FINAL 2021

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

New 2-egg plover nest surrounded by vehicle tracks and horse hoof prints, with riders in background.

Submitted to:

U.S. Fish and Wildlife Service, Ventura Field Office

California Department of Fish and Wildlife,

and Ventura Audubon Society

By:

Debra Barringer, M.S.

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EXECUTIVE SUMMARY

The abundance and productivity of western snowy plover (*Charadrius nivosus nivosus*) and California least tern (*Sternula antillarum browni*) were monitored at Hollywood Beach, located near Oxnard, California during the breeding season. Activities were conducted according to U.S. Fish and Wildlife Service (USFWS) protocols for nest monitoring under the Endangered Species Act (ESA) by recovery permit holder Debra Barringer (TE-89964A-1). During active nesting, monitoring occurred twice per week, more often if hatching was expected or to observe chicks.

There were 14 western snowy plover (WSP) nesting attempts recorded on Hollywood Beach in 2021. Of the 34 eggs laid, 16 hatched successfully (47% hatch rate; the lowest recorded on this beach in 11 years). Breeding adult WSP number was estimated to be 10, with likely a second or more nest attempts made by some pairs. There was an unusual high rate of nest abandonment and the first wind-buried egg losses in many years. Heat also played a role in chick losses this year in addition to the typical American crow depredation. Nests were established further from the historically used dune area than observed in past years, with very little food and cover resources nearby. It is estimated that a minimum of 1 WSP chick, observed at almost 3 weeks old, survived until fledging, but could not be verified. With no local banding, tracking fledglings became impossible as chicks mixed with migratory WSPs and hatch years arriving from other beaches by early July.

CLTs were observed flying over and occasionally stopping on the beach but no nests were initiated.

Symbolic fencing was erected and altered as needed in seven polygons around WSP scrapes and new nests as they appeared. The 4th nest was established approximately 0.5 mile from the remnant dune area, the historical location of the majority of both species' nests in the past and where adequate food and cover resources are available when the wrackline is too busy with people and dogs. This was further away than had been observed over the last 10 years but not entirely surprising. During winter 2020-2021, nearshore sand dredging was especially heavy and resulted in loss of foredunes and even some mid-dunes. The preferred nesting areas seaward of the dunes were completely removed and as has been observed in the past, this usually causes nesting to shift north. This year was an especially large shift for 5 nests, and survival for hatched chicks out in the open is very low.

Wire predator mini-exclosures were used for all WSP nests and were readily accepted by the parent present; no adults were observed to be adversely affected by exclosures. Resident American crows are the primary predators of WSP hatchlings once they leave nest exclosures and for CLT eggs and chicks. Heavy human recreational use and dogs off-leash remain a constant source of nest and chick disturbance in and outside breeding area fences. Both authorized and unauthorized ground and aerial vehicles were also used on the beach very near nest areas. Disturbances, including dogs and crows observed during surveys, were recorded.

INTRODUCTION AND SITE DESCRIPTION

Hollywood Beach is located on unincorporated land in Ventura County on the west side of the City of Oxnard (Figure 1). It is located between the City of Oxnard Beach Park on the north and the entrance to the Channel Islands Harbor and Silver Strand Beach on the south; Figure 2 depicts the nesting bird survey area in relation to these features. Hollywood Beach is administered by Ventura County, much of it is designated as County Open Space, and maintenance is managed by the Channel Islands Harbor Department (HD). Dog regulations are ostensibly enforced by County Animal Control, but responses to calls are close to nil. The dunes are included as a County-designated coastal Environmentally Sensitive Habitat Area (ESHA).

Figure 1. Hollywood Beach Region

The majority of Hollywood Beach is also designated as critical habitat for the western snowy plover by the USFWS excluding the "sand trap" area on the south end that is affected by periodic dredging (Federal Register 2012). The sand trap area supports a 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 (ACOE) oversees dredging of the harbor and channel adjacent to Hollywood Beach, usually occurring every other year. The sand

