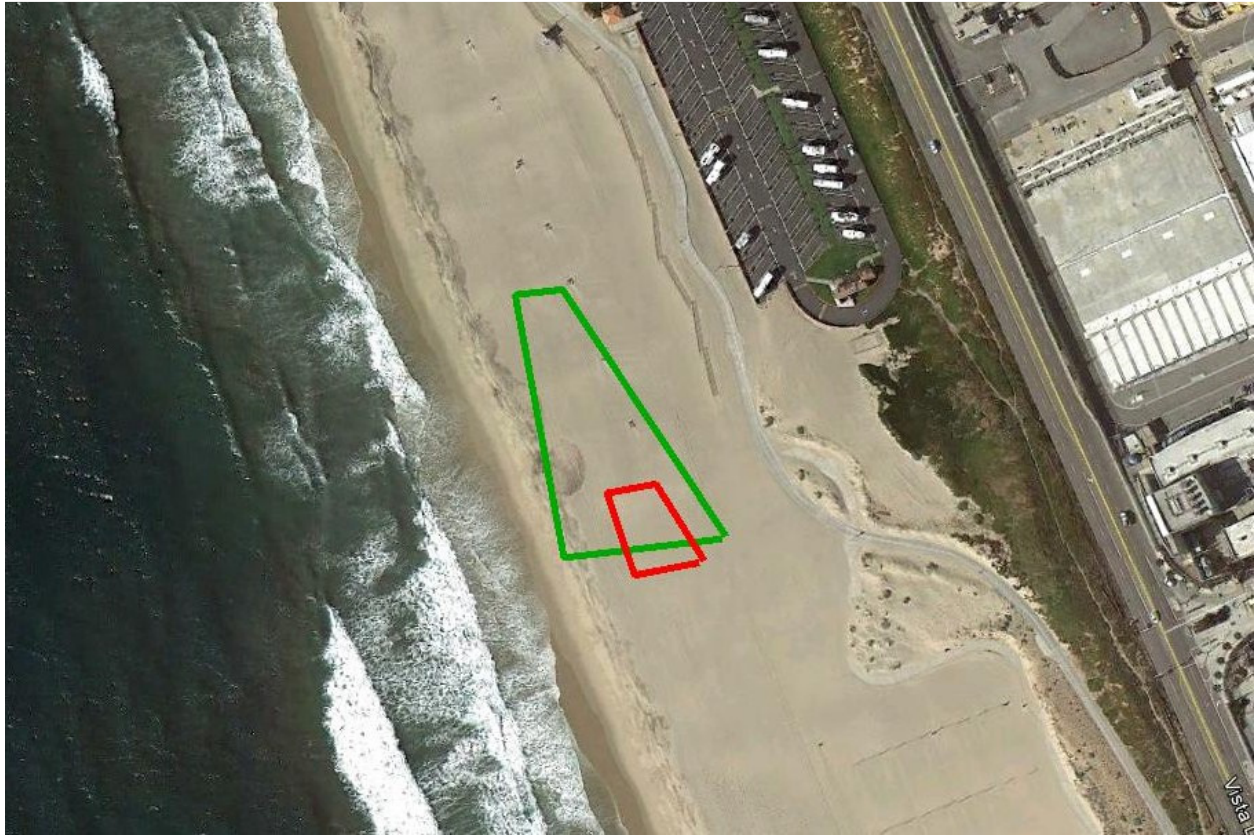
Orange: 3-20-2012

Yellow: 4-11-2012

Purple: 9-26-2012

Imagery Date: 3-7-2011 (GoogleEarth 2012)

Figure 6. Dockweiler LT 58 Roost Survey Results.



