FINAL 2017 Breeding Season Monitoring Report
for
Western Snowy Plover and California Least Tern
Hollywood Beach, Oxnard, California

Nest HB09

Submitted to:

U.S. Fish and Wildlife Service, Ventura Office,
California Department of Fish and Wildlife,
California Audubon Society, and
Ventura Audubon Society

by

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EXECUTIVE SUMMARY

The abundance and productivity of the federally listed threatened western snowy plover (*Charadrius nivosus nivosus*) and the federally and state-listed endangered California least tern (*Sternula antillarum browni*) were monitored at Hollywood Beach located in unincorporated Ventura County near Oxnard, California during the 2017 breeding season. Activities are being conducted according to U.S. Fish and Wildlife Service (USFWS) protocols for nest monitoring under the Endangered Species Act (ESA) by recovery permit holders Debra Barringer (TE-89964A-1) and Danielle Glenn (TE-35387A-0).

There were 11 western snowy plover (WSP) nest attempts on Hollywood Beach in 2017. A total of 32 eggs were laid, 23 hatched, one chick was known to survive to fledging, and one chick was rescued after adults left the area and brought to the Santa Barbara Zoo to be raised and ultimately released. Suspected American crow depredation augmented by the lack of adequate cover near nests and foraging areas coupled with high human disturbances were primary limiting factors for chick survival. In addition, some non-viable eggs and a nest abandonment reduced reproductive success. Early wind events buried 6 eggs but adult WSPs were able to dig out 4 of those that went on to hatch.

On May 23rd 18 California least terns (CLTs) were observed on the beach, some displaying breeding behavior, including carrying fish and copulating. CLTs were also observed making scrapes over several weeks and even exhibited defense tactics (e.g., dive-bombing) with the ever-present crows. However, no nests were initiated by CLTs in 2017. Small groups continued to be observed flying over the beach through August 16th.

INTRODUCTION AND SITE DESCRIPTION

Hollywood Beach is located in Ventura County on the west side of the City of Oxnard (Figure 1). It is located between the Oxnard Beach Park on the north and the entrance to the Channel Islands Harbor on the south; Figure 2 depicts the nesting bird survey area in relation to these features. Hollywood Beach is owned by Ventura County and maintenance is managed by the Ventura County Harbor Department (HD). The majority of Hollywood Beach is designated as critical habitat for the western snowy plover by U.S. Fish and Wildlife Service (USFWS) excluding the sand trap area that is affected by periodic dredging (Federal Register 2012). The dunes are also included within the County-designated coastal Environmentally Sensitive Habitat Area (ESHA). The sand trap area supports the only remaining remnant of natural vegetation and sand dunes that attracts the greatest number of WSPs and CLTs during the nesting season. The U.S. Army Corps of Engineers oversees dredging of the harbor and channel adjacent to Hollywood Beach, usually occurring every other year. Prior to and during the winters of 2013 and 2014 decreased funding reduced the dredging efforts and an unusual amount of sand collected forming an extra wide dune field and beach. In those two years, unprecedented

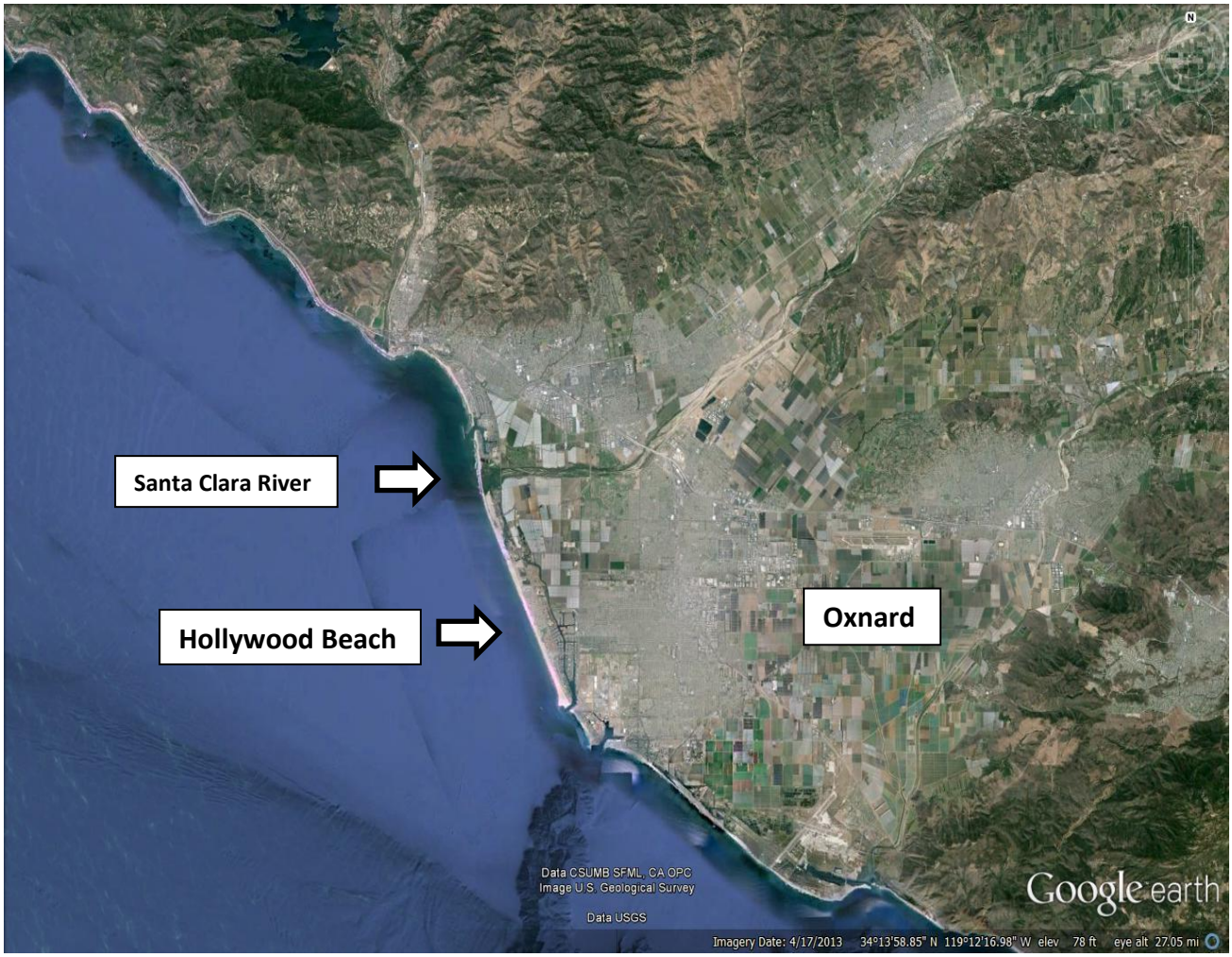


Figure 1. Hollywood Beach Region

increases in WSP nests (29 nests for 2013, over 300% of average) and CLT nests (209 nests in 2013, over 2,000% of average) were initiated. It was also fortunate that depredation was very low, especially during 2013, so hatching and fledgling recruitment were high those years. Dredging occurred fall-winter of 2014, the beach lost a majority of the low dune habitat used by CLTs and WSPs, and an anticipated drop of adult presence and nesting activity occurred during the 2015 breeding season and remained very low in 2016.

Other factors contribute to making this beach a difficult place for sensitive birds to successfully nest and raise chicks to fledging. Because Hollywood Beach is a popular public beach for recreation and tourism, maintenance activities include winter grooming along the tideline. In addition, residents can hire a tractor to remove sand from in front of their homes to be pushed toward the high tideline at any time of the year. This sand-moving removes newly-germinated native vegetation and flattens any potential new dune formation along most of the beach. It is also a threat to unknown and unfenced nests and chicks that can leave the protective fences soon after hatching. Therefore, the vast majority of this beach is

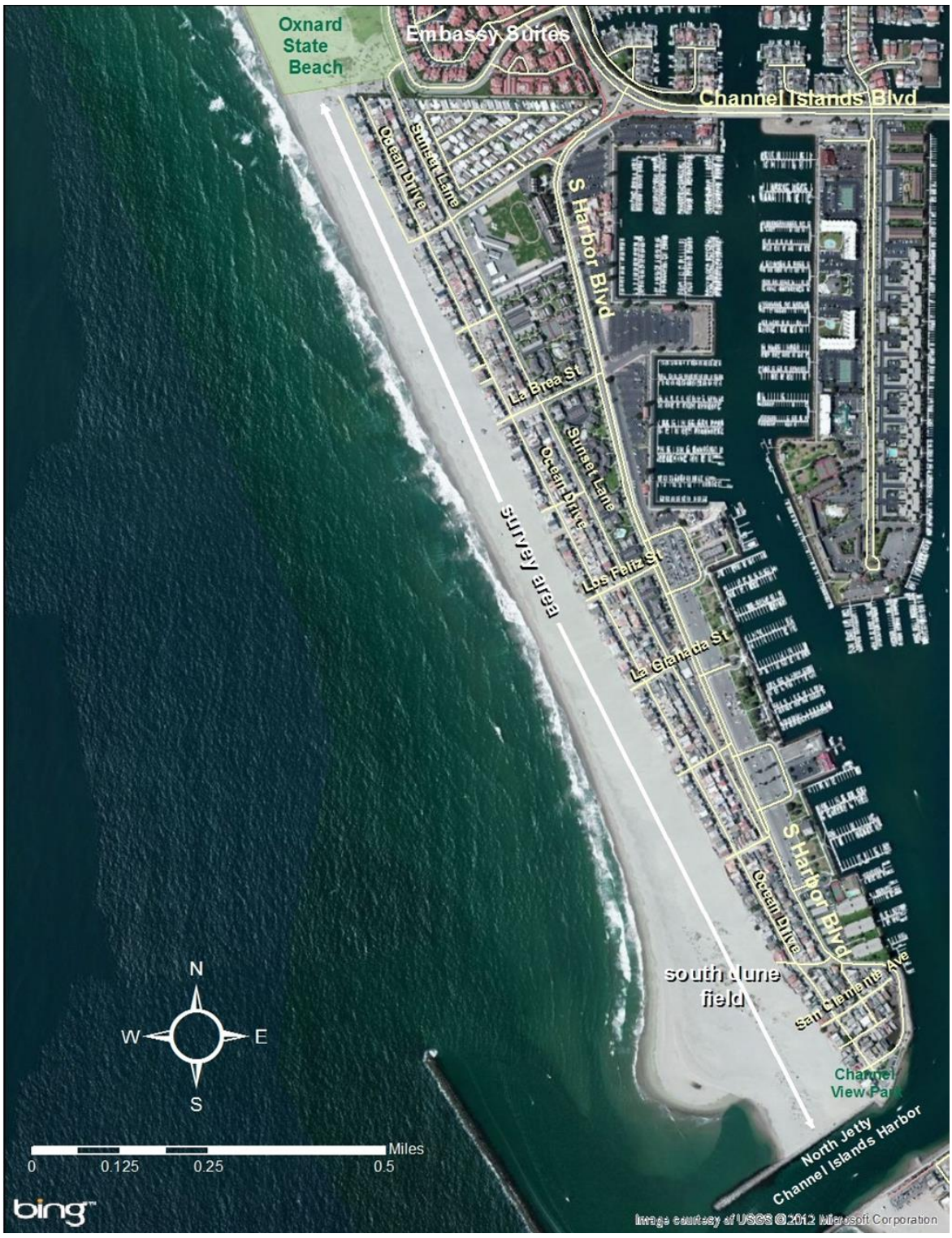


Figure 2. Locations of Survey Area Monitored at Hollywood Beach

completely flat and devoid of vegetation. This year monitors worked more closely with the sand moving tractor driver, communicating with her before a job was begun, and limited sand- pushing to halfway toward the tideline. This effort maintained more distance from the nests that occurred further north than most years and kept a wider swath of undisturbed wrack where large flocks of WSPs were beginning to gather by August (Figure 3).

The beach is popular with dog-walkers and even though regulations are posted that no dogs are allowed between 9 a.m. and 5 p.m. and always leashed other times, dogs are present all day and most without leashes. Lifeguard towers, a restroom building, and trash cans are provided for public use and serviced by the HD staff that drive vehicles along the beach. The HD staff is trained about the beach nesting season but even monitors on foot have a very hard time seeing new nests so vehicles are a concern. Also frequently observed on this beach near nest areas are private golf carts and other all-terrain vehicles (ATVs), plus various low-flying aircraft including ultra-lights, paragliders and drones that fly over the dunes and nesting areas. Ground-nesting birds perceive aerial objects as similar to their avian predators and often flush from nests when flown over. Channel Islands Harbor hosts a Fourth of July festival that attracts very large crowds to the area and includes the noise and lights of fireworks.

The breeding season survey area covers approximately 1.5 miles along the beach and includes the USFWS critical habitat areas. The south end of the beach is generally wider, but varies year to year due to dredging, and supports an approximately 9-acre dune field (Figure 2). Some of the backdunes are quite high due to sand build-up caused by the presence of deep-rooted, nonnative, European beachgrass (*Ammophila arenaria*). The majority of nesting activity by both species takes place on the beach side of the dunes in the “sand trap” as it was designed by the U.S. Army Corps of Engineers in conjunction with harbor development to capture sand before it enters the harbor mouth to be removed by dredging of the harbor and channel adjacent to Hollywood Beach.

