

**The Western Snowy Plover In Los Angeles County, California:
January to August 2010**

Prepared for:

The California Department of Fish and Game

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Foreword

Here we report on monitoring, research, and community outreach activities performed by the Los Angeles County Snowy Plover Research Team between Fall 2009 and Summer 2010. 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/>). Additionally, beginning with this report, we have switched from an annual report that goes from January 1 to December 31 to one that goes from July 1 to June 30. In this report, we do provide some information from July and August, as appropriate and when available. This better matches the Snowy Plover's biology on the 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.

Introduction

History. Prior to 1945, the Western Snowy Plover (*Charadrius alexandrinus 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have nested at Redondo, Ballona (Venice/Marina Del Rey), Los Angeles, and Malibu Beaches (LA Breeding Bird Atlas Data, Unpublished).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). The USFWS lists five beaches in LAC as critical habitat for the Snowy Plover (USFWS 2005). These beaches are protected as wintering habitat (USFWS 2005). 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 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, 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 LAC 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 January to mid-August 2010 and outline activities scheduled to take place mid-August through December 2010 (Table 6).

Summary of Study Findings. Prior to beginning this study, little was known about the wintering Snowy Plovers in LAC. We found that in coastal LAC, the Snowy Plover annually inhabits seven roosting sites at Zuma Lifeguard Tower (LT)9/Zuma Lagoon, Malibu Lagoon, Santa Monica, Dockweiler State Beach (DSB) 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 this 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 LAC 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 Snowy 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 three 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 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 performing 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. In 2010, project biologists and volunteers conducted countywide surveys of all suitable roosting habitat (Ryan et al. 2010) in January 17-24, March 10-16, and May 16-22. The January and May surveys corresponded to the USFWS' winter and breeding season window surveys. Between January 23 and April 29, project biologists surveyed the roosts. 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 3), 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 Reyes Bird Observatory (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 3). 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 February, April, June, and July. Between January 23 and April 29, biologists checked the roosting areas weekly for signs of nesting. 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 3) and recorded any events that occurred near the roosts that could potentially harm the Snowy Plovers, disturbed the Snowy Plovers, or resulted in the mortality of Snowy Plovers. They noted any dead birds found on the beach.

results and discussion

Population Status

Table 1. Results of Countywide Surveys in 2010.

Beach	January	March	May
Leo Carrillo State Beach/Nicholas Cyn CB	0	0	0
Zuma Beach	80	77	0
Zuma Beach South	0	0	0
Dume Cove, Paradise Cove, Escondido B.	0	0	0
Dan Blocker CB, Puerco Beach	0	0	0
Malibu Lagoon, Carbon Beach	67	22	0
La Costa B., Las Flores B., Big Rock B.	0	0	0
Will Rogers SB North	0	0	0
Will Rogers SB South	0	0	0
Santa Monica State Beach North	41	36	0
Venice City Beach North	0	0	0
Venice City Beach South	0	4	1
Dockweiler Beach North	6	12	0
Dockweiler Beach Central	6	1	0
Dockweiler Beach South	16	21	0
El Segundo & Manhattan Beach	4	0	0
Hermosa Beach North	11	7	0
Hermosa Beach South & King Harbor	0	0	0
Redondo County Beach North	0	0	0
Point Fermin & Cabrillo Beach	5	3	0
Total Observed	244	183	1
No. of Sites (N)	9	9	1
Average Roost Size	27.1	20.3	1
Std. Error	10.0	8.0	-

Countywide Surveys. Countywide surveys detected 244 Snowy Plovers in January, 183 in March,

and one in May (Table 1). This is similar in terms of both peak winter count (Table 2) and average roost size for these months (Table 3). The USFWS winter window survey detected 244 Snowy Plovers, this is the highest total since before the population decline observed in 2007 (Table 2). Monthly average detections (Table 3) are mixed with January and March lower and February and April higher. However, the average roost size remains about half what it was prior to the 2006-07 declines (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, and Dockweiler have mostly recovered to pre-decline levels. However, Zuma remains just over half its previous size. Hermosa also appears to be about half its previous size as well.

Table 2. Annual Detections of Snowy Plovers during Winter Window Surveys 2004-10.

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

Table 3. Monthly detections of Snowy Plovers at roosts 2004-2009 vs. 2010.

Month	2004-2009 Average Obs.	SEM	2010 Average Obs.	SEM
Jan	31.1	5.59	27.1	10.0
Feb	30	6	36.0	14

Mar	24.3	6.86	20.3	8.0
Apr	9.2	1.55	16.7	7.6
May	1.7	0.33	1	0
Jun	0	0	0	0
Jul	9.1	1.29	1	0
Aug	24.3	2.95	22.75	4.5
Sep	32.8	4.64	-	-
Oct	42.8	6.3	-	-
Nov	39.5	5.36	-	-
Dec	44.2	6.56	-	-

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

Year	Average Observed	SEM	Total Counted	No 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

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

Table 5. Results of Roost Surveys in 2010.