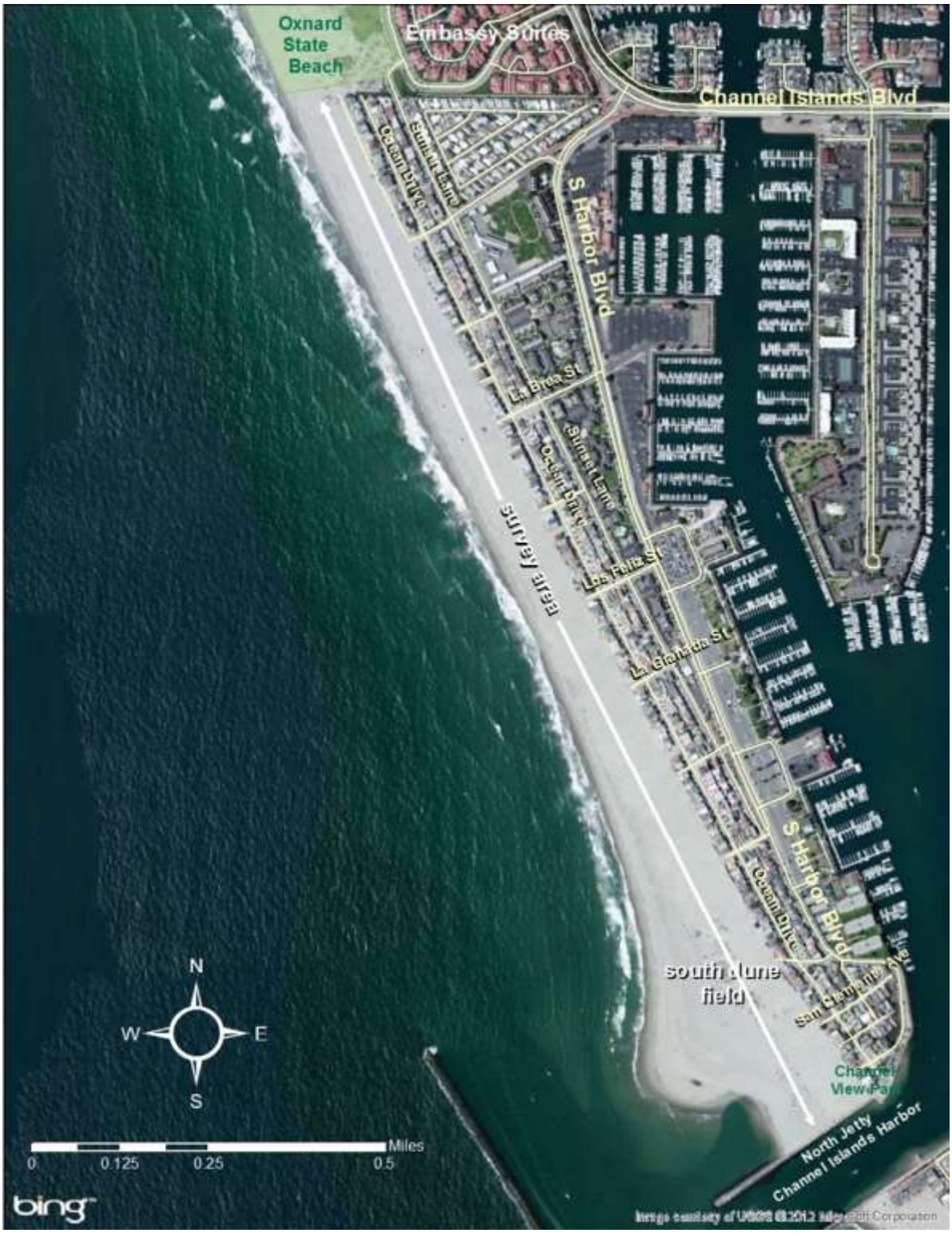

Figure 2. Locations of Survey Area Monitored at Hollywood Beach

trap was designed to capture sand before it enters the Channel Islands Harbor mouth. Prior to and during the winters of 2013 and 2014 decreased available funding reduced the dredging efforts and an unusually large amount of sand collected, forming an extra wide dune field and beach. In those two years, unprecedented increases in WSP nests (29 nests for 2013, 300% increase over average) and CLT nests (209 nests in 2013, 2,000% increase over average) were initiated. Most eggs hatched as there were virtually no predators observed during 2013. With low depredation, fledgling recruitment was high for both species but difficult to verify with no banding. Dredging occurred fall-winter of 2014, the beach lost a majority of the low foredune habitat where most of the nests occurred, and an anticipated drop of adult presence and nesting activity for both species resulted during the 2015 breeding season and has returned to more typical low numbers since. The native vegetation and foredunes have been very slow to regrow since then and continue to be removed during dredging.

The recreating public also uses the dune area, often bringing and unleashing dogs. This beach is a popular public beach and has posted dog leash use and timing restrictions, that are rarely complied with or enforced. Dogs are perceived by nesting plovers and terns as a predator, causing them to leave nests, split from chicks to use distraction displays, and expend extra energy trying to lead/distract the dog away as their only defense. This behavior likely occurs all day long, especially on warm and sunny days when beach visitation is highest. Monitors use various protection measures including fencing, signs and wire predator mini-exclosures over plover nests but it is difficult to eliminate all disturbances.

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. In spring the HD staff is trained about the beach bird nesting season but even monitors on foot have a very hard time seeing new nests so all vehicles are a concern. HD maintenance staff remains on established driving routes along the trash cans to reduce threats to nests. Homeowners on the beach are allowed to hire a private sand-moving tractor to push sand away from their properties all year, even during breeding season. Of most concern are unauthorized vehicles accessing the beach including frequently observed golf carts and other all-terrain vehicles (ATVs), many times used after dark and on weekends near nest areas. Access is easy via several openings between houses leading directly off Ocean Street. Low-flying aircraft including helicopters, ultra-lights, motorized paragliders, and drones that fly over the dunes and nesting areas have caused disturbances to incubating birds on nests. Ground-nesting birds perceive aerial objects as similar to their avian predators and often flush from nests when flown over. Also, Channel Islands Harbor hosts a Fourth of July festival nearby that attracts very large crowds to the area and includes the loud noises and lights of fireworks that are disturbing to nesting birds.