Figure 3. At least 24 snowy plovers using wrack area (vs. where sand has been scraped) on Hollywood Beach

Even though a post-dredge year, by spring of 2017 a wide beach had again formed in the Hollywood Beach sand trap area. This was likely due to the large sand input from both the Santa Clara and Ventura rivers having breached their sandbars after many years of not doing so. However, very few dunes re-formed and very little vegetation had regrown in the area preferred for nesting, leaving primarily taller backdunes and limited mid- and lower dunes for cover. WSPs generally don't nest near the tallest dunes. The beach in 2017 had a good amount of driftwood, dead roots and stalks from giant reed (*Arundo donax*), and re-sprouting nonnative sea rocket plants (*Cakile maritima*) that all suffice as cover for nesting birds and their chicks.

Western Snowy Plover

The Pacific coast population of the WSP breeds along the coast of the Pacific Ocean in California, Oregon, and Washington, U.S. and in Mexico (Page et al. 1991). Loss, development, and disturbance of habitat, predation pressures from a wide variety of animals, and other human disturbances of breeding birds have caused the decline of the coastal population of WSP that led to federal listing as threatened under the ESA on March 5, 1993 (Federal Register 1993). Hollywood Beach is part of Recovery Unit 5 and is Recovery Site CA-97. The Recovery Plan management potential breeding bird number for this beach is 4, based on data prior to 2005 when nesting was sparse (USFWS 2007).

California Least Tern

The California population of the least tern nests on the beaches of central to southern California. CLTs use beaches with wide expanses of relatively flat, undisturbed, and partially vegetated sand for their nesting colonies. Much of their historical breeding habitat has been altered and developed resulting in reduction of nesting to a few beaches. The California subspecies was federally listed as an endangered species under ESA in 1970 and as endangered under the California Endangered Species Act in 1980. Recovery Plan goals are to prevent extinction and return the population to a stable status (USFWS 1985).

METHODS

Methods

Monitors have learned that pre-fencing an area used for scrapes prior to nest initiation provides a safe haven from the many disturbances for WSPs on Hollywood Beach. Fences can keep the majority of beach visitors and their dogs a distance away and allow birds to rest and hide chicks with fewer incidences of flushing and the potential to separate chicks from parents. To be proactive and avoid disturbance once nest incubating began, an area was chosen to fence that overlapped some of last year's WSP nests in front of the dunes. Due to an increased number of nest and exclosure disturbances in 2016 by people, new fencing material was used in 2017 and erected with the help of Oxnard City Corps, a disadvantaged youth opportunity organization. On March 15th a 4-foot Cintoflex mesh fence was erected in two large sections enclosing approximately 5 acres (Figure 4). A walkway for pedestrians was left in the middle of the sections at a heavily used access trail. During 2017 monitors received periodic helpful reports from two pairs of trained volunteer naturalists that observed nests and plovers and talked to dog owners.

Figure 4. New Cintoflex fencing of one section at Hollywood Beach

A thorough population count of all WSPs and CLTs observed is conducted weekly and all numbers recorded. Conducted concurrently with population abundance surveys, nest location, progress, and fate were also tracked. Searching for new nests included assessing adult bird behavior for potential breeding activity and waiting for a bird to return to a nest site if applicable. Known nests were observed twice per week until hatching or other fate, and then chicks were tracked as often as possible after hatch. Each located nest is marked with an inconspicuous numbered wooden tongue depressor placed about 5 feet away. All nests are recorded by date found, egg count, parental attendance, and its location using GPS. The incubating parent is only disturbed when it's necessary to check on additional eggs laid or near

hatching dates. Mini-exclosures (3 ft x 3 ft wire) are placed over WSP nests and anchored with landscape pins to reduce incidences of predation and human-caused disturbance. Once the exclosure is placed, the nest is always watched to assure the parent bird returns to it. Those nests that were not placed within the Cintoflex fences were included within symbolic fences made of wood stakes with educational signs and single-strand rope as used in the past. Some care is taken to observe an incubating WSP's flush distance before putting up symbolic fences. Individually-fenced incubating plovers sometimes flush off nests even with people/dogs walking a few feet from the fence, however, most grow accustomed to people keeping outside symbolic fences.

Nest hatching not directly observed was determined by locating either egg pip shells within the empty scrape, observing displaying behaviors from adults in the vicinity of the nest, and/or by locating chicks when possible. A nest is determined to be successful if at least one of the above signs is observed. When a nest is found without eggs and none of the above signs is observed, evidence of depredation is investigated. Evidence of predators includes animal tracks, large shell fragments and/or egg yolk in the scrape or within 2 meters, and the physical presence of an animal predator in the vicinity (Mabee 1997). Where possible the species of predator is determined or at a minimum whether it was mammal or avian. Egg non-viability due to abandonment was determined by a combination of not seeing an adult bird on/near the nest or their tracks over a couple weeks, checking the nest for a minimum of the incubation time period (4 weeks for WSP, 3 weeks for CLT), and placing one egg on end in the scrape to see if it is repositioned by a parent by the next survey. If the egg has not been moved and no adult activity noted over several weeks, the nest is considered abandoned.

Breeding WSP adult numbers could be estimated by adding the number of active nests and the number of active broods sighted on the same survey date. One breeding male and female were attributed to each active nest and one breeding male was attributed to each active brood. Chick age-week was estimated and associated with a nest number when possible. It is reasonable to assume that some adult WSPs may have bred and nested more than once on this beach, especially following nest, egg, or chick losses.

Adult CLTs both on the beach and observed flying over were also counted and included on the California Department of Wildlife data reporting spreadsheet. Early in the season, the entire beach is surveyed. When no WSPs or CLTs were seen north of the first lifeguard tower and beach crowds expanded in that area, surveys focused on the southern end of the beach during active breeding with occasional checks further north and responses to other observers' calls.

RESULTS

Population Abundance – WSPs

WSP Adults

All adult, juvenile and chick WSPs observed during surveys were recorded by gender and/or age category when possible (see Table 1). Table 1 includes numbers of active nests by date, egg counts, and chicks observed as well as other notes. The average number of WSPs seen weekly during March was 18,

Table 1. 2017 Hollywood Beach Western Snowy Plover Population Counts and Breeding Season Data

Date	Total Adults	Total All	Females	Males	Unk/ Hatch Years	Active Nests	Eggs	Chicks	Fledge-lings	Notes
3/18	15	15		7	8	0	0			
3/26	20	20	8	12		1	3			First nest south of south large fence, 3 eggs, added symbolic fence.
4/2	10	10	2	8		1	3			After extreme wind, all 3 eggs relocated to a different place within exclosure, presumably by the adults. Observed a dog and crows flushing female from nest.
4/5	13	13	5	8		1	3			
4/9	18	18	7	11		1	3			
4/19	8	11	3	5		0	0	3		3 eggs hatched - we observed 2 adults and 3 chicks together in small dunes.
4/23	2	2	1	1		0	0	0		No sign of any chicks, 1 pair foraging at tide line.
4/26	6	6	2	4		0	0	0		Observed a female making a scrape, usually done soon before a new nest.
4/30	4	4	3	1		1	3	0		HB02 found more south of where HB01 had been, with 3 eggs.
5/2	7	7	3	4		1	3	0		
5/7	--	--	2	--		1	1	0		Wind had likely buried 2 eggs, female still present on 1 egg. No total WSP count.
5/10	7	7	3	4		1	1	0		
5/14	4	4	3	1		1	1	0		
5/17	3	3	2	1		2	2	0		HB03 found with 1 egg way north of north large fence, no adults nearby. Added exclosure and symbolic fence.
5/24	4	5	2	2	1	2	4	0		HB03 added 2 more eggs; a crow chased female from HB02, due to hatch 5/30 so added plastic bird spikes onto exclosure.
5/27	--	--	--	--		1	3	0		HB02 hatched, saw no chicks but observed a pair in vicinity not exhibiting behavior consistent with having a chick. Added 2 'decoy' exclosures as crows still in area.
5/31	5	5	2	3		1	3	0		Saw a pair making scrapes so fenced a small area north of the main fence, added 5th 'decoy' exclosure.
6/4	6	7	4	2	1	1	3	0		HYs from other beaches
6/7	7	10	4	3	3	3	8	0		2 new nests today near but not inside large fence
6/14	4	5	3	1	1	3	8	0		
6/21	8	10	5	3	2	2	5	2		Nest HB03 had hatched 3 on 6/18, 1 chick seen 6/22, then not again.

Date	Total Adults	Total All	Females	Males	Unk/ Hatch Years	Active Nests	Eggs	Chicks	Fledge-lings	Notes
6/28	5	10	4	1	5	3	7	0		Nest HB06 found within large fence, 2E
7/2	9	12	5	4	3	4	11	0		Nest HB07 found 6/29 with 3 eggs
7/4	10	15	5	5	2	3	8	3		Nest HB04 hatched 3C observed on nest. Crow near nest soon after hatch.
7/5	6	9	4	2	0	3	9	3		Net HB05 hatched 2E, saw adults calling but no C.
7/12		29	6	5	15	4	12	3		DG saw scrapes being made north of large fence.
7/16		34	4	4	25	3	9	1		HB08 hatched, 1 chick seen with parent.
7/18		57	3	2	50	5	14	2		Older chick from HB04 re-sighted plus HB08 chick. HB10 found near HB09 and HB11 within large fence under branch.
7/23		64	3	2	58	5	15	1		HB04 chick seen with male
7/26		63	2	2	59	4	12	4		HB04 chick at 3 weeks; 3 chicks seen on HB07 scrape.
7/30		106	3	2	99	3	10	2		HB04 pre-fledgling seen; HB06 hatched 2E, 1 chick seen.
8/2		72	1	1	69	3	10	1		HB04 pre-fledgling seen; no adults or tracks near HB11.
8/6		120				3	10	0	1	Final HB06 POE; no activity at HB11; incubating HB09 & HB10.
8/9		53				2	9	0	1	Collected HB06 1E, POE 1E at HB11; HB09 overdue to hatch; crows hanging around HB09 & HB10.
8/13		194				1	3	1	1	Found 2 hatched and 1 remaining chick at HB10. Someone had meddled at nest and adults likely left with other chicks. Rescued remaining chick and brought to SB Zoo.
8/16		105				1	3	0	1	
8/20		141				0	0	1 DC	1	Found 1 dead chick (DC, collected) and eggshells at edge of HB09 exclosure, adults gone, no other eggs. Collected 3E from HB11, no adult activity detected for weeks.

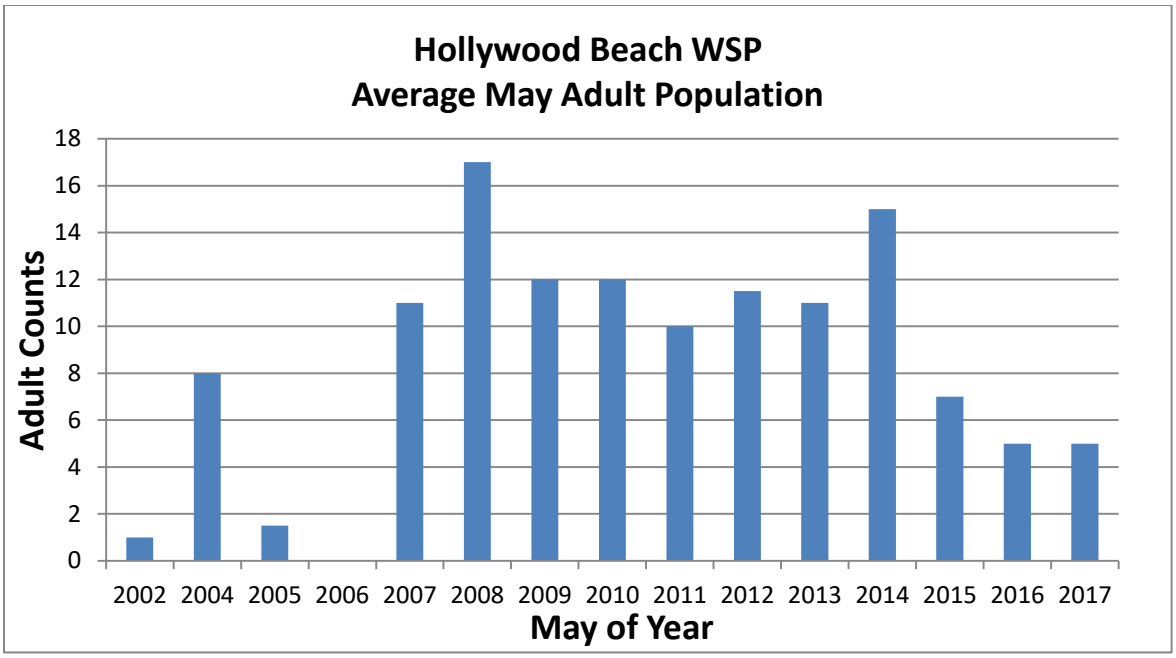


Figure 5. Average Adult WSPs Population During May over Years Data have been Recorded

in April was 9, and in May was 5 - the same as last year. Average adult WSP populations from May over time that data have been collected are compared in Figure 5. May was chosen as the month least affected by presence of non-breeding birds. The May adult count average didn't change from last year but nest numbers for the season more than doubled. Migrating WSPs and hatch-years from other beaches began to arrive in mid-July and counting by gender became difficult. With the high of 5 concurrent WSP nests and 2 broods (on July 18), the estimate of breeding adults for 2017 was 14 WSPs for Hollywood Beach.