Beach	Jan 23&24	Feb 16	Feb 25	Mar 5	Mar 13&15	Mar 22&23	Mar 30	Apr 4&5	Apr 15	Apr 22	Apr 28
Zuma	94	72	94	77	77	52	36	50	24	0	6
Malibu	67	59	52	56	38	35	25	28	6	4	0

Santa Monica	37	37	41	36	29	32	0	0	5	2	4
Dockweiler (LT 47)	31	9	12	11	13	7	12	8	3	0	5
Dockweiler (LT 58)	0	15	14	14	13	15	10	5	2	0	3
Hermosa	5	2	3	3	12	12	8	5	0	0	0
Total	234	194	216	197	182	153	91	96	40	6	18

Roosting Sites

Zuma County Beach. Zuma is the largest roost and supports approximately 41% of the county population (Ryan et al. 2010) (Figures 2 and 3). At Zuma, the flock remained north of Lifeguard Tower 9, although in March and April, most were detected about 300 m north of their usual location (Figure 2 and 3). The winter survey window showed an increase over the 2009 count from 82 to 94 Snowy Plovers (Table 5). Their population remained high until mid-March. They began to depart the roost in mid-March (Table 5). A group of six Snowy Plovers was detected roosting far north of their typical roosting area, adjacent to Trancas Creek on April 28 (Figure 2). This roost is not protected and is regularly groomed and driven through. As discussed here and above, this roost remains at about half its previous population. Additionally, in 2008 a large proportion of the flock moved south to near the lagoon (Ryan et al. 2010). In 2010, they were widely scattered north of their historic roost location. We do not know why this occurs here, but one possibility is the regular disturbance by vehicles.

Malibu Lagoon. Malibu is the second largest roost and typically supports about 16% of the county population (Ryan et al. 2010) (Figures 4 and 5). In 2010, we observed between 52 and 67 until early March, when numbers began to decline to 25-38 Snowy Plovers until early April. The last Snowy Plover was detected on April 22. Overall, there was an increase in the number of Snowy Plovers at this beach in 2010. As was done in 2008 and 2009, an enclosure was installed on March 15, 2010, a little later than in previous years. The Snowy Plovers used it intermittently, preferring to use a segment of beach east of the enclosure (Figure 5), and retreat to it when the beach becomes crowded. The enclosure was well-respected and no damage was done to it while it was in place.

Santa Monica State Beach. The roost at Santa Monica supports about 8% of the countywide wintering population of Snowy Plovers (Ryan et al. 2010) (Figures 6 and 7). In 2010, we consistently detected between 29 and 37 Snowy Plovers until March 22 (Table 5). After that date, there were none detected in late March/early April. A few returned in mid-April and remained here until April 28 (Table 5). Additionally, the Snowy Plover flock was consistently located immediately southeast of the enclosure although footprints and scrapes indicate that the

enclosure was regularly used. We suspect that their relocation and early departure may have been due to heavy disturbance within the enclosure. In 2010, there were regularly 1-3 people sleeping overnight within the enclosure and a local resident who was exercising inside the enclosure most mornings. The enclosure was moved south of its location in 2009, and we may want to consider moving it even further south next year and requesting that local police and lifeguards talk to people who regularly sleep or exercise inside the enclosure.

Venice City Beach South. Individual Snowy Plovers were observed here regularly in 2010, including an unusual June observation (Figure 8). There are very few coastal records of Snowy Plovers in June in LAC. This made an opportunistic observation of a Snowy Plover at the Venice Beach Least Tern Colony by Least Tern Volunteers Marian Katz and Max Ackerman on June 26, 2010 especially interesting. In checking with Kimball Garrett, this is one of very few records for the county between mid-May and June.

Dockweiler State Beach. At the northern roost near LT 47, there were mostly between 8 and 13 Snowy Plovers, with a high count of 31 Snowy Plovers on January 24 (Figures 9 and 10). They were then detected intermittently until April 29. As was noted in the annual report, a new, but temporary, enclosure was installed at Dockweiler State Beach, north of Lifeguard Tower 47 in January 2010 (Figure 10). It was placed in the same area as the road-cones had been previously. It was approximately 100 ft x 300 ft and consisted of t-posts and orange snow fencing. It was placed here independently of our group efforts by Los Angeles County Beaches and Harbors (LACBH) and Cooper Ecological Consulting. During most visits, the Snowy Plovers have been observed within the enclosure; however, on one visit they were immediately south and on another they were immediately north of the enclosure (Figure 10). This beach was severely eroded during the winter storms of 2010. The storms uncovered a dark clay-like layer on the lower beach. The enclosure appeared to be doing a good job of protecting them.

At the southern roost, north of LT58, we detected 10-15 Snowy Plovers with a high count of 21 by volunteers in early March (Figures 12 and 13). They roosted mostly between the volleyball courts and the RV Camping Area (Figure 13). They began to depart at the end of March and the last was observed within the roosting area on April 29. However, on May 16 an individual was observed. A follow-up nest survey did not detect any signs of nesting. This is similar to their numbers in 2009. This roost is not protected and is regularly groomed and driven through.

El Segundo and Manhattan Beach. Four Snowy Plovers were observed at two locations during the January survey (Figure 14). We have observed low numbers of individuals sporadically in previous years. There does not appear to be a well-defined roosting area here.

Hermosa Beach. We detected between two and 12 Snowy Plovers at this roost until April 5

(Table 5). This is a notable decline from 2004 and 2009 when between 23 and 41 Snowy Plovers were present (Ryan et al. 2010). Additionally, between 2004 and 2009, the roost has typically been located near 26th Street (Ryan et al. 2010) (Figures 15 and 16). In 2010, there have been very few Snowy Plovers detected at 26th street (typically 0-6) and most have been observed approximately 0.5 km south near 21st Street (Figure 15). The reason for this decline, movement, and unusually early departure 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).

Cabrillo Beach. We detected five and three Snowy Plovers at Cabrillo Beach during the January and March surveys. They were located on the outer beach in the same area that they have been found in previous years (Figure 17). Numbers of Snowy Plovers at this beach continue to decline from 13 in 2004. They are exposed to heavy disturbance as well as a local feral cat population.