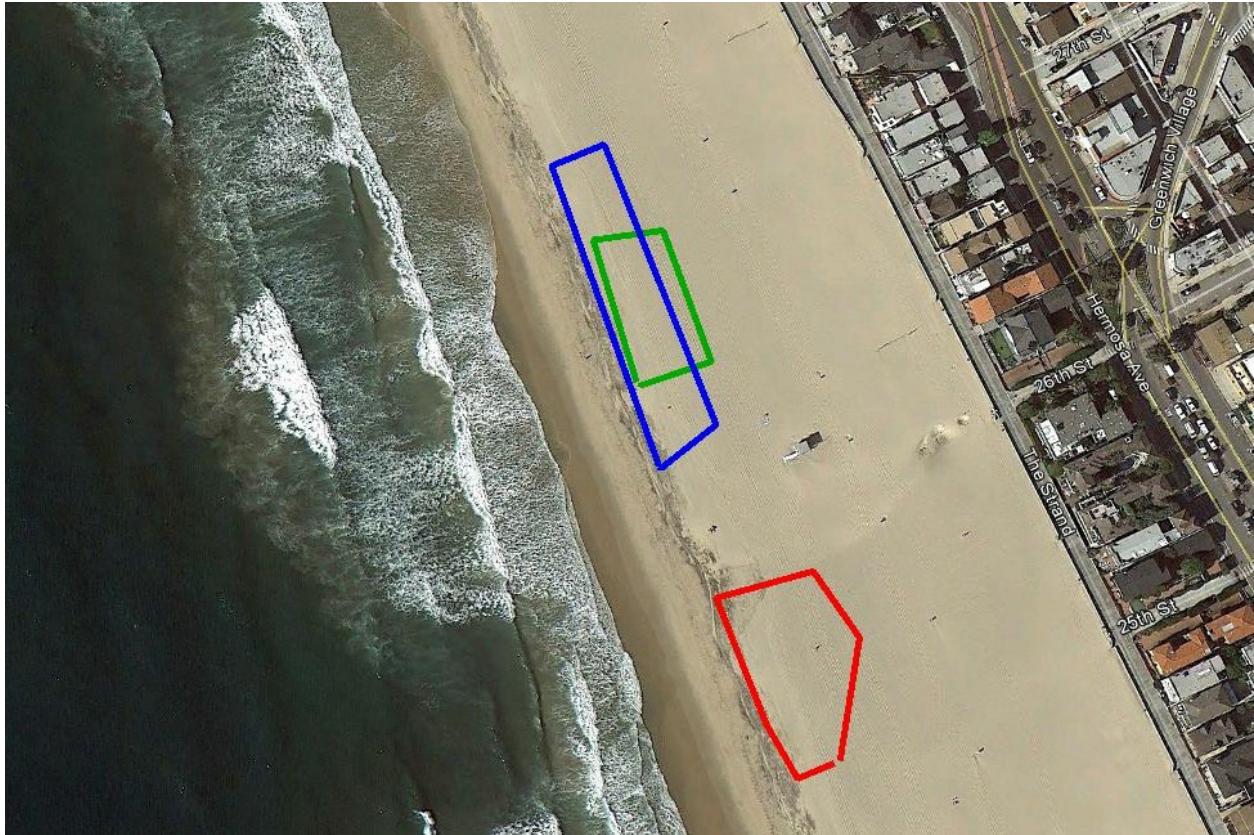
Legend:

Red: 8-22-2012

Green: 9-26-2012

Imagery Date: 3-7-2011 (GoogleEarth 2012)

Figure 7. Hermosa Beach Roost Survey Results.



Legend:

Red: 2-14-2012

Green: 8-22-2012

Blue: 9-26-2012

Imagery Date: 3-7-2011 (GoogleEarth 2012)

Appendix 2. Data Sheet used in 2012.