WSP Nest Activity

During the 2017 nesting season, 11 WSP nests were initiated on Hollywood Beach. Below is a brief summary table of breeding information requested by the California Department of Fish and Wildlife (CDFW):

First Observed Nest Initiation Date	26-Mar-17
First Observed Hatch Date	19-Apr-17
First Observed Fledge Date	3-Aug-17
Period of Peak Nesting (the 1-week period with maximum number of active nests)	17 to 23-July-17
Last Observed Nest Initiation Date	18- July-17
Last Observed Hatch Date	13- Aug-17
Last Observed Fledge Date	3- Aug-17
Length of Breeding Period (Total # days from first observed nest initiation to last observed fledging)	147 (to last active nest)

Only 2 of 11 nests were located inside the new mesh fences, with 3 others near a fence on the outside. Nest locations are plotted on Figure 6.

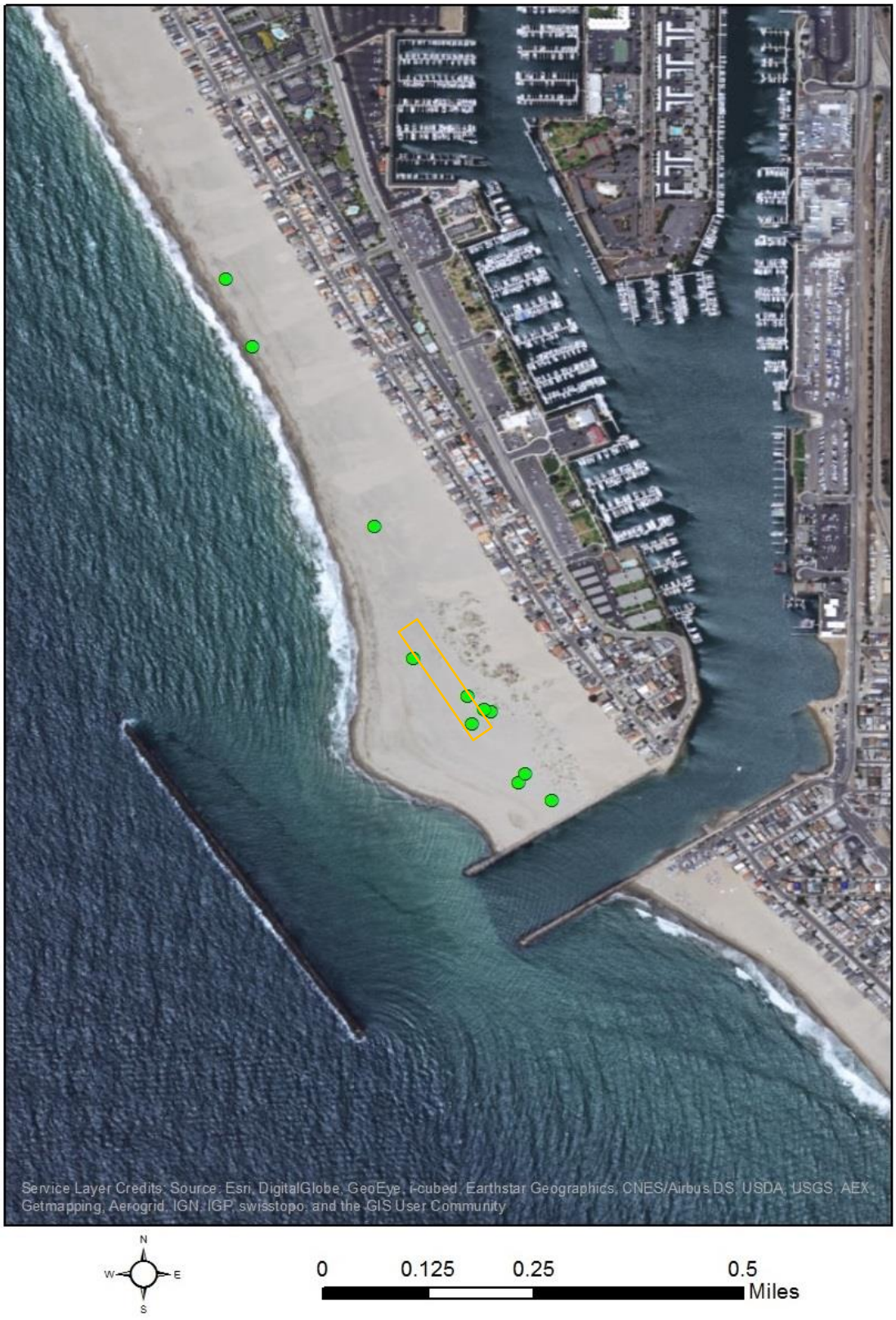


Figure 6. Hollywood Beach 2017 Documented Nest Locations,
(orange box is approximate location of mesh fencing)

The first nest was located on March 26, one month before last year's first nest on April 30. Interestingly, the first nest in 2016 was 21 days earlier than that for 2015 (May 21). Most other breeding beaches have first nests in March. Scrape and nest locations primarily followed what has typically been observed on this beach in the past, being located in close proximity to the remnant dune field as well as where natural beach debris (e.g., driftwood) was available to use for cover. The broods for the first 3 nests were lost fairly quickly after hatching and monitors suspect that the nests established near these locations may have been the same pairs re-nesting.

Monitors were surprised with the placement of 2 nests approximately 0.5 mile from the dunes where no dune or vegetation cover was available (Figure 6). The area was busy with beachgoers setting up umbrellas, tents, and chairs near these nests, yet the adults continued to incubate, in one case longer than 4 weeks. Nest activity over the season is graphed in Figure 7.

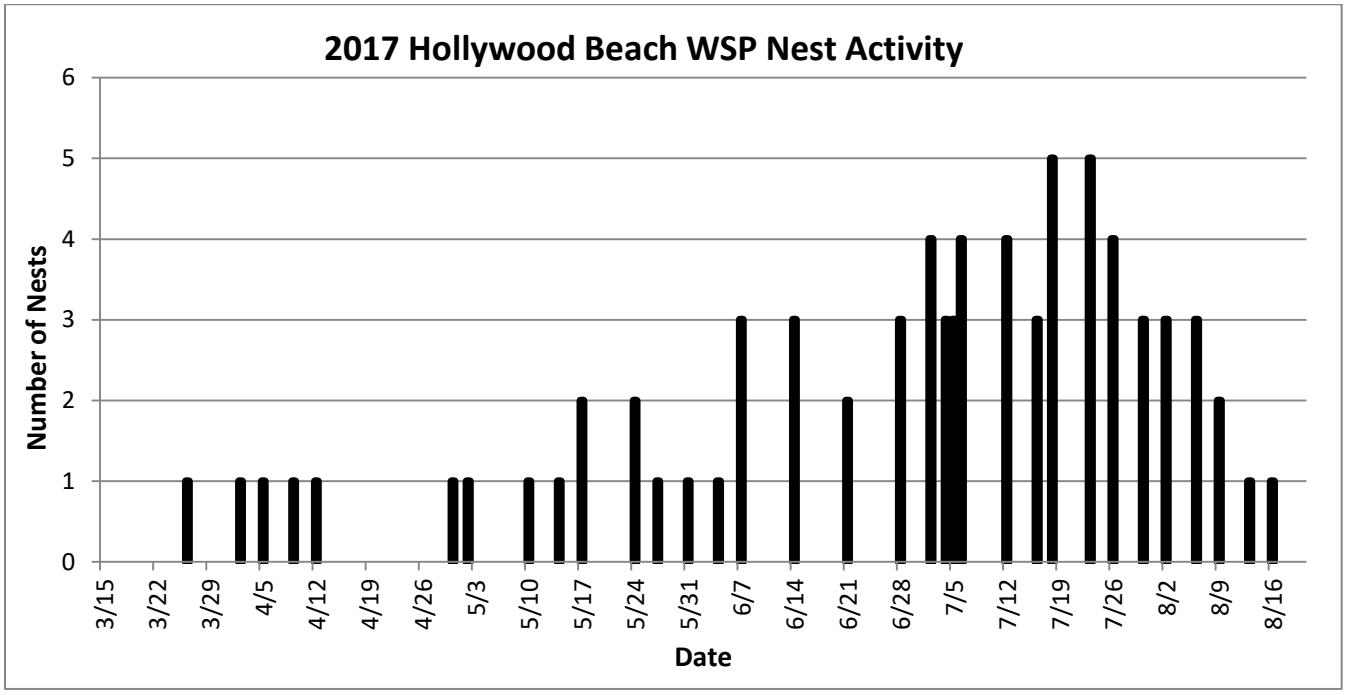


Figure 7. Hollywood Beach Nest Activity by Date

WSP Nest Fates

Of 11 nests established in 2017, 9 nests had at least one egg hatch for a hatch rate of 82 percent (compared to 60 percent last year). This continues a high hatch rate for Hollywood Beach over 15 years, even with experiencing wind burial of eggs, nest abandonment, and a non-viable nest this year. In 2017, 23 eggs hatched of 32 laid.

The first nest (HB01) was suspected of having been covered in sand during a wind event within its first week. However, the 3 eggs were unburied by the adults, as evidenced by them having been moved to another spot within the exclosure. The pair not only continued to incubate but the 3 eggs hatched on

schedule on April 19th and 3 chicks with 2 adults were observed together that day within the low dunes. Table 2 outlines individual nest details, while Table 1 included population data as nest, egg and chick counts. The HB01 chicks were not seen again within 4 days after hatch.

Table 2. Hollywood Beach 2017 Western Snowy Plover Nests Fates

Nest #	Date Found	Eggs Laid	Date of Hatch/Other	Eggs Hatched	Comments
HB-01	3/26	3	4/19	3	Observed 3 chicks with 2 adults, no chicks by 4 days later.
HB-02	4/30	3	5/26	1	Other 2 eggs buried 5/7, didn't want to disturb incubating female to unbury. Chick never seen.
HB-03	5/17	3	6/18	3	Observed 2 chicks with adults. One chick seen 4 days later and then not again.
HB-04	6/7	3	7/4	3	Observed 3 chicks with adults, also on next day;, then saw 1 chick with male on 7/18 & seen sporadically until fledging age.
HB-05	6/7	2	7/5	2	No chicks observed (pips found).
HB-06	6/28	3	7/30	2	Female was not incubating regularly. Found 2 pips, saw one chick with adults. One egg did not hatch.
HB-07	6/30	3	7/26	3	Saw 3 chicks with adults.
HB-08	6/29	3	7/16	3	Saw a chick with the female, could not locate male or other chicks (3 pips found). One chick seen next week and not again.
HB-09	7/5	3	8/20	0	Incubated until 8/20 (6 weeks) when eggs must have been rolled to exclosure edge, taken by predators, and adults gone; 1 dead chick remained with eggshells.
HB-10	7/18	3	8/13	3	Shells from 3 eggs found but no adults at nest; 1 chick abandoned at scrape taken to SB Zoo for recovery, release.
HB-11	7/18	3	8/2	0	By 8/2 no adult tracks near nest, POE'd for several weeks, abandoned.
Totals		**32**		**23**	

As soon as it was observed that American crows were spending time on the beach, sometimes near active nests, monitors began adding "decoy" exclosures within the fenced areas to attempt to reduce crow attention on active nests. The crows at Hollywood Beach show little fear of people but monitors felt that observations of them landing directly onto exclosures were reduced after adding decoys.

The second 3-egg nest (HB02) was first recorded on April 30th not far from where HB01 was located and also outside the large fences; it is difficult to know if the HB01 pair was re-nesting so soon after chick loss, suspected to be by 4/23. This nest is also believed to have been wind-buried by the following week because a day after a wind event (May 7) only 1 egg was observed about 8 inches away from the original scrape within the exclosure. A female continued to incubate it but spent unusually long periods off the nest. This female was also observed to chase another female that was frequently seen in the area. On May 24th during the last week of incubation prior to expected hatch, a crow was observed to land on the HB02 nest exclosure and after the female fled the nest and was displaying, the crow continued to follow/harass her. Since monitors were present, they approached and scared away the crow; the female WSP eventually returned to the nest. Within a couple hours, monitors purchased Bird-B-Gone plastic spikes that do not harm birds and attached them to the top of the exclosure to discourage additional birds from landing on it (Figure 8). The volunteer naturalists correctly reported a probable hatch of HB02 one egg on May 26, which was verified the next day (egg pip found) but no chick was

Figure 8. Nest HB02 exclosure with Bird-B-Gone plastic spikes attached.

seen and a WSP pair observed in the area were sitting quietly not exhibiting the agitated behavior associated with adults that have chicks.