Nesting

During the roost surveys, we detected large numbers of scrapes. In 2010, they were first detected on February 16, and then they were detected until April 22. The numbers of scrapes peaked in late March at 142 (March 13 and 15) and 109 (March 30). Unfortunately, we were typically only able to obtain four (of 10) scrape counts at Dockweiler LT58, 3 (of 9) at Hermosa, and four (of 10) due to beach groomers smoothing the sand and removing any scrapes present prior to our surveys. In 2010, we detected six scrapes that appeared to be nesting scrapes. All were within the enclosure at Dockweiler 47, one on March 5 and the other five on March 30. A female Snowy Plover was also noted on May 16, outside of typical migration at Dockweiler south. We did not detect any eggs or chicks in 2010. However, we did note nesting behaviors including calling, aggressive displays, and male-female pairings.

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 2010, our community outreach program continued to reach LAC beachgoers. However, there remains a large number of beach users that are completely unaware that the Snowy Plovers are present and things that they can do to minimize their impact on Snowy Plovers. We plan to continue our volunteer recruitment and training, expand our docent program, expand our 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. Grooming equipment continues to pass through Snowy Plover roosts, flushing Snowy Plovers and removing roosting scrapes between February and April at

Zuma, Dockweiler LT 58, and Hermosa Beach. We did note that the groomer operator on Santa Monica State Beach attempted to avoid the area that the Snowy Plovers relocated to south of the enclosure on most days. We recommend that the beach groomers avoid Snowy Plover roosting areas at these beaches.

Vehicles Driving on Beaches. We continue to observe vehicles that appear to be moving at greater than 10 mph (), some significantly faster. LACBH's speed limit for regular vehicles on the beach in non-emergency situations is 10 mph, trash trucks and dump trucks are allowed to go 15 mph (LACBH, Policy 2918 2.2 and 3.1.10). However, we have noticed an improvement in many of the vehicles observed near the roosts. It appears that the message to slow down near the roosts is reaching some beach driving staff. However, we continue to observe fast-moving vehicles near the roosts. Both slow-moving and fast-moving vehicles continue to drive through the roosting areas, flushing Snowy Plovers, and removing roosting scrapes at Zuma, Santa Monica (outside the enclosure), Dockweiler LT 58, and Hermosa. We recommend continued training by all agencies that drive on the beach and increased enforcement by supervisory staff.

Dogs. We continue to observe off-leash dogs near all roosting areas. We suspect that one reason the Snowy 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.

Predators. We did not detect any direct predation on Snowy Plovers in 2010. However, numerous potential predators were observed. These include a gopher snake, red-tailed hawks, peregrine falcon, American kestrel, western gull, American crow, common raven, raccoon, domestic dogs, and domestic cats. We recommend putting lids on all trash cans.

Education and Outreach

Volunteer participation in the Snowy Plover monitoring program. From January to July, 2010 37 individuals volunteered to monitor Snowy Plovers in LAC and/or aided in the set-up of the protective enclosure at Malibu Lagoon, contributing over 219 people-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) to conduct docent activities at the Snowy Plover roost at Dockweiler North (Beach 19), to lead a series of Snowy Plover-focused beach walks for the general public, and to coordinate public school visits to observe Snowy Plovers. Through outreach activities, we have worked to

establish community connections that will provide volunteers for both data collection and docent activities. From late January to mid-April, eight volunteers spent over 30 hours combining docent activities with data collection at roost sites at Dockweiler, Santa Monica, and Malibu Lagoon, collectively. During the late summer and fall of 2010, we have scheduled training sessions for new volunteers and anticipate considerably more volunteer hours will be spent on docent activities during the 2010/2011 non-breeding season.

School Outreach Program. We explored multidisciplinary ways to engage young, inner-city students in Snowy Plover conservation. In late 2009, we secured funding for a Snowy Plover art contest. In February and March of 2010, 65 inner-city Los Angeles students from Leo Politi and Weemes Elementary Schools participated in a Snowy Plover Illustration Workshop, learning about Snowy Plovers in the classroom, visiting Snowy Plover habitat to observe birds and collect data, and then integrating ecological concepts with science illustration techniques to create Snowy Plover conservation posters. Artwork was judged by students from Dorsey High School, and top designs will be used as signs at Snowy Plover enclosures and other venues. On May 21, 2010, the workshop culminated in a “Share The Shore” art exhibit and conservation outreach event at the Leo Politi Elementary campus that was attended by over 400 students, family members, and local community members. Los Angeles Audubon established an online gallery so that the public could view all student artwork at any time (http://losangelesaudubon.org/index.php?option=com_content&task=view&id=625&Itemid=244). We have secured funding to continue this type of in-depth, multidisciplinary outreach for the 2010-2011 school year.

We also worked with the UCLA Center for Community Learning in 2010. Los Angeles Audubon served as a community partner to the Civic Engagement and Sustainable Environments course during the Winter 2010 quarter. Three students served as interns, receiving training in survey and docent protocol, and spent a portion of their internship hours observing Snowy Plovers and serving as docents at Santa Monica Beach from January to March 2010. Their hours are included in the total stated in the “Formalized Docent Program” section above.

We are currently coordinating with graduate student Lauren Tingco at CSU Los Angeles. As part of her masters project, she will develop an educational activity relating to Snowy Plover ecology that will be implemented in the winter and spring of 2011 at Dockweiler State Beach.