LOS ANGELES COUNTY
Western Snowy Plover Field Survey Form 2012

Page ___ of ___

Survey Location _____ Month _____ Day _____ Year 2012

Observer Name (s): _____

Prep Time _____ Survey Start Time _____ Survey Stop Time _____ Total Time at Beach _____

Weather conditions: _____ Temperature: _____ Cloud Cover: _____ (0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%)

Precipitation: _____ (N = None, R = Rain, F = Fog, D = Drizzle) Wind: _____ (mph and direction)

Tides: _____

SECTION 1: SNOWY PLOVER MONITORING:

Number of Snowy Plovers seen? _____ Ad: _____ Juvs: _____ Im: _____ P: _____

Survey Complete? _____ (if not, note area surveyed on map)

# SNPL Seen	Time	Map #	Gen. Habitat & Location ¹	Bands ²	Sex, Age ³	Nest, Eggs, Chicks	Behaviors Observed ⁴

1 - wet sand, wet/dry, mid-beach, beach
 2 - Remove band colors for the bird's left leg first, right leg second. Separate the colors on the left leg and right leg with a colon (:). Record colors from the top to bottom for each leg. Band T, J, S, K, L, R the bird is facing you. Underscored letter is code for color: Asp Blue Grn Green Blk Black Wht White Yel Yellow Red Red Or Orange Pk Pink Gr Grey Br Brown Un Unbanded Un Unbanded. A bird that has no bands on its left leg and one yellow band on its right leg is S:Y. A bird with a left band on top (upper) left bottom (end) and a right band on top (upper) right bottom (end) would be D:R:U. A bird with only one band (end) on the left and one band (end) on the right would be R:U.
 3 - Im Immature Ad Adult Juv Juvenile (Young capable of flight, Chick (capable of flight), Unkn Unknown
 4 - H = hatching Y = fledging S = sitting on nest and O = other (specify in notes); Nest Status Codes: C = copulation and nest construction I = incubation
 H = hatching F = fledging O = other (specify in notes)

SECTION 2: BEACH USE & PREDATOR MONITORING:

Walking	Jogging	Sitting	Spots	Bicycle	Fires	Fishing	Vehicle	ATV	Equipment
Dog Coll.	Dog Coll.	Coyote	Fox	Cat	Crow	Raven	Raptor	Hawk	Other ⁴

*Describe Other:
 Speeding Vehicles (time, make & model, decals, license plate, or other markings):
 Other wildlife species (especially potential predators): _____

SECTION 3: HABITAT INFORMATION:

Changes from Previous Survey:
 Percentage of shoreline > 50 m wide _____ if 0%, then maximum shoreline width: _____
 What general habitat types² are present at this site?
 beach scrub marsh overwash HRA (habitat restoration area) barrier island/peninsula
 Additional habitat notes: _____

For more information contact: (310) 461-4139, wplover@dotnet.com
 Mailing address: Los Angeles Audubon, P.O. Box 931657, Los Angeles, CA 90093

Appendix 3. Photos from outreach events conducted in 2011 and 2012.



November 2011. Elementary school students study the wrackline, writing down observations and making sketches of what they see in field notebooks provided by Los Angeles Audubon during a field trip to view plovers at the Dockweiler enclosure.



October 2012. A high school student from Los Angeles Audubon's Baldwin Hills Greenhouse Program helps an elementary school student fill out her field notebook during a field trip to view plovers at the Dockweiler enclosure.

Appendix 4. Excerpts from Critical Habitat Final Rule pertaining to Los Angeles County Beaches.

Application of the “Adverse Modification” Standard

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result consultation for the Pacific Coast WSP. These activities include, but are not limited to:

- (1) Actions and management efforts affecting Pacific Coast WSP on Federal lands, such as refuges, national seashores, parks, and wildlife reserves. Such activities may include clearing and raking of tidal debris (seaweed, driftwood) from beaches, causing a loss in cover and forage; high levels of visitor use, which can disturb and disrupt normal behavior; restoration efforts, which can temporarily affect Pacific Coast WSP’s use of an area; and utility corridors that require maintenance, which can lead to disturbance of Pacific Coast WSPs;
- (2) Dredging and dredge spoil placement that permanently removes the physical or biological features to the extent that Pacific Coast WSPs are affected for the foreseeable future;
- (3) Construction and maintenance of roads, walkways, marinas, access points, bridges, culverts, and other structures that interfere with Pacific Coast WSP nesting, breeding, or foraging or that result in increases in predation;
- (4) Storm water and wastewater discharge from communities, which could impact invertebrate abundance, on which Pacific Coast WSPs rely for food; and
- (5) Flood control actions that change the physical or biological features to the extent that the habitat no longer contributes to the conservation of the species.