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 have grown quite high due to sand build-up caused by the presence of deep-rooted, nonnative, European beachgrass (*Ammophila arenaria*). Both WSPs and CLTs avoid placing nests near the tallest dunes and tall vegetation, primarily using the beach side of the dunes in the sand trap. Continued spread of the beachgrass may reduce availability of suitable nesting habitat.

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

The breeding season survey area covers approximately 1.5 linear miles along the beach and includes the USFWS critical habitat areas. Population counts are collected all year on Hollywood Beach and WSPs continue to occupy the beach year-round, in high numbers during the winter, and with an average of between 3 and 6 breeding pairs during the nesting season. Monitoring is stepped up during the breeding season to twice per week, more often when chicks are present. Banded bird data is also recorded and submitted to the list server. As for last two years, it was not possible to get federal staff to help erect 4-foot mesh fencing due to the Covid-19 restrictions on social distancing. In addition, with the radical loss of historic nest area habitat after dredging in winter 2021, it would have been nearly impossible to estimate where nests would occur this year to pre-fence. It is hoped that mesh fencing can be used in the future as it helped keep beach visitors and their dogs a distance away from actively used areas, allowing birds (all species) to rest and roost and WSPs to hide nests and chicks with fewer disturbances when they choose sites within the fences.

A thorough population count of all WSPs and CLTs observed is conducted weekly and all numbers recorded (see Table A-1 in Appendix A). In addition, number of dogs observed on- and off-leash and potential predators, primarily crows, are also recorded. Once WSP pairs have formed, behavior is watched closely to determine if they are considering a nesting site and when they begin making scrapes. Each located nest is marked with an inconspicuous numbered wooden tongue depressor placed about 5 feet seaward of nests. All nests are recorded by date found, egg count, parent 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.

The monitor placed symbolic wood stake and rope fence around areas being used for nest scrapes prior to nest initiation when possible and after in some cases. This year as nests spread to the north, a total of 7 fenced polygons were built and at least 140 fence posts deployed. Educational signs in English and Spanish, some

drawn by kids, were added. Monitor activities and protection supplies are largely funded by grants obtained by the Ventura Audubon Society. When nests are established in an area with little or no cover, beach driftwood, wrack debris, and palm leaves are added inside fences when opportunities to not disturb the adult allow.

Mini-exclosures (most 3 ft x 3 ft wire, some 2.5 ft) are placed over WSP nests and anchored with landscape pins to reduce both the wind moving them and incidences of predation as well as human-caused disturbance. Once the exclosure is placed, the nest is always watched to make sure the parent bird returns to it. If not located within an established fence, a symbolic fence is added paying attention to flush distance for the adult. Individually-fenced incubating plovers sometimes flush off nests even with people/dogs walking a few feet from the fence, however, they grow accustomed to people keeping outside symbolic fences. In addition, several "decoy" exclosures over no nests are placed on the beach because exclosures can attract the attention of crows. Using decoy exclosures eliminates the positive reward that the crows get landing on active nest exclosures and flushing adults from nests (but not getting access to eggs). This is an attempt at behavior modification to contrast using no exclosures where corvids can flush adults from unprotected nests and receive egg/chick depredation as a reward. In addition, plastic, non-sharp bird spikes were added to the tops of selected exclosures to further discourage birds landing on them. It has been observed that crows have landed on exclosures less since these tactics were begun. Raptor presence, which is also a threat to adults, on this beach is very rare.

Nest hatching not directly observed is determined by locating either egg pip shells within the empty scrape, observing displaying/calling behaviors from adults in the vicinity of the nest, by locating half eggshells further away, and/or by observing chicks. A nest is determined to be successful if at least one of the above signs is observed. When a nest is found missing eggs and none of the above signs is observed, evidence of depredation is investigated. Evidence of predators includes animal tracks, eggshell fragments and/or egg yolk in the scrape or within 2 meters, and the physical presence of an animal predator in the vicinity. Where possible the species of predator is determined or at a minimum whether it was mammal or avian. Egg non-viability and/or abandonment is determined by a combination of not seeing an adult bird on/near the nest or their tracks over at least two 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 egg/nest is considered abandoned.

Total breeding WSP adult numbers is estimated by adding the highest number of simultaneously 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. Observed chick age-week was estimated and associated with a nest number when possible. It can be assumed that some adult WSPs breed and nest more than once, 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 Fish and Wildlife (CDFW) nesting data reporting spreadsheet. If present, CLT nests located are also documented and marked with tongue depressors a distance from the scrape. Monitors also respond to phone calls from the HD or the public regarding possible nest sightings.

RESULTS

WSPs - Population Abundance

WSP Adults

All adult, juvenile and chick WSPs observed during surveys were recorded by gender and/or age category when possible (Table A-1). Table A-1 includes numbers of active nests by date, egg counts, and chicks observed as well as other notes.