The third nest (HB03) was located approximately 1,600 feet north of HB02, once again outside the large fence and away from the dunes with only minimal vegetation and driftwood for cover (Figure 9). WSPs nesting in areas away from the dunes in the past have not succeeded in raising broods to fledging, likely due to lack of cover and distance to wrack line. HB03 was discovered May 17th with only 1 egg and no adult was seen near it during the hour it took for monitors to carry in fence material, erect the symbolic fence and exclosure, and complete the day's survey. For a 1-egg WSP nest to not be constantly incubated is not unusual for other beaches but is at Hollywood Beach, where incubating adults generally return rather quickly to nests. A male WSP was seen in the vicinity near the high tideline. Another egg was observed the next day, followed by what was likely an extended loud and visual disturbance of the sand-moving tractor working near this nest fence. This tractor is hired by nearby homeowners to move sand from their properties and it usually gets pushed to the wrack line. Also, usually the operator is good about calling monitors prior to working near a fenced nest, which didn't occur this time. A monitor saw the tractor tracks on May 19th and talked to the tractor driver, reminding her that this work was too close to an active nest and to call before the next sand move request. By this date a third egg was expected but not laid, no adult was seen, and it was feared that the disturbance may have caused nest abandonment.

Figure 9. Nest HB03 (1 egg) initiated far from dunes and adequate cover, especially for chicks.

Fortunately by the next check on May 21 a third egg was observed for HB03 and an adult finally seen incubating. The adults continued to incubate and on May 28th another set of Bird-B-Gone spikes were added to that exclosure to reduce crow harassment, which had been reported by volunteer naturalists. This nest went on to hatch and a chick was observed only until 4 days after hatch.

Another pair was observed scraping in the general vicinity north of the main fence and a symbolic fence was erected and fifth "decoy" exclosure added on May 31st. The low dunes, driftwood, and vegetation present within this small area represented good habitat and would make a potential refuge for the chicks from HB03 if they survived and were to toward the dunes after hatch. A pair of WSPs continued to be seen in this area and occasionally least terns were also landing within the symbolic fence. The tractor driver continued to communicate with monitors before moving sand and covered less wrack this year than in the past per monitors' request.

Nests HB04 through HB08 were all located near the dunes area and near or inside fences. Following hatches, chicks for four of these five nests were seen but not observed after one week of age. One chick from nest HB04 was observed until its fourth week and then it mixed in with hatch years arriving from other beaches, therefore it was assumed to reach fledging stage.

As mentioned above, two nests, HB09 and HB10, were placed 0.5 mile north of the dune area near where many people recreate and walk their dogs (Figure 10). Nest HB09 was incubated for 6 weeks, and then it was suspected the adults moved the eggs near the edge of the exclosure and they were taken by predators (exclosure was undisturbed). One dead, fairly developed chick and some egg shells remained when monitors checked on 8/20; adults were gone. Monitors have observed evidence in the past of parent birds apparently recognizing when an egg was cracked or otherwise nonviable and rolling the egg outside the scrape, often to the edge of the exclosure. In this manner, a predator usually finds it and takes it away.

Figure 10. Nests HB09 and HB10 exclosures approximately 0.5 mile north of the dune field

HB10 had one of the strangest fates seen yet. Near hatch day, it was noticed that an approximately 18 inch by 6 inch piece of cardboard had been placed within the exclosure (within the symbolic fence). A chick was seen lying under the edge of the cardboard and assumed dead, while evidence and photos were being gathered (Figure 11). It was a chilly, overcast morning. When the monitor began to examine the chick, it moved and was actually alive so the monitor began warming it in her hand and called Lena Chang with USFWS. At the same time, the monitor found no other chicks or eggs and began combing the area to see if the adults or other chicks were nearby. After some time and revival of the chick, no pairs of WSPs nearby could be identified, whereas many migrating WSPs were in the vicinity. The chick was taken to the Santa Barbara Zoo to be raised. The most likely scenario was pieced together after

Figure 11. HB10 with human-placed cardboard and chick at bottom edge. Chick was rescued and brought to Santa Barbara Zoo

finding 3 eggshells that did not fit together over the next 2 weeks. This indicates that adults were present when all 3 eggs hatched and carried away the eggshells as they typically do. The first two chicks must have become mobile before the third one. The adults may have either been disturbed or could not locate sufficient food sources nearby so they decided to leave the nest and third chick behind. People (kids?) may have seen the abandoned chick and put the piece of cardboard in as a wind or sun shade. Lifeguards and a nearby homeowner were questioned but no one had seen anyone approach the nest. The chick thrived at S.B. Zoo and was released with leg bands (Pa:wg) on October 17th at Coal Oil Point Reserve where a stable flock of WSPs resides during winter.

Nest HB11 was found on the same day as HB10 (July 18th) with 2 eggs placed within the large fence and under an overhanging branch. Adults incubated the nest and displayed alarm behavior when approached as expected. HB11 included a third egg but was soon after partially covered in sand and neither adults nor their tracks were seen by two weeks later. An egg was placed on end for several weeks but no adult returned and the nest was determined to be abandoned.

Since individual fates for eggs within a nest varied, Figure 12 depicts egg fates in a pie chart. Overall, 9 of the 11 nests had at least one egg hatch.

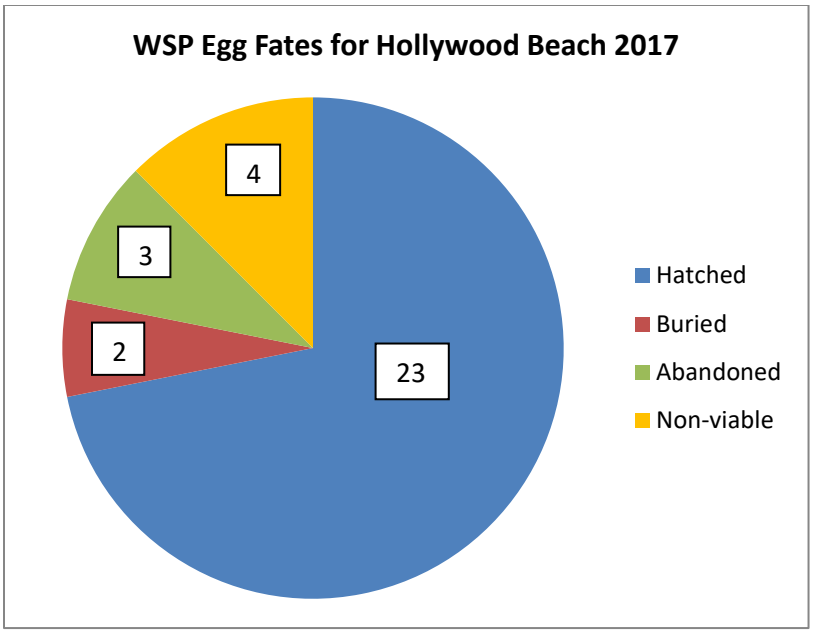
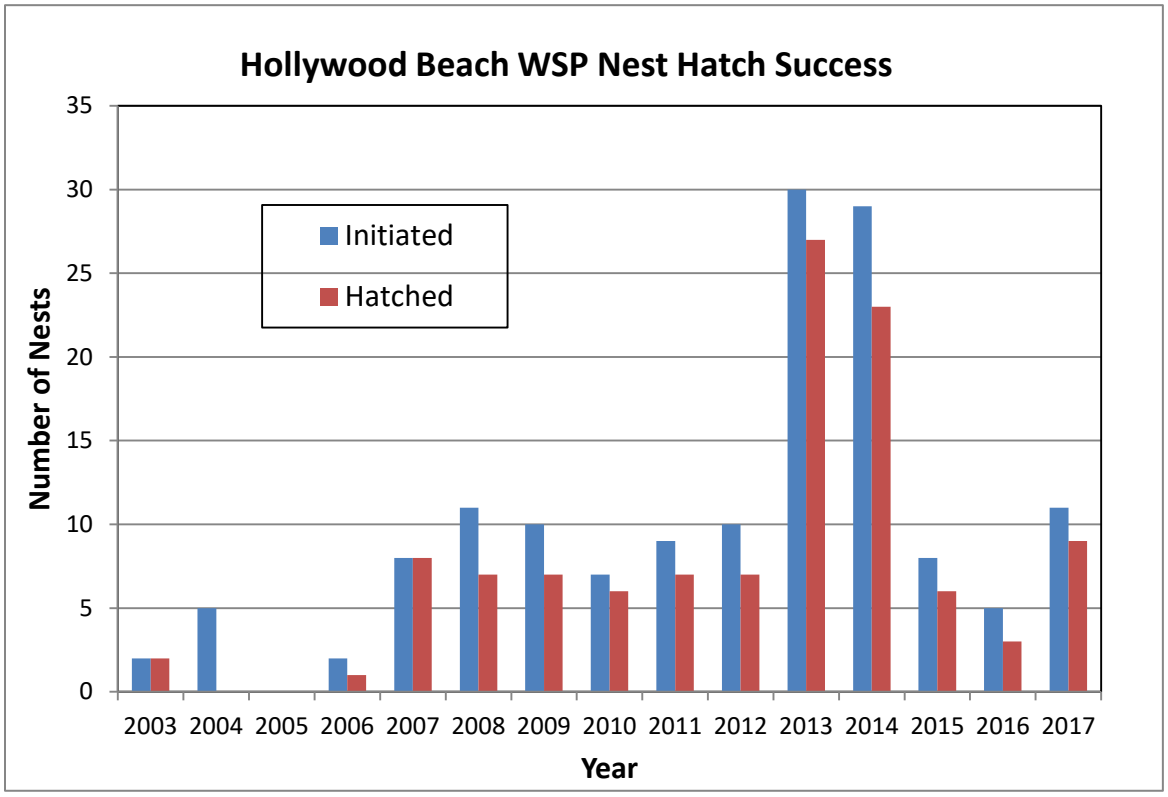


Figure 12. Hollywood Beach 2017 Egg Fates

The figure below compares nests initiated and hatched over the years data have been collected. As in the past, a high WSP nest hatch rate was maintained in 2017.



WSP Chicks

Of the nine WSP nests that hatched, chicks were observed for seven of them soon after hatching. Two visits each week were included to especially make an effort to follow chicks and record success. However, the constant presence of crows and the prevalence of human recreation and off-leash dogs on the beach, especially in front of the dune area where the majority of the nests were placed, made it difficult to impossible for adult WSPs to lead their chicks to safely forage at the wrack line. Crows were present during the entire nesting season, were observed perched in groups and walking within symbolic fences around active nests, and once observed to not only flush an adult from a nest but continue to chase her for several minutes. Therefore, crow depredation likely accounts for unknown chick disappearances. Chick observations in relation to dog and crow observations are included in Figure 13 presented in the Discussion section.

Banded Birds

During weekly surveys birds were examined for leg bands through binoculars. All band combinations were seen on WSPs and will be reported to Point Blue Bird Observatory (PBBO) when time permits. Very few WSP bands are observed during the nesting season on this beach. During fall and winter surveys, however, bands are frequently seen and recorded. CLTs were also monitored for bands and/or transmitters but none were observed.

Population Abundance - CLTs

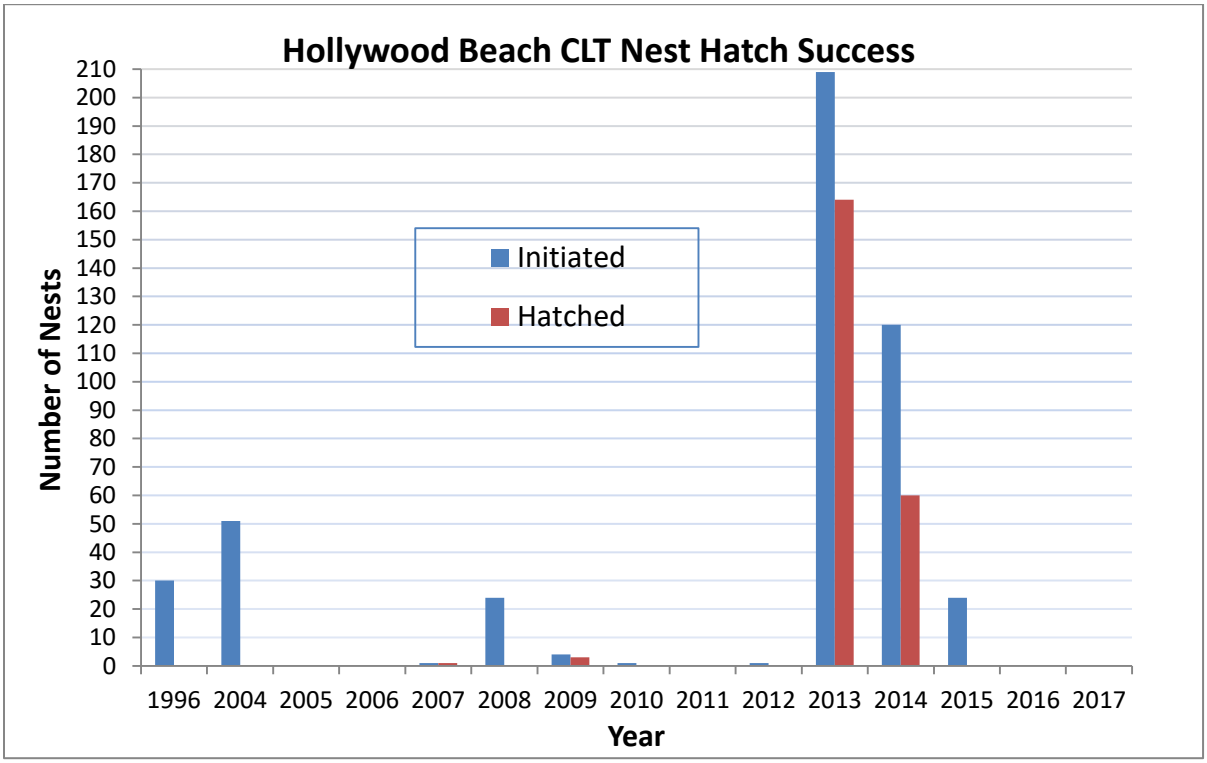
All CLT observations during the surveys are recorded; CLTs were observed on 14 survey days, up to 18 CLTs on one occasion. In late May, CLTs landed on the beach and exhibited breeding behavior, including exchanging fish, copulating, and making and sitting in scrapes. The largest population observed on June 14th (18 CLTs) also engaged in harassing crows, which was a good sign of choosing the beach for nesting but no eggs were ever found. After June, observations were primarily of CLTs flying over the beach, with occasional observations of CLTs fishing in the nearby channel waters. The following table lists the 2017 CLT observations.