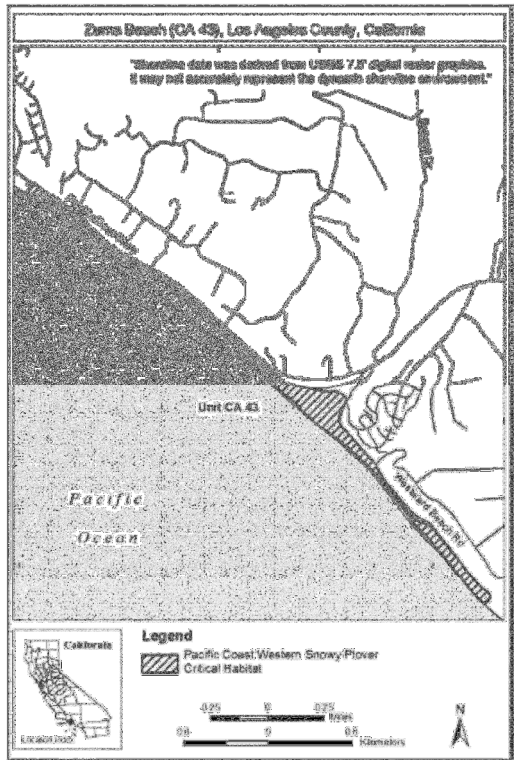
Unit Descriptions

CA 43, Zuma Beach, 73 ac (30 ha) This unit is located about 8 mi (13 km) west of the City of Malibu in Los Angeles County. It extends about 3 mi (5 km) north along the coast from the north side of Point Dume to the base of Trancas Canyon. This unit encompasses approximately 72 ac (29 ha) of Los Angeles County lands, and 1 ac (0.5 ha) of State land. This unit was occupied at the time of listing and is currently occupied. It is an important wintering area with up to 213 Pacific Coast WSPs recorded during a single season over the last 7 years (Service unpublished data; Ryan *et al.* 2010, p. 19).

This unit includes the following physical or biological features essential to the conservation of the species: Areas of sandy beach above and below the high-tide line with occasional surf-cast wrack supporting small invertebrates and generally barren to sparsely vegetated terrain.

The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from nonnative vegetation, human disturbance, development, horses, and pets. Control of nonnative