The average number of adult WSPs observed during May over time that data have been collected is compared in Figure 3. This reflects the population better than the 1-day snapshots collected during the spring Window Survey because this beach often becomes active later than other beaches. May was chosen as the month least affected by presence of non-breeding birds. The May average adult count (4.8) was similar to that determined in recent years. Breeding reached a peak in the third week of June.

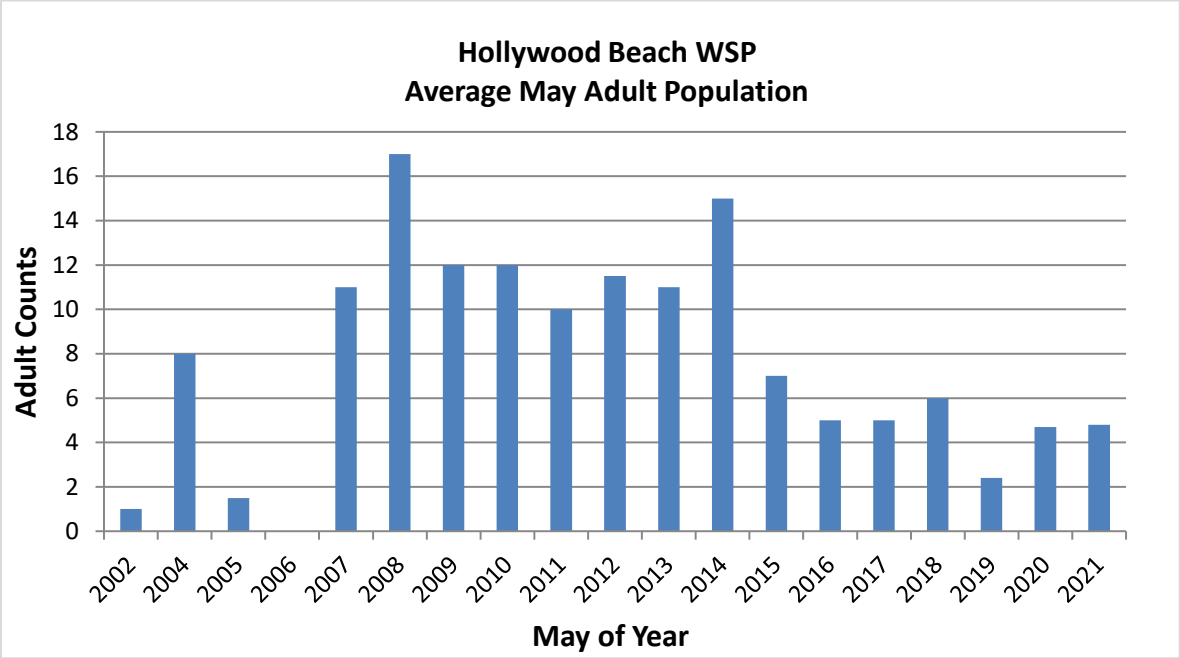

Figure 3. Hollywood Beach Average Adult WSP Population as Recorded During May

WSP Non-breeding/Winter Season

Hollywood Beach supports a fluctuating but consistent WSP population throughout the year. Non-breeding season WSPs have been counted and recorded most weeks through the winter (non-breeding) season since 2012. Especially when Hollywood Beach has experienced reduced nesting season success, it is essential to show data that depict this beach's overall importance for migrating, foraging, resting and winter roosting WSP populations. The amount of kelp and other fresh seaweed wrack that washes up is often substantial,

especially in the sand trap area, providing a reliable food resource for WSPs. Their locations often correspond with good amounts of wrack above and at the wrackline. In addition to the large numbers of WSPs migrating through and stopping at Hollywood Beach beginning in late July and August, these fall-winter results further support the reason a majority of this beach was designated as critical habitat by the USFWS. Figure 4 depicts WSP counts taken during surveys conducted from August 2020 to February 2021.