For the fall of 2010, we have scheduled four public schools to visit the Dockweiler Youth Center and Dockweiler State Beach. Inner-city students in elementary, middle, and high schools will be led by a biologist and docents on a beach ecology hike to view Snowy Plovers in their native habitat.

General Public Outreach. In the summer of 2010, we coordinated with California State Parks to

conduct a series of campfire programs, addressing Snowy Plover conservation, at Leo Carrillo, Carpinteria, and MacGrath State Beaches. We also set up a conservation table at the West Los Angeles Farmers Market in August, making interpretive materials about Snowy Plover conservation available to the public. In February 2010, our abstract and poster presentation for *Efficacy of community-based science in the conservation of Snowy Plovers and Least Terns in Los Angeles, California* was accepted and displayed at the COS/AOU/SCO Joint Meeting in San Diego, California (Appendix 2).

Table 6. Outreach and education events completed and pending in 2010, including presentations, tabling events, and fieldtrips led by a project biologist.

Activity	Date	Location	Demographic	No. Attending
Snowy Plover Illustration Workshop	Feb 11, 24, 25 Mar 3, 4, 10, 11, 17, 18	Leo Politi Elementary School	Inner-city public school students	44
	Feb 17 Mar 10, 11, 12	Weemes Elementary School		21
	Feb 19	Malibu Lagoon		65
	Apr 19	Dorsey High School		16
	May 21	Leo Politi Elementary	Inner-city students, families, community members	Over 400
University Outreach	Jan 14	UCLA	UCLA students	20
	Jan 24	Santa Monica North	UCLA students	3
Cooper Ornithological Society, American Ornithologists Union Joint Meeting	Feb 7-11	San Diego	Academic and professional community	unk

Farmers Market	Aug 8	West Los Angeles	General public	unk
California State Parks Campfire Program	July 31	Leo Carrillo State Beach campground	General public	25-30
	Aug 14	Carpinteria State Beach campground	General public	35-40
	Aug 28	McGrath State Beach campground	General public	35-40
Dockweiler Youth Center Programming (beach walks and enclosure clean-up events)	Aug 12, 19, 21 Sept 2, 11, 16, 23, 30 Oct 7, 16, 21 Nov 4, 13	Dockweiler State Beach	General public	19 to date
Dockweiler Youth Center Public School Visits	Sept 8 Oct 21, 24	Dockweiler State Beach State	Inner-city public school students	30 to date

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, and we are currently coordinating with Cabrillo Marine Aquarium and Santa Monica Bay Aquarium to potentially set up other display options for this artwork and interpretive material.

Creation and maintenance of a website. Los Angeles Audubon currently hosts a Snowy Plover website within its general website (laaudubon.org). Volunteer materials, annual reports, updates, and maps of Snowy Plover locations from volunteer observations are available to the public and management agencies.

Create signage for the winter and breeding season fencing. The project team secured funding for the creation of signage for the enclosure at Dockweiler North. Signs have been printed, and we hope to install them in late summer 2010 once the seasonal enclosure at Dockweiler State Beach is set up. In addition, we now have several conservation posters created by elementary school students that can be used at the seasonal enclosure at Malibu Lagoon in spring 2011.

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.

Recommendations for Future Education and Outreach:

- Work towards sustainability in docent and outreach programs. Of course, expansion to more public schools and interested groups throughout LAC 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.
- 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 both 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 should then be considered in the design and placement of protective measures, including enclosures. The project team believes that to develop a public survey with genuine scientific credence 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.
- 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. 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.

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Appendix 1: Survey and roost maps

(January – May 2010)

Figure 1. Map of Study Locations.