Date CLTs Observed	Number (usually flyovers)
5/2	0
5/10	0
5/14	0
5/17	0
5/21	0
5/23	18
5/24	2
5/28	0
5/31	2
6/4	1
6/7	8
6/11	2
6/14	18
6/21	2

Date CLTs Observed	Number (usually flyovers)
6/28	4
7/2	3
7/9	1
7/12	0
7/18	3
7/23	3
7/26	0
7/30	0
8/2	0
8/6	0
8/9	0
8/16	1
8/20	0
8/23	0
8/27	0

CLT (at right, red circle) harassing crow near nest fences June 14, 2017

The figure below depicts the CLT nest attempts and hatches for the years that data have been recorded at Hollywood Beach.



DISCUSSION

The WSP nest hatch rate for Hollywood Beach in 2017 of 82 percent continued the high hatching rate that has been established at Hollywood Beach with regular monitoring and the use of nest predator exclosures. Lower chick survival than observed on this beach historically was suspected for a couple reasons. These include reduced high quality habitat in the form of low, vegetated foredunes, which have not recovered since being washed away in winter 2015-2016 and are essential for hiding nests and chicks once they leave the protection of exclosures. As noted last year, having no large CLT nesting colony again this year has been correlated with reduced WSP nests numbers and success due to the reduction in predator alarm and defense that the CLTs provide. CLTS should have been attracted to the broad, flat beach this year for nesting so it was unknown why they did not remain after spring visits and breeding behavioral displays.

Also, it was observed in the weeks following the new Cintoflex fencing installation that wind traveling through this mesh material actually smoothed the formerly choppy sand topography within the fence. The lack of footprints and other sand depressions was less attractive to roosting plovers and very few were seen within the fence. Monitors added logs, sticks, palm leaves and other beach debris within the fence hoping to vary the topography and provide potential nest and chick hiding places. However, sand often blew over and buried these items. Only 2 of 11 nests were located within the fences, and one of those was abandoned after 2 weeks. Monitors did see WSP pairs and adults with chicks run into the fences when disturbed, so they likely provided some protection from human and dog disturbances. These temporary fences were removed September 27th and will be reused again.

All types of human, dog, aerial and land vehicle disturbances were documented during most surveys and a count of dogs observed recorded each time. Also, the count of American crows present was noted. Figure 13 depicts dog and crow data taken during the surveys. The constant pressure from crows, seen both near nests being incubated and soon after hatch, was obviously a stressor for adults and thought to be a major contributor to depredation of chicks. Dogs and crows as disturbance factors when assessed together magnify threats to chick survival. Monitors have observed newly hatched chicks being displaced from hiding places and separated from adults by off-leash dogs and then crows waiting nearby fly in to attempt depredation. So whereas having either dogs or crows may be a nuisance, the combination of both has been observed to be a major cause of chick loss once they leave the safety of the exclosures, essentially right after hatch. Number of WSP chicks is also included in Figure 13 but a significant numerical relationship with dog and/or crow numbers is difficult to determine. It should be pointed out that these are just numbers recorded during an average two-hour survey. Incubating birds have to endure probably 8 times that number of dogs and constant crow presence on a daily basis while sitting on eggs. It was apparent that at least one crow pair had a nest nearby and by late June fledgling crows probably joined their parents on the beach and numbers increased.

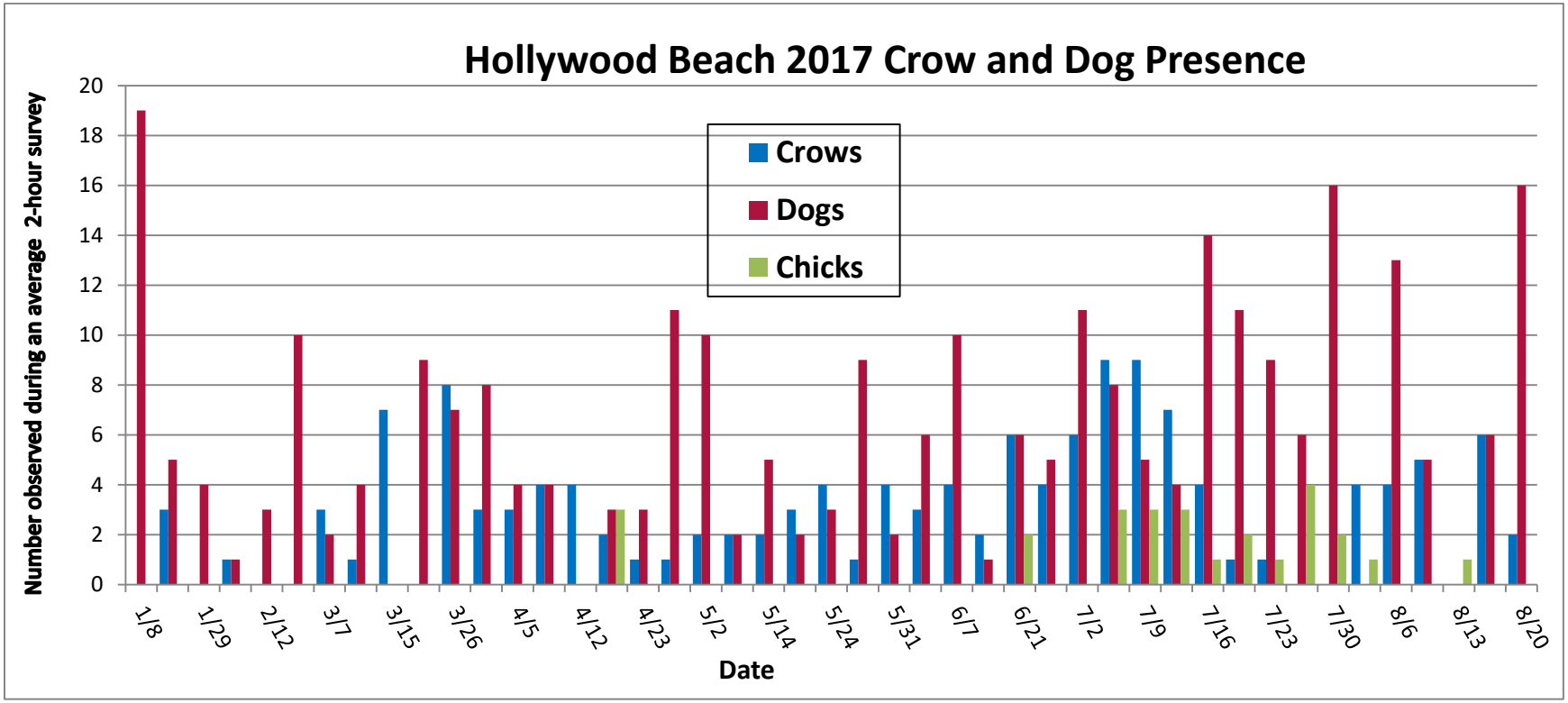


Figure 13. Observed domestic dog and America crow numbers during a typical 2-hour survey on Hollywood Beach. Chicks observed are in green.

Other disruptive events noted by monitors included low-flying paragliders (with motors), ultralights, drones, motorized wagons, horse riders, frequent golf carts, and several Coast Guard helicopters flying low. Monitors contacted personnel at Naval Base Ventura County who notified newly-transferred Coast Guard personnel on base regarding USFWS posted no-fly areas around nesting beaches and the latter flights seemed to decrease as the season went on. The loud, motorized paraglider reappeared the day CLTs began to make scrapes and flew within 20 feet above three fenced areas, disturbing incubating plovers and terns – CDFW and USFWS were notified. This may have contributed to CLTs not deciding to remain and establish nests. Also, several types of off-road vehicle tracks were noted on the beach and photographed near nest areas. The public has fairly easy access between homes to drive onto the beach and no signs or barriers are present. Undoubtedly many more disruptions that flushed and caused energy loss to incubating adults or separation of chicks from parents occurred when monitors were not present to reduce reproductive success. Hollywood Beach is the "backyard" of many residents as well as heavily visited by tourists throughout the summer and even with more volunteer naturalists' help, it is difficult to inform and get cooperation from everyone.

High WSP hatching success has been difficult to turn into high recruitment as long as the dune area and wrack line in front of nests remain open to the general public that are not prevented from bringing off-leash dogs (i.e., low enforcement of rules in place). Even when the fencing provides some measure of disturbance reduction for areas within, once WSPs with chicks leave the fenced areas the safety factor is erased. Early spring high tides and the need to provide human access prevent additional fencing toward the wrack line.

Monitors conducted an experiment with a GoPro camera on Sunday May 28th. It was placed at the exclosure on nest HB03 by two people, with the female WSP leaving the nest upon approach. Within 50 seconds after the monitors backed a distance from the nest the female returned to the eggs. Later, the camera showed a man approaching at a jog with a dog on a leash. When they were approximately 50 feet from the nest, the female exited the exclosure. She had not yet returned in several minutes. The dog and jogger returned perhaps 20 feet closer to the nest and passed by again. After being away 5 minutes and 19 seconds the female finally felt safe to return to the nest. This is a notable difference in WSP reaction between a two-person disturbance right at the nest and a more distant one-person and one-dog disturbance.

Beach ecology manipulation in the form of winter grooming and sand-moving undoubtedly remove essential elements required by WSPs including wrack that harbors invertebrate food sources, and other driftwood/debris that offers cover from wind and predators. Germinating native and other vegetation that spreads via seeds is also removed, stopping any chance of natural sand-trapping and dune building to occur further than the current areas. This renders the current habitat less suitable and limits its size.

CONCLUSIONS

WSP nest attempts on Hollywood Beach in 2017 (11 total) are slightly above average over the years that records that have been kept (average nest numbers = 9.8 over 15 years). There also was a characteristically high hatching success rate at 82 percent compared to the average of 75 percent on this beach using predator exclosures. In addition, the estimate of breeding WSPs (14) is above the USFWS Management Goal of 4 breeding birds listed in the Recovery Plan (USFWS 2007). However, even with high hatching success, chick survival was down for the third year. The use of mesh fences was experimented with and will be continued because fencing was observed to increase protection to sensitive bird species and chicks inside it. CLTs did not initiate nests for the second year, even after visiting the beach and exhibiting breeding behavior.

Over the years of monitoring at Hollywood Beach, direct disturbance to WSP and CLT nests have been reduced by the combination of regular nest monitoring, the use of nest predator exclosures, educational signage, large fenced areas that kept the majority of human and dog disturbance at a distance, and volunteer naturalist presence. Breeding birds must avoid the dangers of frequent humans, dogs running loose, aerial disturbances, and vehicles on the beach as well as the other more natural threats of predators, wavewash and wind events. Ensuring survival of chicks to fledge stage remains the most difficult aspect to achieve. Ideas conceived by monitors to increase nesting success are presented in the next section, Recommendations.

RECOMMENDATIONS

1. Human Disturbance

Issue: Humans trespass into fenced nesting areas has caused disturbance to brooding birds, exclosures, and sometimes nests and eggs. In 2017, these incidences were fewer than in 2016 but still occurred.

Partial Solution: Monitors used a more substantial fence material in 2017 consisting of 4-foot height Cintoflex, which is similar to a plastic chicken-wire. This fence provided a more continuous boundary that prevented human and dog entry into nest areas. However, the birds did not use them for nesting as often as hoped.

2. Resident Crow Depredation

Issue: Corvids are considered a human-subsidized native species and are increasing everywhere. Depredation of least tern eggs and suspected depredation of newly hatched snowy plover chicks as well as spooking adults off nests has been observed on this beach.

Partial Solutions: Continue the use of "decoy" empty exclosures to re-enforce non-rewards for crows landing on them. Monitors also began to use Bird-B-Gone plastic spikes on exclosures and observed fewer crows on exclosures after. Volunteer naturalists can remind people not to feed birds or leave trash behind.

Crow near active nest in exclosure

3. Beach Loss due to Dredging

Issue: In regular dredging years, suitable nesting beach will be lost.