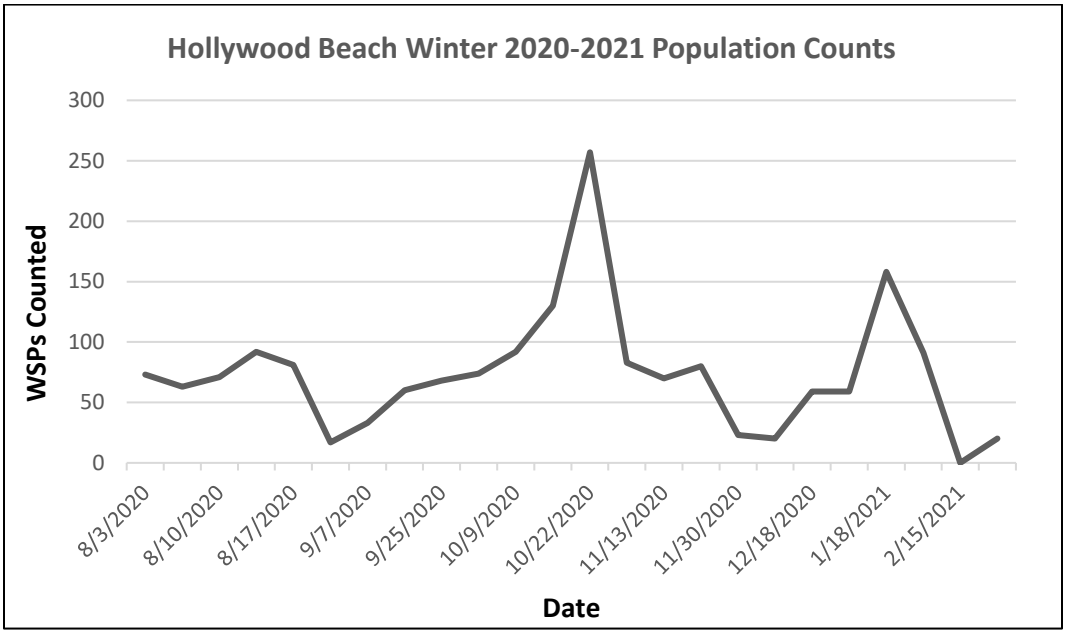

Figure 4. Hollywood Beach WSP Populations Recorded During Winter Season

WSP Banded Birds

During surveys birds were examined for leg bands through binoculars. Leg band information collected mostly during the winter season provides researchers information on birds' movements. All band combinations were seen on WSPs and are reported to the Snowy Plover listserv. Very few WSP bands are typically observed during the nesting season on this beach. CLTs were also monitored for bands and/or transmitters but none were observed.

Bands observed on Hollywood Beach in recent years were traced primarily to locations to the north including: Moss Landing Salt Ponds (Monterey County), Oceano Dunes State Vehicle Recreation Area (SVRA), Vandenberg Air Force Base (VAFB), Salinas State Beach and National Wildlife Refuge (Monterey County), Marina State Beach (Monterey Bay), Fort Ord State Beach (Monterey County), Humboldt County, CA, and Oregon. WSPs observed banded from southern locations including Naval Base Coronado (San Diego County), Bolsa Chica Ecological Reserve (Orange County), and Camp Pendleton.

WSP Nest Activity

During the 2021 nesting season, 14 WSP nests were initiated on Hollywood Beach, with an estimated number of breeding adults at 10 determined using largest concurrent nest count (5) plus active broods on same day (0). Nest placements began north of the dunes, which is typical of post-dredge years, rather than seaward of the dunes in years when more space is available there. Figure 5 depicts all of the WSP nest locations for 2021. Table 1 contains a brief summary of breeding information requested by the CDFW.

Table 1. Summary of Hollywood Beach WSP Breeding Activity During 2021

First Observed WSP Nest Initiation Date	15-Apr-21
First Observed Hatch Date	3-June-21
First Observed Fledge Date	NA - Oldest chick observed was 19 days old, on July 24 and then became mixed with migrants and other hatch years so fledging could not be verified.
Period of Peak Nesting (the 1-week period with maximum number of active nests + broods)	June 21-27
Last Observed Nest Initiation Date	2-Aug-21 (nest was in 3rd week)
Last Observed Hatch Date	9-Aug-21
Last Observed Fledge Date	NA
Length of Breeding Period (Total # days from first observed nest initiation to last observed fledging)	123 days (to last observed chick)

The first 3 nests appeared on the open sand area about 1,300 feet north of the dunes with very little in the way of natural cover or nearby food resources. Exclosures were used and a large symbolic fence was built. Fencing was added and constantly adjusted as necessary to keep a buffer around as active nests and some scrape areas increased. When opportunities arose, the monitor added driftwood and palm leaves to nest fences for additional cover opportunities. Nest HB04 appeared in an area approximately 0.5-mile north of the dunes where nests hadn't been recorded in at least 10 years. Subsequently, 4 more nest attempts were located in the same area. Four additional nests were initiated in the central open area and 2 nests were placed closer to the dunes.

Vegetation and other ground cover components observed in both nest habitats and within 1 meter of established WSP nest sites were recorded and are listed in Table 2. The lack of vegetative and other cover around nest sites proved an adverse effect once chicks hatched and had no immediate cover from predators and, unusual for this year, heat. Chicks hatched in the open area were predominantly led south to the cover and better food resources of the dunes and vegetation by their parents. This trip was often perilous, including encounters with visitors and dogs.