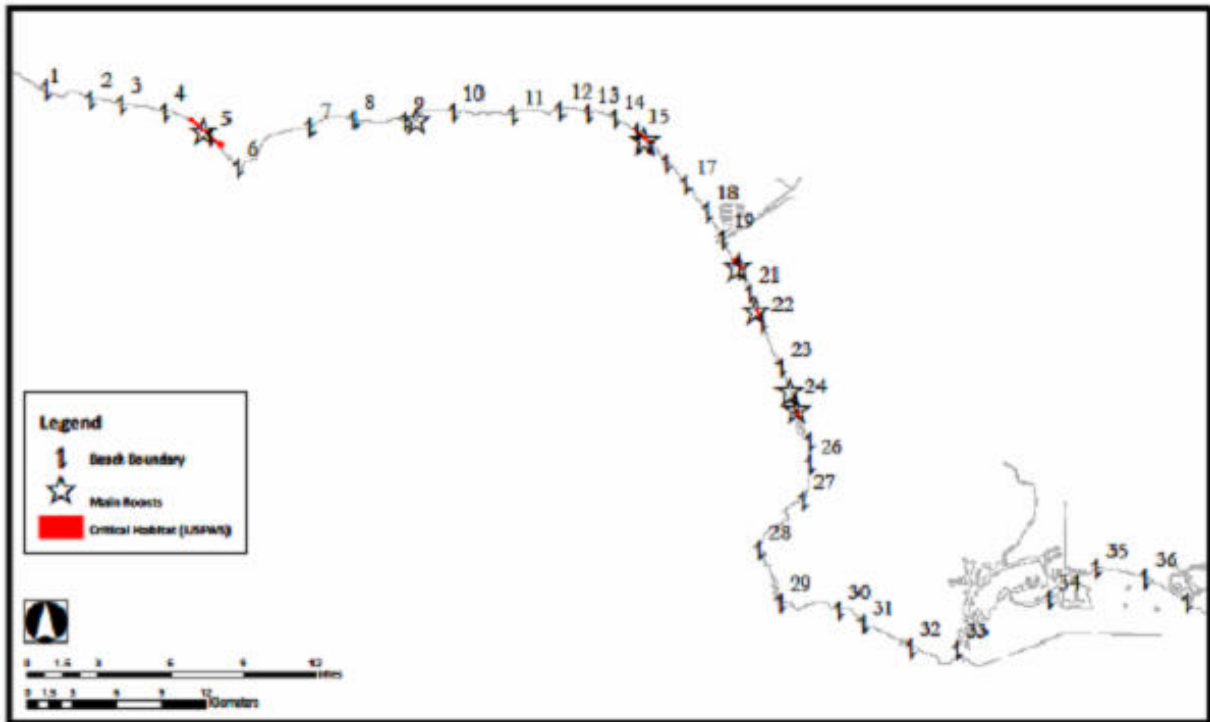


Figure 2. Zuma Beach Countywide Survey Results



Figure 3. Zuma Beach Roost Survey Results.



Figure 4. Malibu Countywide Survey Results.



Figure 5. Malibu Beach Roost Survey Results.

Malibu Lagoon, Carbon Beach (Beach 9)



Figure 6. Santa Monica Countywide Survey Results.



Figure 7. Santa Monica Roost Survey Results.

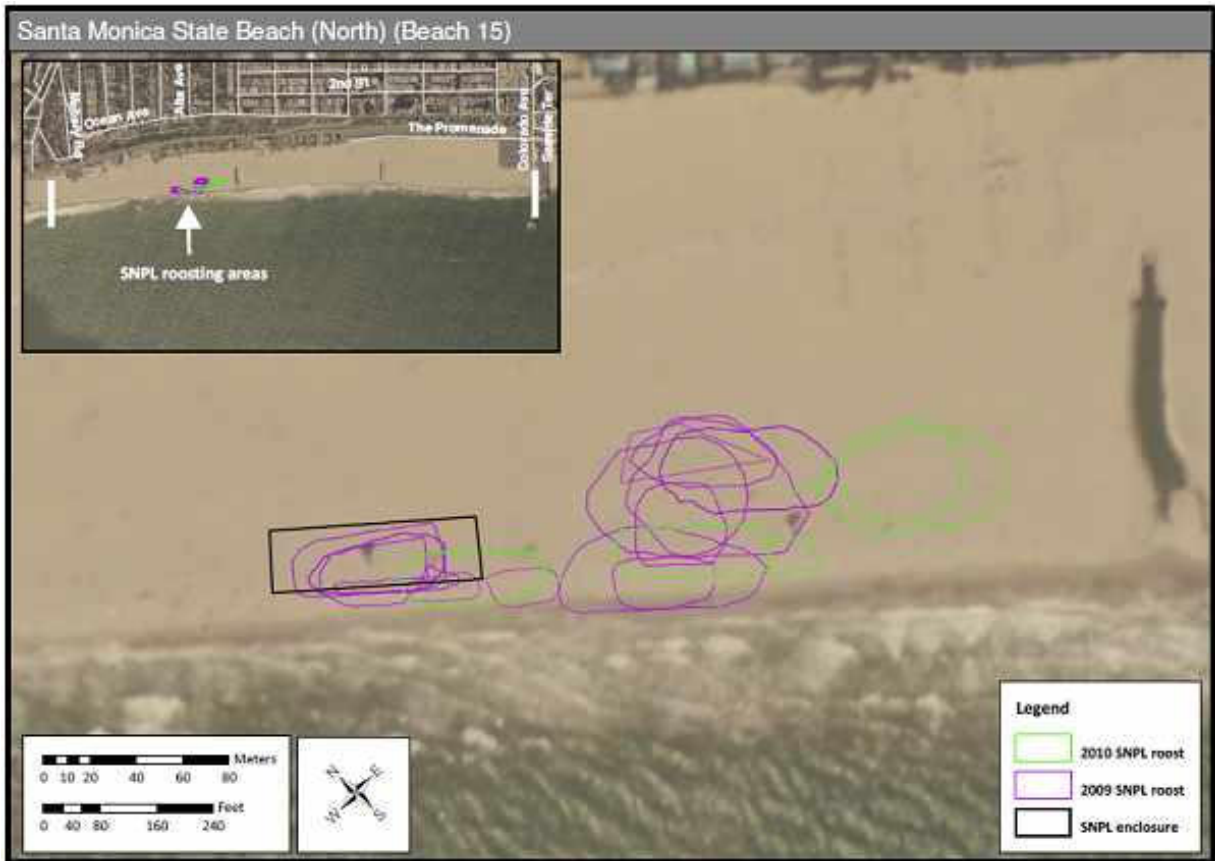


Figure 8. Venice Beach South Countywide Survey Results.



Figure 9. Dockweiler North Countywide Survey Results.



Figure 11. Dockweiler Central Countywide Survey Results.

Dockweiler Beach Central (Beach 20)



Dockweiler Beach (South) (Beach 21)



Figure 14. El Segundo and Manhattan Beach Countywide Survey Results.