Partial Solution: VAS hopes to move a Restoration Plan forward to outline removal of European beachgrass (*Ammophila* sp.) and to reduce tall dunes in height to expand suitable nesting areas that are not prone to removal by dredging and thus are more permanent.

(Left) Grass-covered dunes (background) and natural dunes in foreground with great blue herons; (right) dunes with grass of unnatural height outlined within dune field

4. Sand Moving

Issue: Private homeowners hire a tractor to move sand from the edge of their property toward the tide line all year. During nesting season, this threatens safety of unknown nests and chicks outside fences and can bury essential natural constituents (vegetation and driftwood) effectively eliminating cover and invertebrate (food) sources.

Solution: Sand moving should be prohibited or limited during the WSP nesting season (March - Sept 15th). Monitors have a relationship with current regular tractor driver who has cooperated to call and clear an area before sand-moving, sometimes skipping those areas close to nests. Other operators may not be so careful.

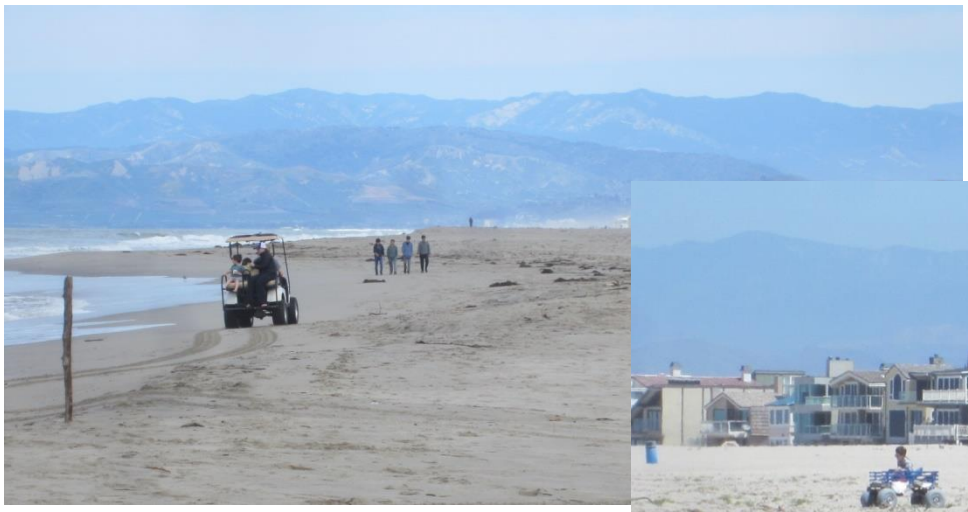
Private sand-moving tractor

Post sand-moving (background), WSPs (foreground)

5. Vehicles Access

Issue: Illegal access onto the sand by golf carts, ATVs, and other unauthorized vehicles, is especially harmful during nesting season and tracks are seen frequently. Some of these may be included with home rentals.

Solution: There are no barriers or posted signs at the many side street access points (e.g., San Clemente St) that only authorized vehicles are allowed on beach. There seems to be confusion about who enforces illegal access.

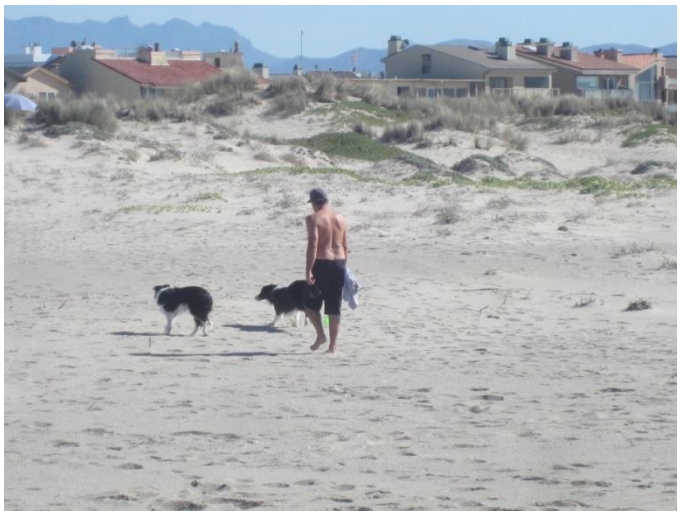


Golf cart and self-propelled wagons

6. Dog Laws

Issue: Posted dog rules are: dogs allowed on leash before 9:00 a.m. and after 5 p.m. and not allowed between those times. However, people bring dogs all day long and most commonly let them off leash on the beach. On- and off-leash dogs will always be perceived as a threat by beach-nesting birds and cause stress and perhaps nest/chick abandonment or losses. Monitors observed two incidences in 2016 of newly hatched WSP chicks separated from adults by off-leash dogs.

Solutions: The agency responsible for enforcement is Ventura County. Some limited response to calls was obtained and a few visits by County Animal Control enforcement officers made. Ideal would be 1 or 2 visits per week and citations given to decrease scofflaws and at a minimum to get leashes used, then enforcement could be reduced. Perhaps the hours allowed for on-leash dogs could be adjusted/increased if 100 percent leash use obtained.



Harbor Department grooming tractor

7. Beach Grooming

Issue: Winter grooming by Ventura County of most of the beach removes vegetation, driftwood and wrack that provides cover and harbors primary food supply for over-wintering and migratory WSPs that occupy entire beach in numbers into the hundreds. Vegetation and beach debris are the catalysts for new dune formation that is prevented on this beach.

Partial Solution: Grooming is not done before October or after March and operators do seem to be leaving some fresh wrack at the high tideline.

8. Homeowner and Other Education

Issue: Some of the public are not attuned to the idea of sharing the shore with sensitive nesting birds. Some of the local homeowners don't realize that most of the beach is County land, that two bird species have federal protection, and that their activities can cause stress and reduced reproductive success.

Solution: Continued seasonal educational sign use – a new sign has been developed and ordered for 2018. Volunteer naturalist presence during nesting season helps answer questions and explain disturbances. Ventura Audubon Society provided HD with a training video to enhance their knowledge of the birds and potential vehicle effects to nesting birds. VAS also hopes to continue Beaches Are Habitats educational events, perhaps on the beach.

9. Ultra-lights, motorized paragliders, drones, kites, low-flying aircraft, etc.

Issue: Low-flying and loud aerial hobbyists too near the nesting colony cause distress of incubating birds exhibited by adults leaving the nest. Least terns may actually dive at the object and hurt themselves, pilots, or aircraft.

Partial Solutions: The USFWS sent a memo with map to local airports reminding pilots to fly above 500 feet in nest areas during the nesting season. Monitors also alerted a new Coast Guard facility at NBVC to this information. May need to be sent out every year.

Motorized paraglider and ultralight observed over Hollywood Beach.

10. July 4th Celebration and illegal fireworks

Issue: City-sponsored festivities draw huge crowds, noise, and lights of fireworks over nesting area that disturbs breeding birds at a high chick presence time of season. Also private fireworks launched into dunes endanger nests.

Solutions: Move July 4th fireworks from immediate area. More volunteer naturalists during July 4th and other summer holidays (especially Memorial Day, Father's Day, and Labor Day).

11. Other Special Events

Issue: Large special events popping up on the beach with no contact to monitors (tent photo from 2015). These can occur in suitable nesting habitat that has not been fenced yet or near where new hatchlings leave fences. The associated vehicles and crowds threaten unfound nests and chicks, cause noise and physical disturbances, and can disrupt or delay nesting as was suspected in 2015.

Solution: Harbor Department must be alerted to an event request and communicate with monitors to allow them to survey an area and give advice on if/where an event may occur where it will not disturb WSPs and CLTs, especially during nesting season.

ACKNOWLEDGEMENTS

A huge thank you once again to Danielle Glenn for her long-term, dedicated assistance with monitoring; the success of this effort would be adversely affected without her expert help. Other gratitude goes out to State Parks for mobilizing and training volunteer naturalists; Bruce Schoppe and Cynthia Hartley of Ventura Audubon Society for recovery program management; Pasadena and National Audubon Society for funding; and USFWS for funding and agency liaisons Lena Chang, Chris Dellith and Michael Glenn. Also thanks to the Channel Islands Harbor Department staff that help with supplies and storage. A special appreciation goes to 2017 volunteer naturalists Tom and Nancy Black and Yolanda Lesser for their patrols, outreach, and reports. Debra is also grateful for the local residents she talks to that realize how extraordinary it is to have these incredible birds call Hollywood Beach their home for the breeding season.

LITERATURE CITED

Atwood, J.L. and B.W. Massey. 1988. Site Fidelity of Least Terns in California. The Condor 90: 389-394.

Colwell, M.A., S.E. Mcallister, C.B. Millett, A.N. Transou, S.M. Mullin, Z.J. Nelson, C.A. Wilson, and R.R. Levalley. 2007. Philopatry and Natal Dispersal of the Western Snowy Plover. The Wilson Journal of Ornithology 119(3): 378-385.

Federal Register. 2012. Revised Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover, Final Rule. Vol. 77, No. 118, pp. 36728-36869. June 19.

Federal Register. 1993. Determination of Threatened Status for the Coast Population of the Western Snowy Plover. Vol. 58, No. 42, pp. 12864-12874.

Mabee, T.J. 1997. Using Eggshell Evidence to Determine Nest Fate of Shorebirds. Wilson Bull. 109(2) 307-313.

Massey, B.W. and J.L. Atwood. 1981. Second-wave nesting of the California least tern: age composition and reproductive success. The Auk 98: 596-605. July.

Page, G.W., L.E. Stenzel, W.D. Shuford and C.R. Bruce. 1991. Distribution and abundance of the snowy plover on its western North American breeding grounds. J. Field Ornithology 62: 245-255.

Smith, R.V. 2007. Hollywood Beach California Least Tern and Western Snowy Plover Nesting 2007. Ventura Audubon Society.

U.S. Fish and Wildlife Service (USFWS). 1985. Revised Recovery Plan for the California Least Tern (*Sterna antillarum brownii*), original approval April 2, 1980. USFWS, Portland, Oregon. Signed September 27.

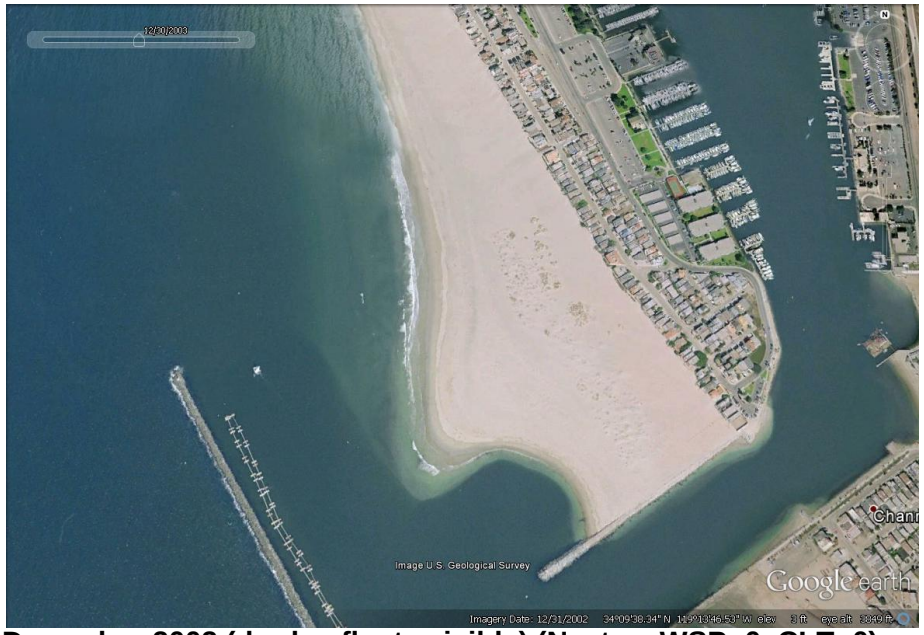
USFWS. 2007. Western Snowy Plover (*Charadrius alexandrianus nivosus*) Pacific Coast Population Recovery Plan Vols. 1 and 2. California and Nevada Operations Office, Sacramento, CA. Signed August 13.