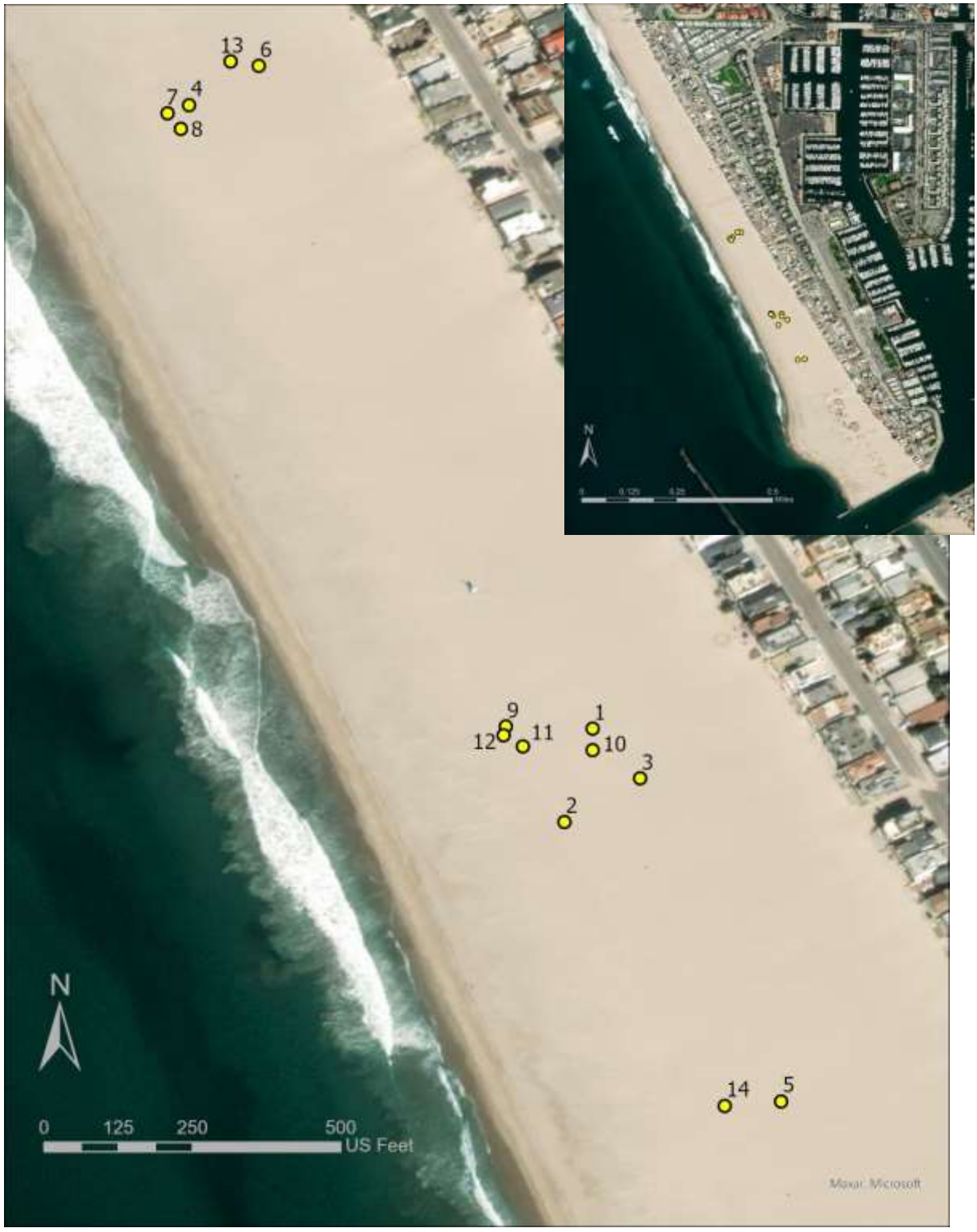

Figure 5. WSP Nest Locations on Hollywood Beach During 2021 (beach geomorphology in photo does not necessarily reflect what was present during nesting). Inset shows nest activity in relation to entire survey area.

Table 2. 2021 Ground Cover Estimates for Hollywood Beach WSP Nest Sites and 1 Meter Surrounding

Nest	% Slope	Total % Cover	Veg Types*	% Veg Cover	% Other Cover
Nest HB01	0	5	SR seedlings	1	95 bare sand, 4 palm leaf
Nest HB02	0	8	SR seedlings in high tide wrack	1	92 bare sand, 7 wood
Nest HB03	0	10	SR	9	89 bare sand, 1 wood
Nest HB04	0	2	N/A	0	98 bare sand, 2 wood
Nest HB05	0	20	BB (nest inside), SR (0.5%)	20	80 bare sand, 0 litter
Nest HB06	0	1	N/A	0	99 bare sand, 1 wood
Nest HB07	0	5	N/A	0	95 bare sand, 5 wood
Nest HB08	0	5	N/A	0	95 bare sand, 5 wood
Nest HB09	0	15	N/A	0	85 bare sand, 15 wood
Nest HB10	0	5.5	SR	0.5	94.5 bare sand, 5 wood
Nest HB11	0	2	N/A	0	98 bare sand, 2 wood
Nest HB12	0	5	N/A	0	95 bare sand, 5 wood
Nest HB13	0	1	N/A	0	99 bare sand, 1 wood
Nest HB14	0	15	N/A	0	85 bare sand, 15 wood (nest in high tide wrack)

*Notes: SR = sea rocket (*Cakile maritima),* SB = saltbush (*Atriplex leucophylla*), BB = beach bur (*Ambrosia chamissonis*), RSV = red sand verbena (*Abronia maritima*), litter consists of driftwood, dead arundo stalks, and dried kelp. This beach has very little trash.