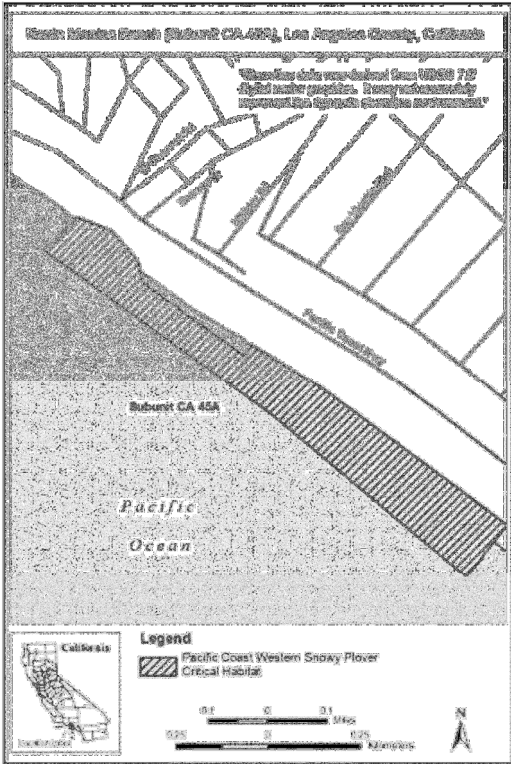
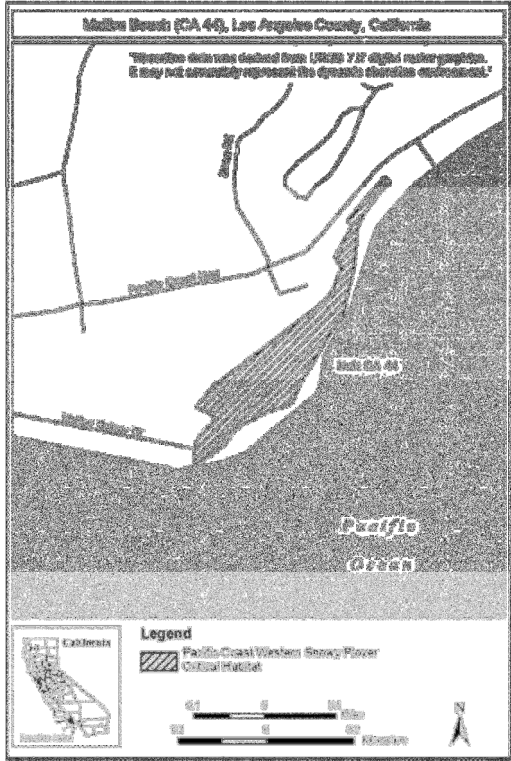
vegetation and enforcement of existing human-use regulations are needed to ensure the suitability of the unit. With time, we anticipate that the lower portions of this unit will be inundated by sea-level rise associated with climate change.



CA 44, Malibu Beach, 13 ac (5 ha) This unit is located within the City of Malibu in Los Angeles County. It extends about 0.5 mi (1 km) north along the coast from approximately 300 ft (94 m) north of the Malibu Pier to Malibu Point. Approximately 9 ac (4 ha) are within Malibu Lagoon State Beach. The ownership of the remaining 4 ac (1 ha) are not known; however, the State likely has jurisdiction over these lands. This unit was occupied at the time of listing and is currently occupied. It is an important wintering area with up to 67 Pacific Coast WSPs recorded during a single season over the last 7 years (Service unpublished data).

This unit includes the following physical or biological features for the conservation of the species: Areas of sandy beach above and below the hightide line with occasional surf-cast wrack supporting small invertebrates and generally barren to sparsely vegetated terrain.

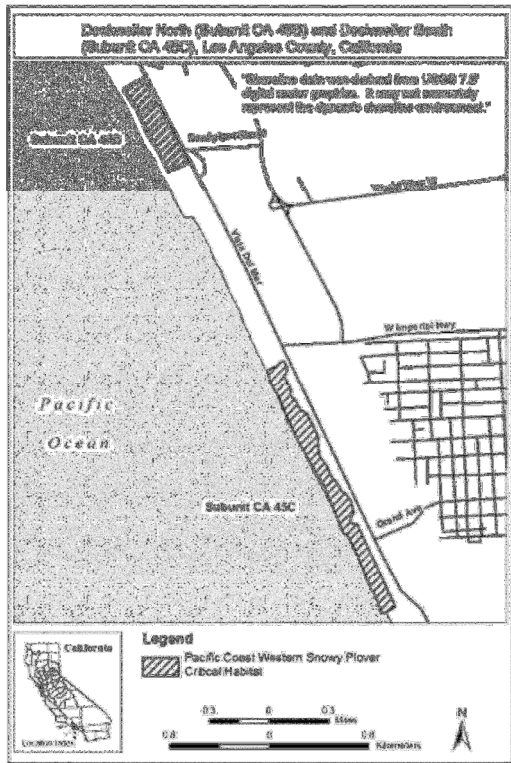
The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from nonnative vegetation, human disturbance, and pets. Control of nonnative vegetation and enforcement of existing human-use regulations are needed to ensure the suitability of the unit. With time, we anticipate that the lower portions of this unit will be inundated by sea-level rise associated with climate change.