Appendix A. Aerial Photos of Changes in Beach Morphology Comparisons to Nest Attempts

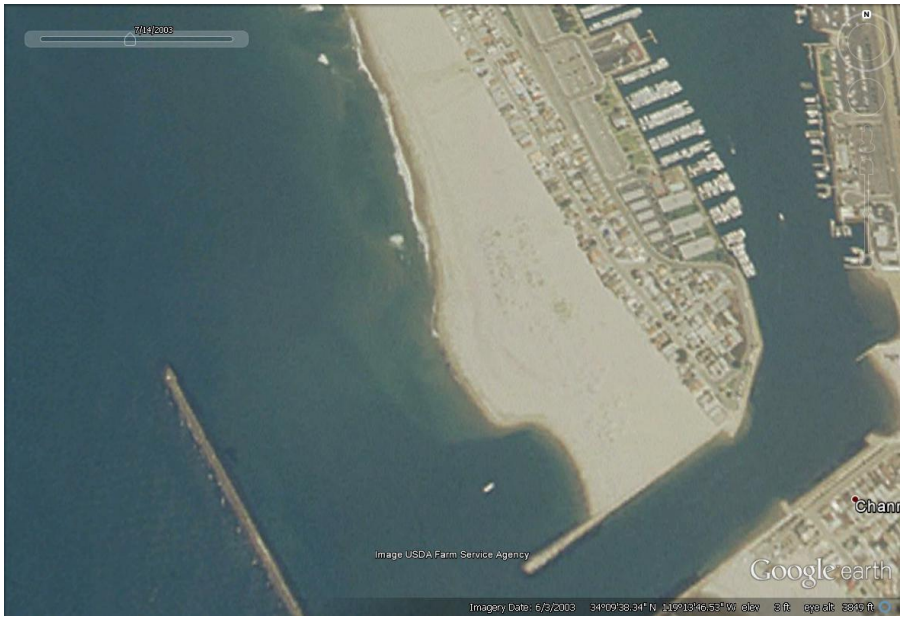
Hollywood Beach
Oxnard, CA

Comparing Historical Aerial Imagery
and WSP & CLT Nest Initiation Numbers

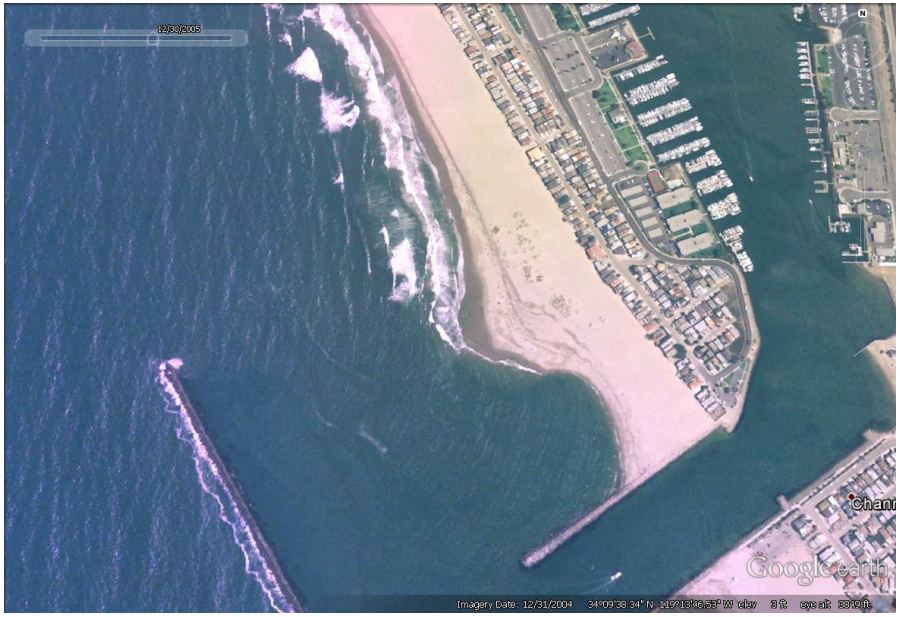
September 1994
(no nest data)



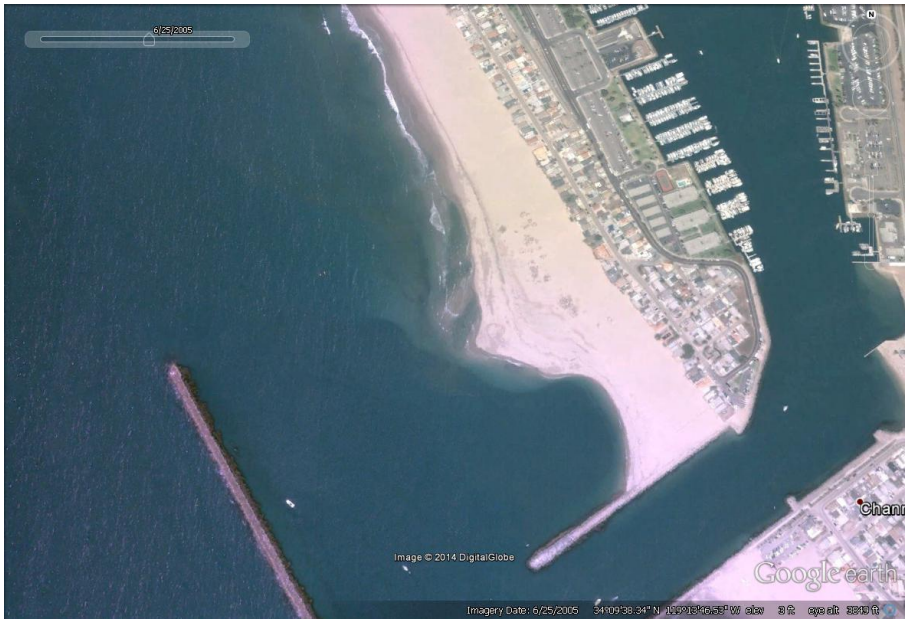
December 2002 (dredge floats visible) (Nests = WSP- 0, CLT- 0)



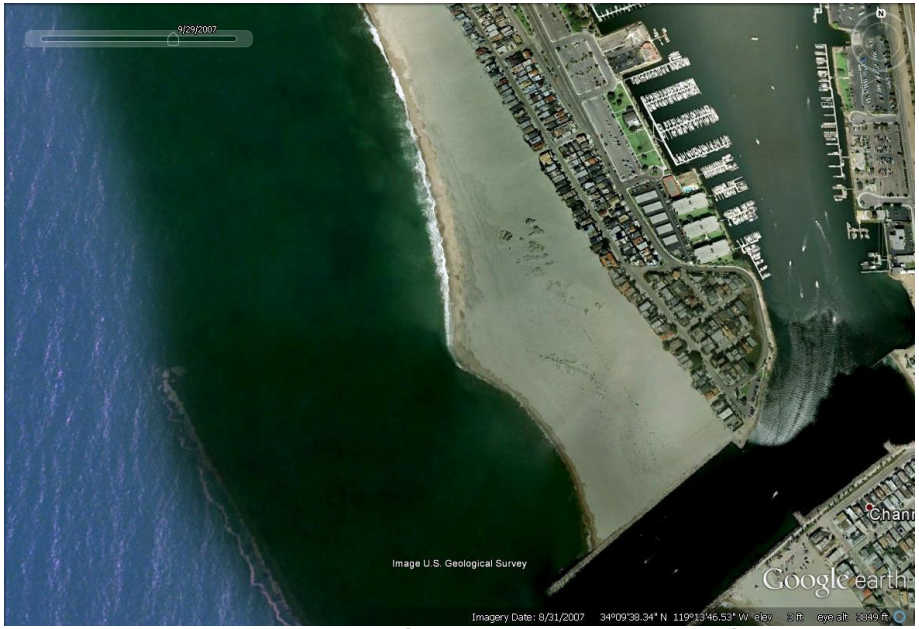
July 2003 (Nests = WSP- 2, CLT- 0)



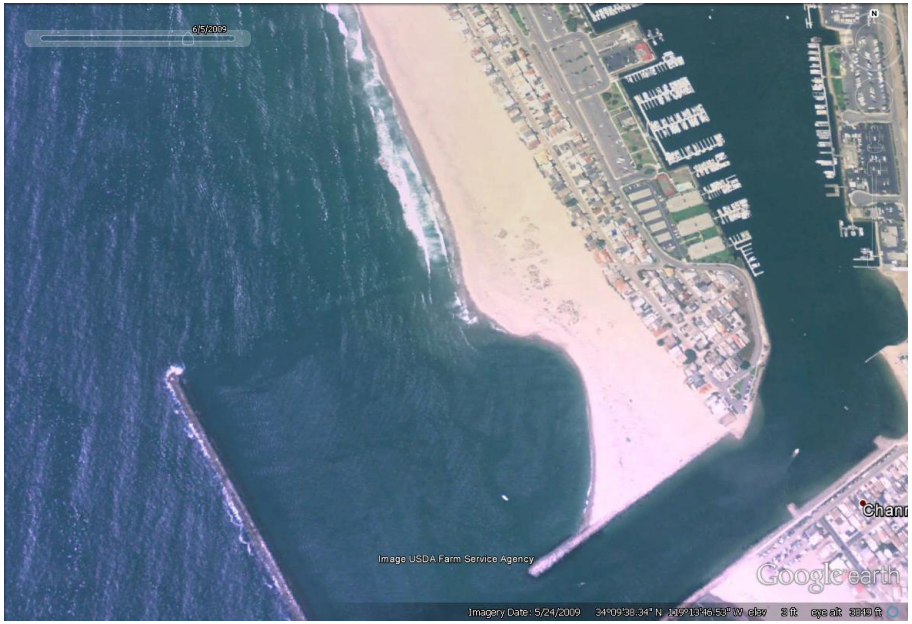
December 2004 (WSP = 5, CLT - 51)



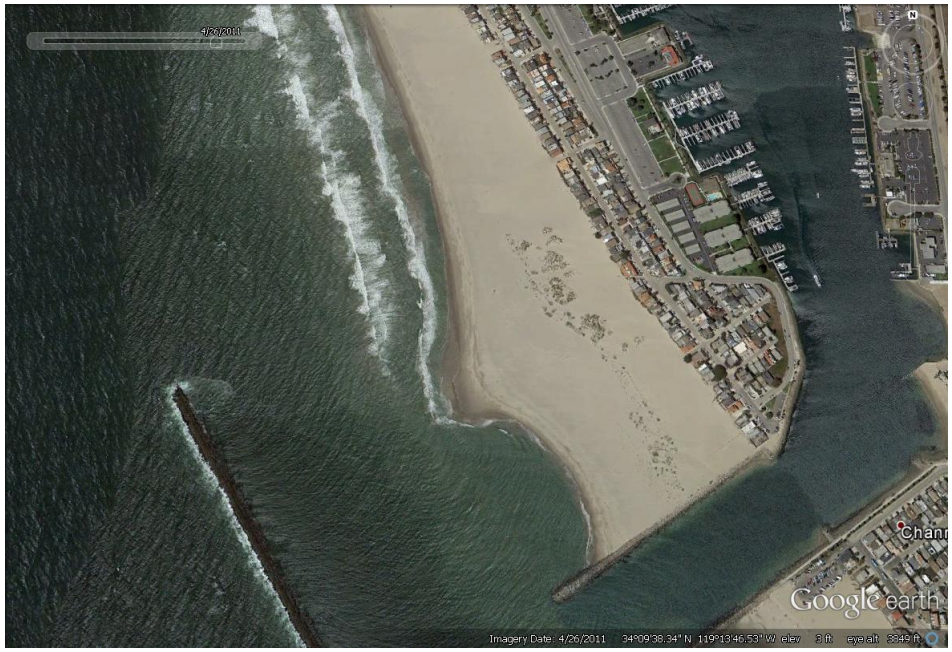
June 2005 (Nests = WSP- 0, CLT- 0)



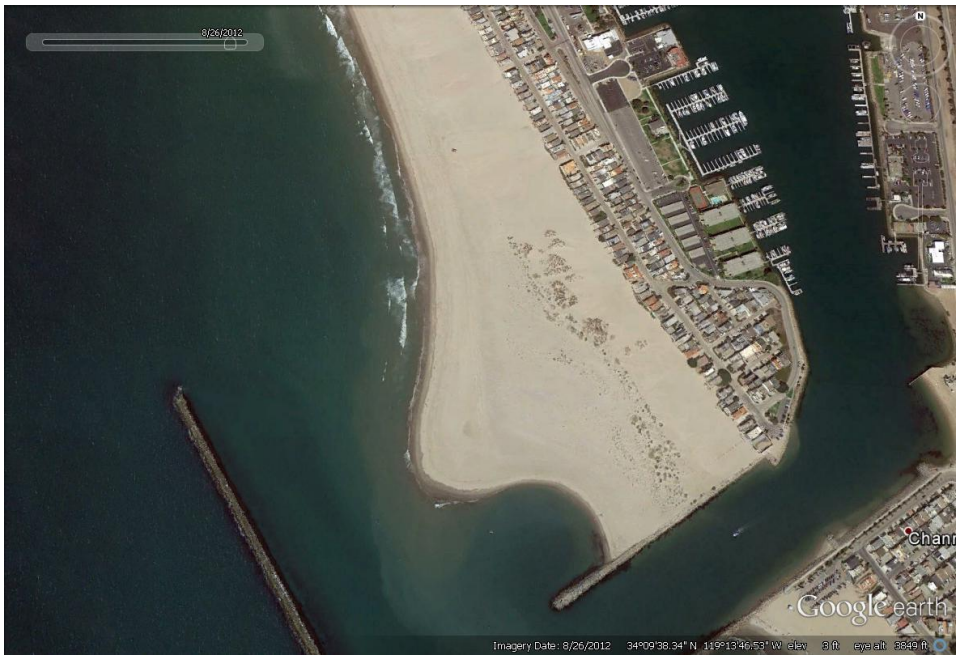
August 31, 2007 (Nests = WSP- 8, CLT- 1)