WSP Nest Fates

Of the 14 nests initiated in 2021, 6 hatched a total of 16 eggs (43% nest hatch rate, 47% egg hatch rate). This is significantly lower the hatch rate average of 74% determined over 17 years of data collected. Three of the nests consisted of single eggs that may have come from other nests so nest number was a bit uncertain this year. An unusually strong wind event may have actually blown eggs from established nests and it was

suspected HB07 and maybe HB13 were from other nests. Other uncommon causes of reproductive failures for this beach were experienced this year with high abandonment, heat exposure/ starvation, and wind-buried eggs adding to egg and chick losses.

It was determined that American crows depredated two nests and likely a third nest immediately upon hatching and chicks leaving the exclosure, as observed by track evidence. However, their hassling of brooding adults or landing on top of exclosures was not observed this year as was more common in the past. There were fewer observations of crows in general, who seemed to spend more time away from and less attention on the nest area, perhaps closer to beach visitors and their trash. Table 3 summarizes nest, egg and chick details. A pie chart is presented in Figure 6 summarizing nest fates using individual egg fates because fates varied within a single nest. Unusual behaviors that affected nest/egg/chick fates and contribute to lessons learned are highlighted in text below.

Table 3. Hollywood Beach 2020 Western Snowy Plover Nest Fate Summary

Nest #	Date Found	Eggs Laid	Date of Hatch/Other	Eggs Hatched	Oldest Chick # & Age Observed	Comments
HB-01	4/15	3	5/19	0		Abandoned, potentially affected by low-flying motorized paraglider flights
HB-02	4/30	3	6/3	3		No chicks seen, likely depredated.
HB-03	5/3	3	5/24	0		2 eggs wind-buried, no adults returned.
HB-04	5/19	3	5/24	0		3 eggs wind-buried or blown out of exclosure, found broken shells
HB-05	5/24	3	6/27-28	3	2 @ 1 day	1 egg wind-buried, monitor dug up; single female incubating last egg while chicks hatched, 2 chicks died of exposure/starvation soon after hatch, 3rd unknown fate
HB-06	5/28	3	6/28	2		2 chicks depredated by crows after hatch, 1 abandoned egg
HB-07	5/31	1	6/14	0		Abandoned, egg potentially from another nest
HB-08	6/3	2	7/5	2	1 @ 19 days	1 chick likely fledged, can't verify
HB-09	6/6	3	6/27	0		Abandoned
HB-10	6/18	3	7/16	3		3 chicks depredated by crows after hatch, track evidence and WSP feathers found
HB-11	6/28	2	7/23	0		Abandoned
HB-12	7/5	1	7/23	0		Laid in HB09, probably from HB11 pair.
HB-13	7/26	1	8/6	0		Abandoned
HB-14	8/2	3	8/9	3	1 @ 8 days	Lost sight of chick within migrant flocks
Totals		**34**		**16**		**43% nest hatch rate, 47% egg hatch rate**

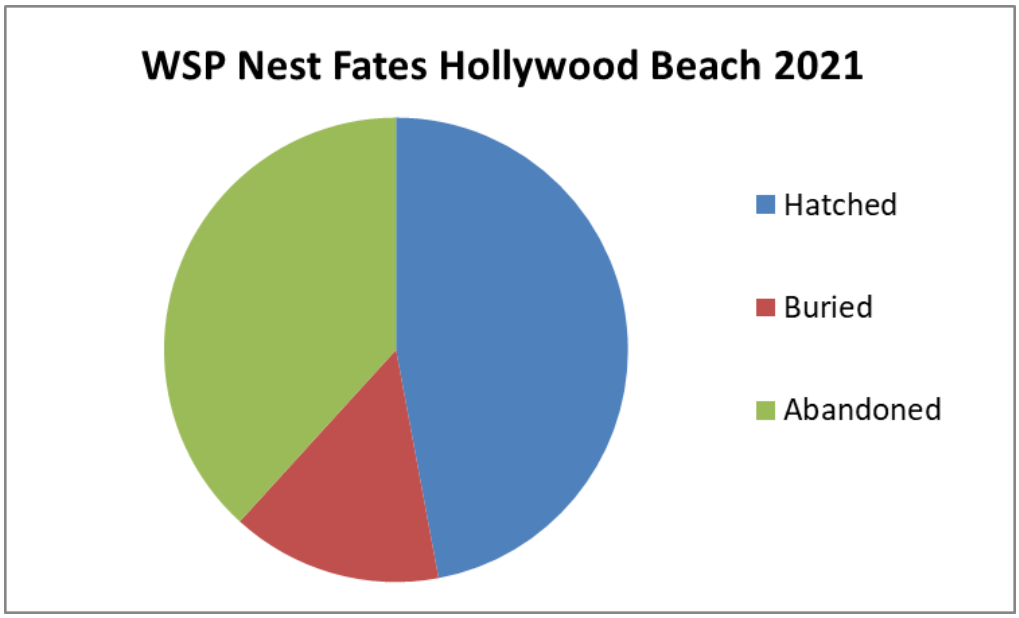

Figure 6. Nest fates, as tracked by individual egg fates, for Hollywood Beach in 2021