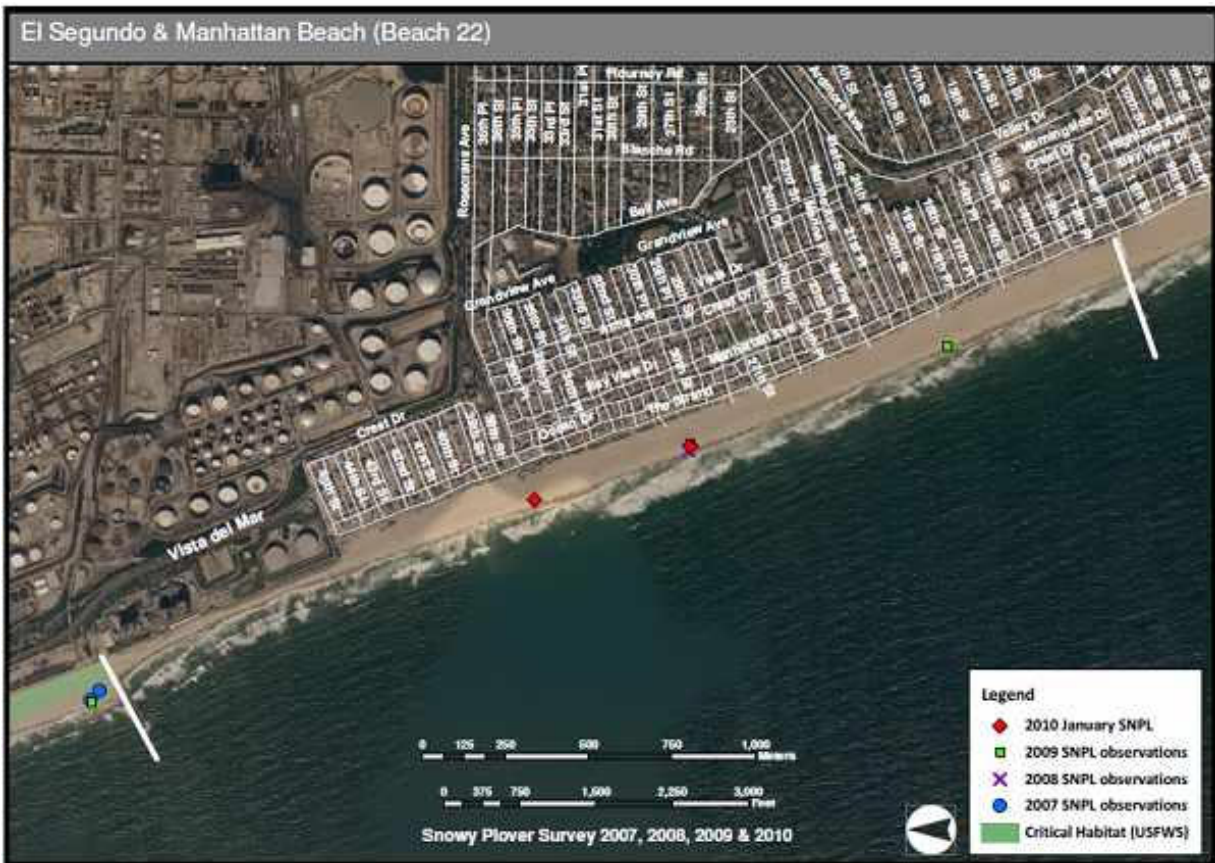


Figure 15. Hermosa Beach Countywide Survey Results.

Hermosa Beach North (Beach 23)



Figure 16. Hermosa Beach Roost Survey Results.

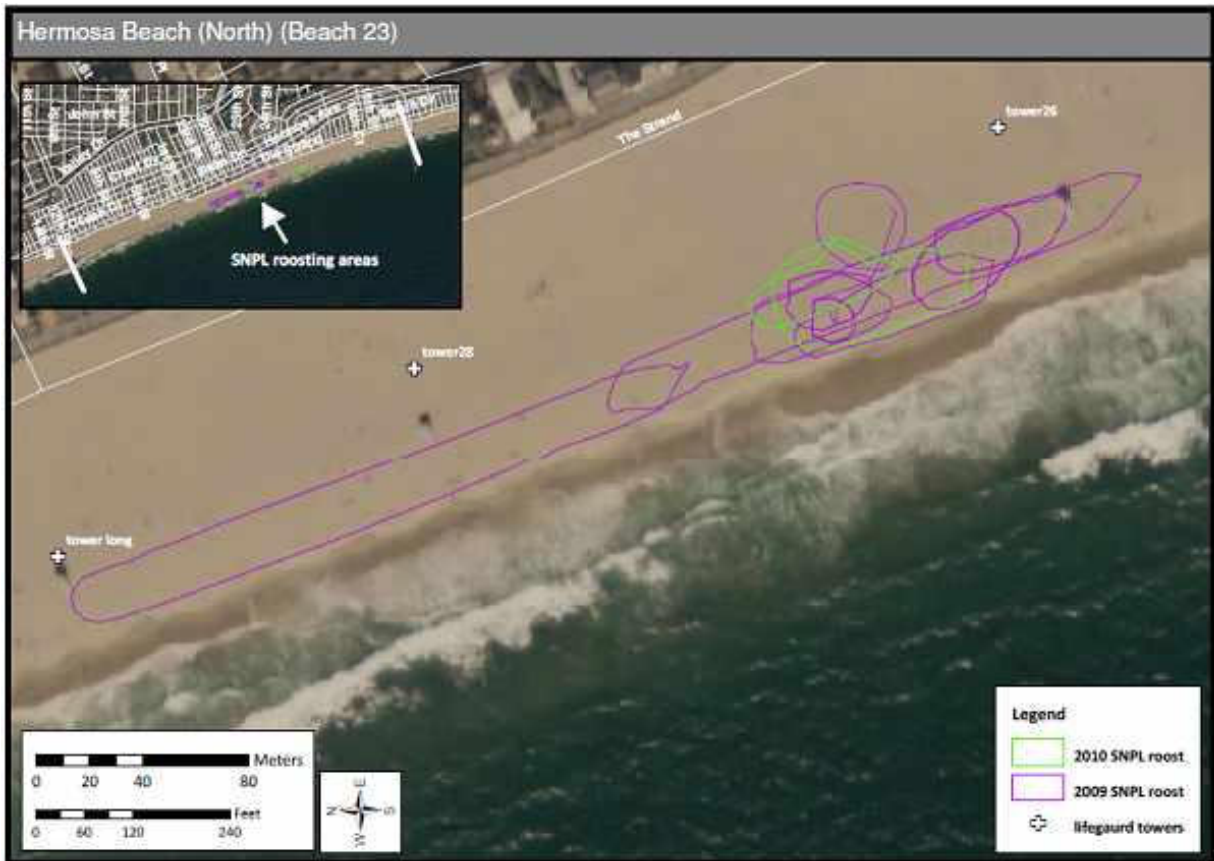
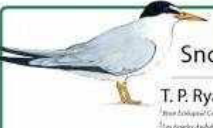