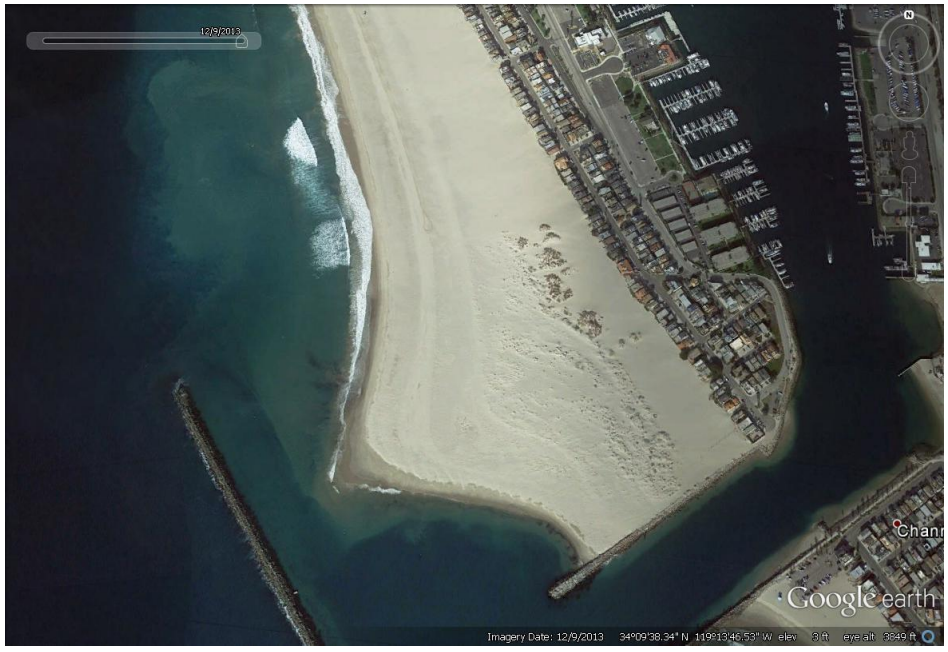
May 2009 (Nests = WSP- 10, CLT- 4)



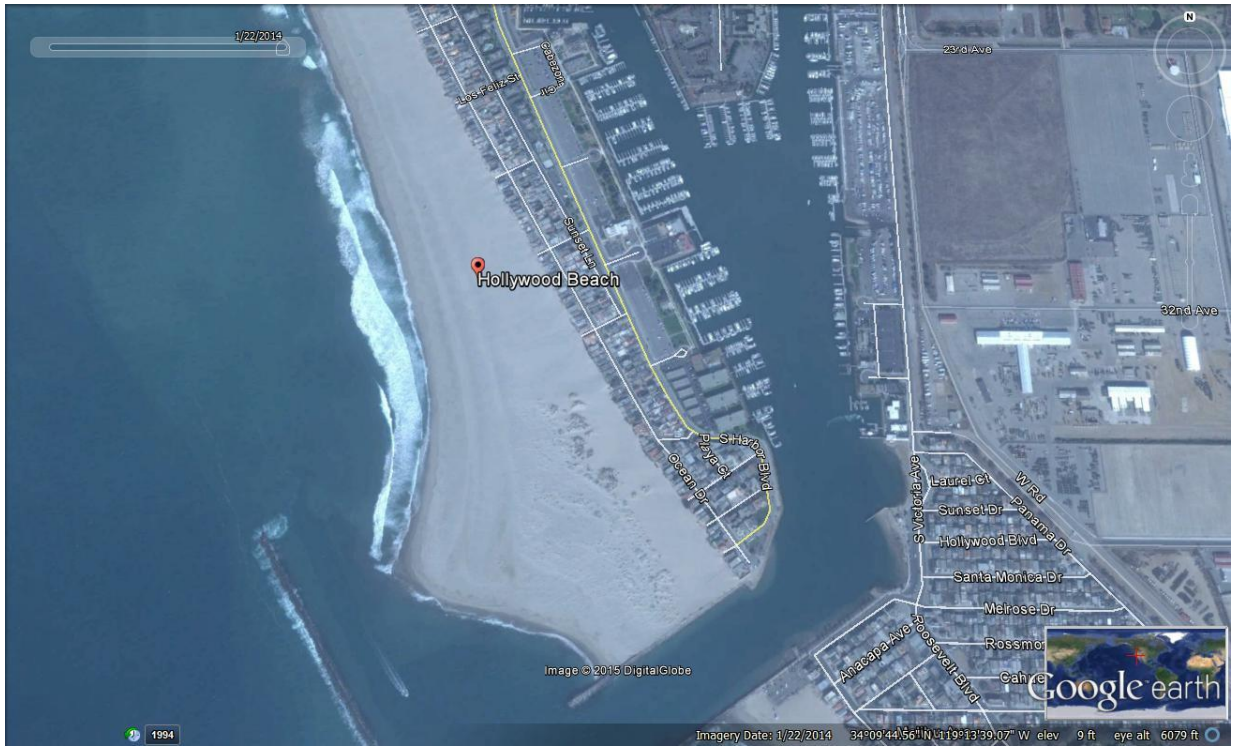
April 2011 (Nests = WSP- 8, CLT- 0)



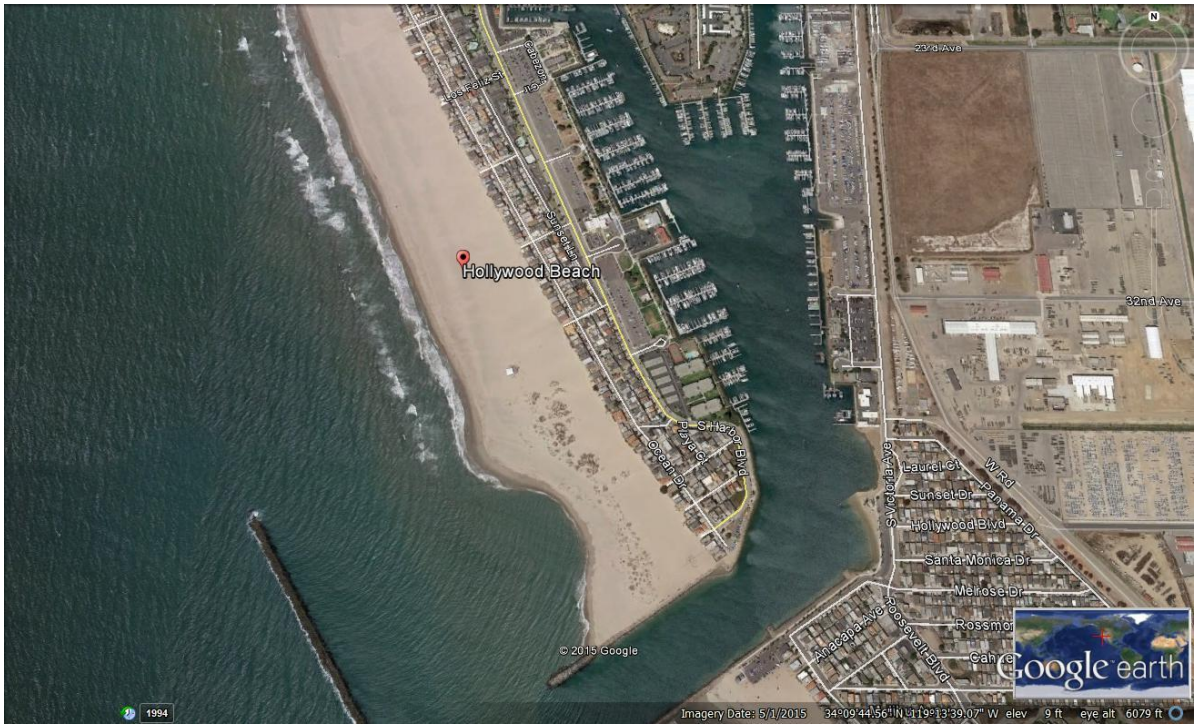
August 2012 (Nests = WSP- 10, CLT- 1 egg)



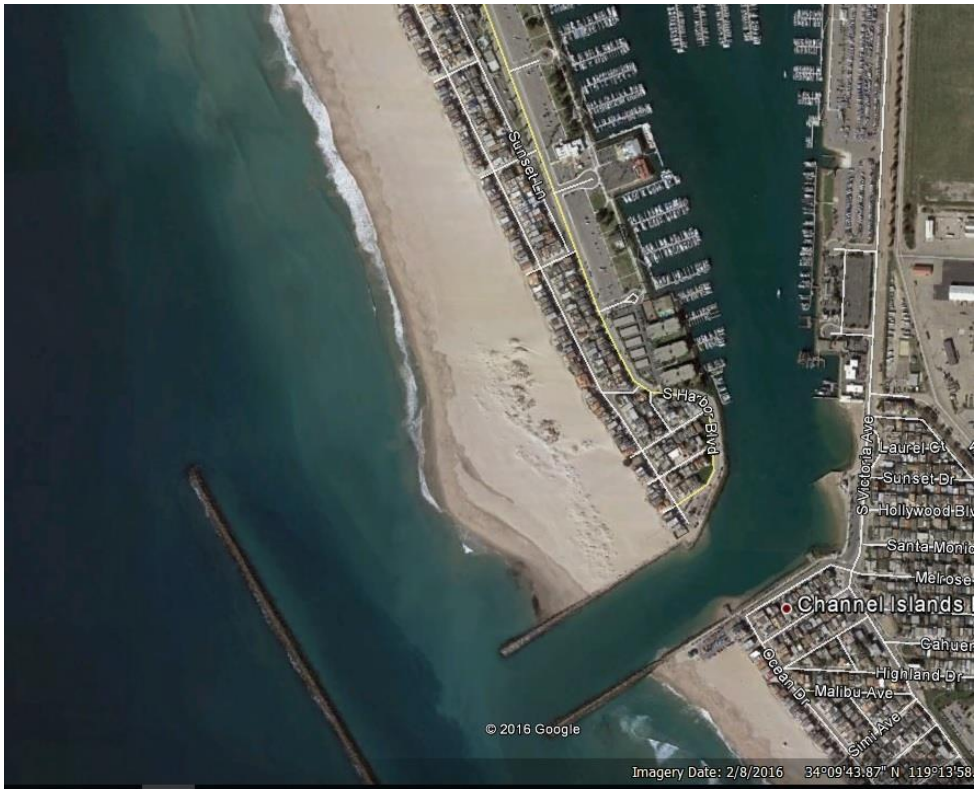
December 2013
(Nests = WSP- 30, CLT- 210)



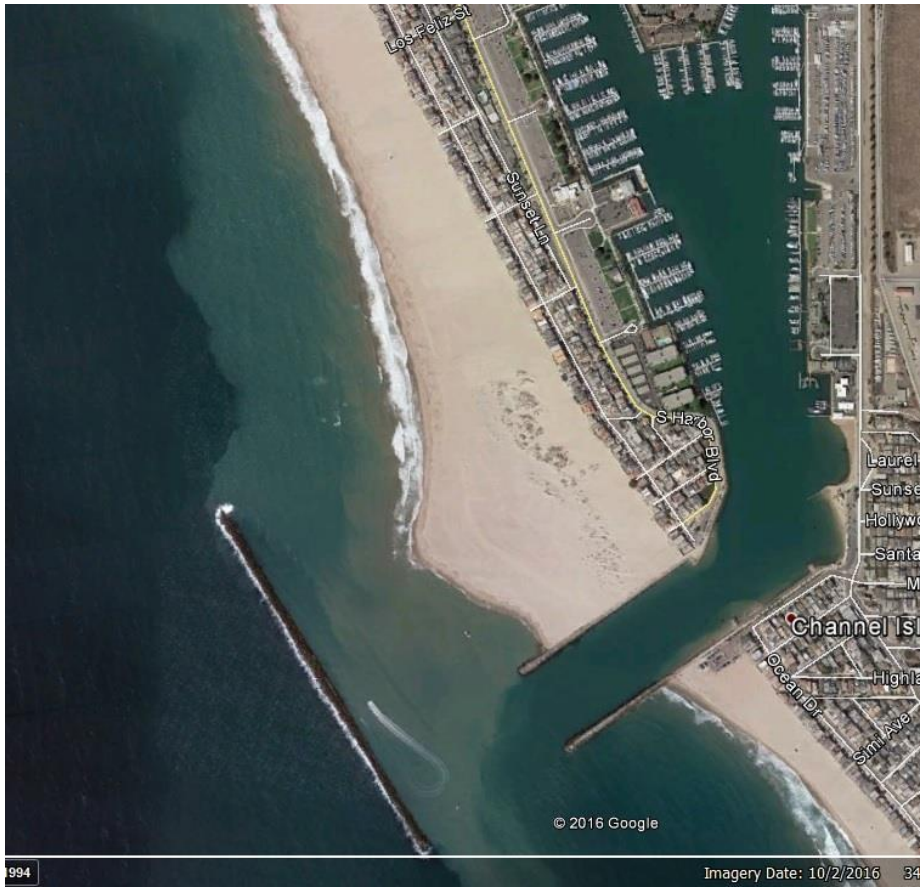
January 22, 2014
(Nests = WSP- 29, CLT- 120)



May 1, 2015
(Nests = WSP- 8, CLT- 24)
(Note: presence of event tent north of dunes)



February 8, 2016
(Nests = WSP- 5, CLT- 0)



October 2016
(Note visible sand deposits nearshore under water. Dredging began in December 2016.)
(2017 Nests= WSP – 11, CLT- 0)