CA 45A, Santa Monica Beach, 48 ac (19 ha) This subunit is located between the cities of Santa Monica and Los Angeles in Los Angeles County. It stretches roughly 1 mi (2 km) from Montana

Avenue to the mouth of Santa Monica Canyon. This subunit consists of 29 ac (12 ha) of State owned land, and 19 ac (8 ha) are owned by the City of Santa Monica. This subunit was occupied at the time of listing, is currently occupied, and annually supports a significant wintering flock of Pacific Coast WSPs (an average wintering flock of 36 from 2003 to 2010 (Service unpublished data)) in a location with high-quality breeding habitat. This location also facilitates interchange between wintering locations. This location contains the physical or biological features essential to the conservation of the species, including a wide sandy beach with occasional surfcast wrack supporting small invertebrates.

The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from human recreational disturbance, pets, and beach raking.



CA 45B, Dockweiler North, 34 ac (14 ha) This subunit is located south of Ballona Creek and west of the El Segundo Dunes, and immediately west of the Los Angeles International Airport, in the City of Los Angeles, Los Angeles County. It stretches roughly 0.5 mi (0.8 km) centered at Sandpiper Street. This subunit is owned by the State of California. This subunit was occupied at the time of listing and is currently occupied. In conjunction with Subunits CA 45C and CA 45D, the subunit annually supports a significant wintering flock of Pacific Coast WSPs in a location with high quality breeding habitat (Page *in litt.* 2004) and facilitates interchange between wintering locations.

This location contains the physical or biological features essential to the conservation of the species, including a wide sandy beach with occasional surfcast wrack supporting small invertebrates.

The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from human recreational disturbance, pets, and beach raking.

CA 45C, Dockweiler South, 65 ac (26 ha) This subunit is located immediately west of the Hyperion Wastewater Treatment Plant between the cities of Los Angeles and El Segundo in Los Angeles County. It stretches approximately 1 mi (1.6 km) along Vista del Mar from West Imperial Highway extending past East Grand Avenue. This subunit consists of 54 ac (22 ha) of State land and 11 ac (5 ha) of privately owned land. This subunit was occupied at the time of listing and is currently occupied. In conjunction with Subunits CA 45B and CA 45D, it annually supports a significant wintering flock of Pacific Coast WSPs in a location with high-quality breeding habitat (Page *in litt.* 2004) and facilitates interchange between wintering locations.

This location contains the physical or biological features essential to the conservation of the species, including a wide sandy beach with occasional surfcast wrack supporting small invertebrates.

The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from human recreational disturbance, pets, and beach raking.

CA 45D, Hermosa State Beach, 27 ac (11 ha) This subunit is located immediately west of the City of Hermosa Beach in Los Angeles County. This subunit stretches roughly 0.5 mi (1 km) from Eleventh Street to First Street. This subunit consists of 8 ac (3 ha) State land and 19 ac (8 ha) are privately owned. This subunit was occupied at the time of listing and is currently occupied. The unit supported an average wintering flock of 25 Pacific Coast WSPs from 2003 to 2010 (Service unpublished data). In conjunction with subunits CA 45B and CA 45C, this subunit annually supports a large and significant wintering flock of Pacific Coast WSP and facilitates interchange between wintering locations.

This location contains the physical or biological features essential to the conservation of the species, including a wide sandy beach with occasional surfcast wrack supporting small invertebrates.

The physical or biological features essential to the conservation of the species may require special management considerations or protection to address the main threats from human recreational disturbance, pets, and beach raking.