Figure 17. Cabrillo Beach Countywide Survey Results.

Point Fermin & Cabrillo Beach (Beach 32)




Appendix 2. Poster presented at the Feb 2010 COS/AOU/SCO Joint Meeting in San Diego, California.



Efficacy of community-based science in the conservation of Snowy Plovers and Least Terns in Los Angeles County, California

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ABSTRACT: From 2007 through 2009, Los Angeles Audubon collaborated with project biologists and management agencies to coordinate volunteers to monitor and restore habitat for Snowy Plovers, a threatened, endangered and Least Terns (Stercoraria antillarum) on Los Angeles County beaches. The goal of the project was to (1) enhance the data-gathering capacity of projects staffed by only 3-4 biologists (2) engage the public in citizen-based science as a means of encouraging support for these threatened and endangered species in the highly urbanized setting of Los Angeles. More than 80 volunteers participated in Snowy Plover and Least Tern monitoring, volunteer coordination, egg LARV counts, plover monitoring, over 100 hours of nest protection, and 1,300 hours of habitat restoration. Volunteers proved highly effective in gathering data on target species, population size, behavior, and habitat, and greatly enhanced the data set by feeding this also target species, such as habitat and predator use patterns. As a by-product, habitat restoration opportunities were able to engage a broad spectrum of the public, including public school children, experienced birders, and local beach communities.



Introduction

Snowy Plovers (*Charadrius alexandrinus*) and Least Terns (*Stercoraria antillarum*) are both species of conservation concern in Los Angeles County (L.A.C.) California. By the 1940s Snowy Plovers had ceased to nest on L.A.C. beaches (Gray Page, pers. comm.) and Least Terns were gone from most beaches in the county (Grimell and Miller 1949). Beaches in this county receive over 50 million visitors a year (County of Los Angeles 2009), are heavily groomed, and are subject to many beach uses as part of a public-sides infrastructure. Despite beach habitat use, L.A.C. beaches still support wintering flocks of Snowy Plovers and two breeding colonies of migratory Least Terns. From 2007 through 2009, Los Angeles Audubon collaborated with project biologists and management agencies to coordinate volunteers to monitor and restore habitat for these species within the county. For plovers, the main goals of the volunteer monitoring program were to determine overall population and distribution on L.A.C. beaches and to determine the size and location of nests. For the Least Terns the goals were to monitor the breeding colony located on a public beach, to restore habitat within the colony enclosure, and to determine trends in nest site selection.

Our motivation for engaging volunteers in these projects was two-fold. First, we hoped it would greatly enhance our data-gathering ability within the confines of a small project budget. Volunteers have been used to gather data on a large-scale program such as the Christmas Bird Count and North American Breeding Bird Survey. Other smaller-scale projects have also successfully employed volunteers to meet research goals (Cooper et al. 2007, Cohn 2008, McCallum 2005). Second, we intended to use volunteer opportunities as a form of outreach and education about Snowy Plovers and Least Tern conservation. Public awareness and support for conservation is often an essential component to species recovery as it affects public policy decisions and day-to-day behavioral choices.

Methods

Students of both the Snowy Plover (SNP) and Least Tern (LTT) took place on highly urbanized beaches of Los Angeles County. Each project operated on a small budget with few staff and project budget. A local biologist who also serves as volunteer coordinator and a field specialist making volunteers on overall components of data collection. In 2007, we initiated the projects with a volunteer group comprised of avian hobbyists and members of local beach communities. Through outreach presentations in 2008-2009, we broadened our volunteer base to include students from nearby colleges and universities, inner city public school students, and employees from large companies (see below). Volunteers received on-site training in a variety of techniques and survey operations were made available on-site at all activity periods.

Least Tern Colony Monitoring

Least Tern monitoring took place at the Venice Beach colony enclosure, one of only two breeding colonies in L.A.C. Birds typically arrived at the colony by mid-August and departed in mid-September. During that window, each volunteer monitored the site on a consistent schedule, one hour per week. Access to the colony enclosure is limited to permitted staff only, so volunteers gathered data from around the perimeter of the colony during that window. Data collected included number of adult terns, nests, chicks, and fledglings, nest behavior, behavior (foraging activities, vigilance, behavior, perching and predator activity) in the immediate vicinity of the colony, and time and weather information. Data were submitted to the volunteer coordinator and the local biologist who then weekly reports an colony status to managing agencies.

Snowy Plover Monitoring

Snowy Plover monitoring occurred on a near coast beach. All colonies and private beaches surveyed are approximately every mile of coastline from Venice to Hermosa Beach and monitored biologically by monitoring plovers were surveyed either once per year. Survey methods were adopted from the USFWS protocol for surveying for Western Snowy Plovers (Eaton, unpublished May 2009). Each volunteer on terms of volunteer carried a survey transect (200m in length) in a single pass, collecting data on number and location of Snowy Plovers, color band sightings, the date and weather conditions of each survey. Habitat type and presence of predators. Volunteers also collected data on human use patterns in nesting. Data were submitted to the volunteer coordinator and the local biologist who then weekly reports an colony status to managing agencies. As a by-product, habitat restoration opportunities were able to engage a broad spectrum of the public, including public school children, experienced birders, and local beach communities.

Least Tern Colony Habitat Restoration

In order to maintain habitat within the colony enclosure and study site preference, we introduced to three habitat restoration events each spring prior to the terns' arrival and one each fall following their departure. The enclosure was open to the public, so these sites for volunteers to come, observe, discuss and look and learn to participate in vegetation manipulation to study goals. We actively engaged students from inner city public schools to participate in these events.

Acknowledgements

We wish to thank each of the volunteers who participated in these projects on project biologists in Projects. Such as the volunteer biologists and the local biologist who also serves as volunteer coordinator and field specialist making volunteers on overall components of data collection. In 2007, we initiated the projects with a volunteer group comprised of avian hobbyists and members of local beach communities. Through outreach presentations in 2008-2009, we broadened our volunteer base to include students from nearby colleges and universities, inner city public school students, and employees from large companies (see below). Volunteers received on-site training in a variety of techniques and survey operations were made available on-site at all activity periods.

Results/Discussion

Table 1. Number of volunteers participating at Snowy Plover and Least Tern Monitoring Programs and in other main activities, 2007-2009.

	2007	2008	2009
SNP volunteers	57	14	156
SNP volunteer hrs	430	269	961
LTT volunteers	12	15	20
LTT volunteer hrs	141	164	146


Table 2. Number of volunteers participating in Least Tern habitat restoration and volunteer hours contributed, 2007-2009.

	2007	2008	2009
Spring volunteers	20	19	111
Fall volunteers	31	10	89
Total volunteer hrs	141	218	501

Volunteers proved highly effective in gathering data on target species' population size, location, and behavior, and greatly enriched the data set by moving towards to larger species, such as human and predator use patterns. By also coordinating habitat restoration opportunities, we were able to engage a broad spectrum of the public, including public school children, experienced birders, and local beach communities. The substantial amount of hours (Tables 1 and 2) invested in these projects by volunteers accomplished three important things:

- (1) It greatly enhanced the data-gathering capacity of projects with only 3-4 staff members.
- (2) It represented a large in-kind donation in terms of project budget. Using California's minimum hourly wage (8) for this calculation, volunteers effectively donated \$13,848 in Snowy Plover conservation (1,681 hrs) and \$19,548 to Least Tern Conservation (1,818 hrs) over the course of these years.
- (3) It engages the public in hands-on conservation action as a means of encouraging support for these threatened and endangered species in the highly urbanized setting of Los Angeles.

Our results are in keeping with other projects that suggest that community-based science is an effective way to concurrently reach science and outreach goals (Cooper et al. 2007, Cohn 2008, McCallum 2005).



Appendix 3. Data Sheet used in 2010.

LOS ANGELES COUNTY
Western Snowy Plover Field Survey Form 2010

Page ___ of ___

Survey Location _____ Month _____ Day _____ Year 2010
 Observer Name (s): _____
 Start Time ____ Stop Time ____ Total Time ____ Prep Time ____ Weather conditions: _____
 Temperature: _____ Cloud Cover: _____ Precipitation: ____ Wind: (mph) _____ (direction) ____
 Tides: _____ Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100% Precipitation: N = None, R = Rain, F = Fog, D = Drizzle

SECTION 1: SNOWY PLOVER SIGHTINGS:

Number of Snowy Plovers seen? _____ Ad: Juv: M: F: Survey Complete? _____ (if no, circle area surveyed on map)

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

¹ Wet sand, wrackline, mid-beach, foredune, linear beach, estuary mouth, overwash, HRA (habitat restoration area), barrier island/peninsula
 Behavior Codes: R = roosting F = foraging S = sitting as if on nest O = other (specify in notes) Nest Status Codes: C/N = copulation and nest construction I = incubation H = hatching F = fledging O = other (specify in notes)

SECTION 2: BEACH USE & PREDATOR MONITORING:

Walking	Jogging	Sitting	Sports	Bicycle	Fires	Fishing	Vehicle	ATV	Equipment
Dog Off	Dog On	Coyote	Fox	Cat	Crow	Raven	Raptor	Horse	Other

Speeding Vehicles (time, make & model, decals, license plate, or other markings): _____
 Describe Other: _____
 Other wildlife species detected (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? _____

Recording band colors: Record 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. Read T = T, R = R, L = L if the bird is facing you.
 Underlined letter is code for color: Aqua Blue Green Black Brown Lime Orange Pink Red Silver Yellow White Yellow. * Record un-banded birds as X:X.
 Example: A bird that has no bands on its left leg and one yellow band on its right leg is X:Y. A bird with a left band on top (orange) left bottom (red) and a right band on top (green) right bottom (red) would be OR:GR. A bird with only one band (red) on the left and one band (white) on the right would be R:W.
Sex: Male, Female, Unknown **Age:** Addult, Juvenile (Young capable of flight), Chick (incapable of flight), Unknown