Serial Black Widow or Deadbeat Dad Again

HB05 and HB14. Even though initiated out in the open sand, HB05 was brilliantly constructed in the center of a solo beach bur plant that completely hid the eggs and usually the parent incubating them. On May 19th a fierce windstorm buried eggs in several nests. In many cases, the parents somehow were able to protect or dig the eggs back out of the sand. In the case of HB05, there was still one egg buried when the monitor arrived and she dug it out and arranged it with the other 2 on the nest scrape. The female returned and accepted that the third egg was back and continued to incubate the eggs to term. The day before hatch day, a male was observed near the nest; paired males are generally rarely seen during the day and may have to travel a distance to find adequate forage, but they do reappear near hatching date. On the next day that 2 of 3 eggs hatched in HB05, no male was present and the female needed to switch between brooding the 2 chicks and incubating the remaining egg. This is a repeat of an incident that occurred last year not far from this nest location. There have been 3 nests (1 last year, 2 this year) not far from each other that have had only the female parent present at hatching day and on following days when there should be both parents. This year was very likely the same female both

Figure 7. Single mom with 2 chicks

times. The monitor remained observing from a distance for over 4 hours to see if the last egg hatched or if the chicks would be moved to adequate cover. The day was also warm, from 68 to 73F air temperature, sand probably hotter, so finding the chicks shade as well as food resources was also critical; they were utilizing some of the wood debris the monitor placed near the nest for cover. In addition, this was a Sunday and the beach was very crowded with people and dogs, therefore, the female and 2 chicks remaining within the symbolic fence had some benefits of distance from disturbances. After about 1.5 hours, the female left the remaining egg in the scrape and the symbolic fence and began to lead the 2 chicks south toward the dunes (Figure 7). She moved very slowly, stopping to rest and shade the chicks frequently. The monitor steered people away from their path when necessary. Occasionally she managed to hide the chicks in debris and flew off, likely to forage herself, returning within a few minutes. With perhaps 50 feet remaining between the adult with chicks and the dunes, the monitor needed to leave for the day. By the next day, the third egg had hatched and the chick was found dead about 15 feet from the nest. It is difficult to know if the cause was heat exposure or starvation. It was collected and then the female was observed visiting the spot two times later. She didn't appear to have the other 2 chicks with her or hidden anywhere. By 4 days later, another of the chicks was found dead very near where they were last seen traveling toward the dunes.

Within 25 feet of nest HB05, another nest (HB14) was later initiated and only the female observed on hatch day with 3 chicks. She was observed a week later with one chick and not thereafter.

Long-Distance Hiking Family

After three other nests failed in this new nesting area, Nest HB08 was initiated approximately 0.5 mile north from the typical nesting area near the dune field. This is the first year in 10 that nests (5) were attempted that far from the dunes. Because we use predator exclosures (wire cages over nests) on this beach, most all eggs hatch but nests even much closer to the dunes rarely are successful because they are out in the open and too far from adequate cover and food resources for the chicks. So when the monitor was present on hatching day for HB08 in this area, it was difficult to know what to do to increase survival potential. The 2 parents and 2 chicks were still within the symbolic nest fence, which is scant protection from crows or off-leash dogs. The monitor's first instinct was to go to the shoreline and try to gather wrack that would contain the invertebrates that chicks need to feed on and bring some to the fenced area. As this was being done, the parents made their very difficult decision to begin walking the 2 newly hatched, tiny chicks the 0.5 mile to the relative safety of the dune field. Plover chicks won't be able to fly for a full month so have no defense except hiding and running. They needed to cross open beach with barely anything in the way of cover from the ever-present crows and gulls flying over. In addition, it was likely the chicks had not had anything to eat yet (at least during the day the shoreline was too dangerous with people and dogs for chicks to be led there, the parents seemed to know this). As they moved, people constantly were crossing their path from the street to the beach, often with dogs off leash. The monitor accompanied them staying about 20 feet behind and on the ocean side to be available to speak to anyone headed toward them. Fortunately, this was an overcast day and not as hot as previous hatching days. In addition, the WSP family had to cross paths with several groups of migratory snowy plovers that can be quite hostile to other plovers' offspring. One parent would stay with the chicks while the other would run interference and actually pick fights or basically chase other birds out of their path as they moved. This is the only aggression plovers seem to ever show – to their own species. In one hour and 15 minutes, the

four family members made it to the sand dunes, vegetation, and hidden insects they needed to sustain the chicks until it was safe for them to forage at the tideline (usually after dark on busy beaches). The monitor was able to track that one of these chicks made it to 19 days old, and likely to fledging, which could not be verified once many other plovers and hatch years arrived on the beach.

Nest HB11 (2 eggs) was initiated very near the abandoned HB09, where eggs were not collected so as not to disturb nearby active nests. When 4 eggs were observed in HB09, it was given a new nest number (HB12). However, it was suspected that the female from HB11 became confused and she laid her 3rd egg into the abandoned HB09 scrape (where 3 eggs remained). She was observed sitting on 4 eggs in HB09/12 once, and thereafter incubated 2 eggs in HB11, abandoning both early. None of the 6 eggs hatched and they were collected.

WSP nest hatch success at this beach since 2003 is compared in Figure 8.

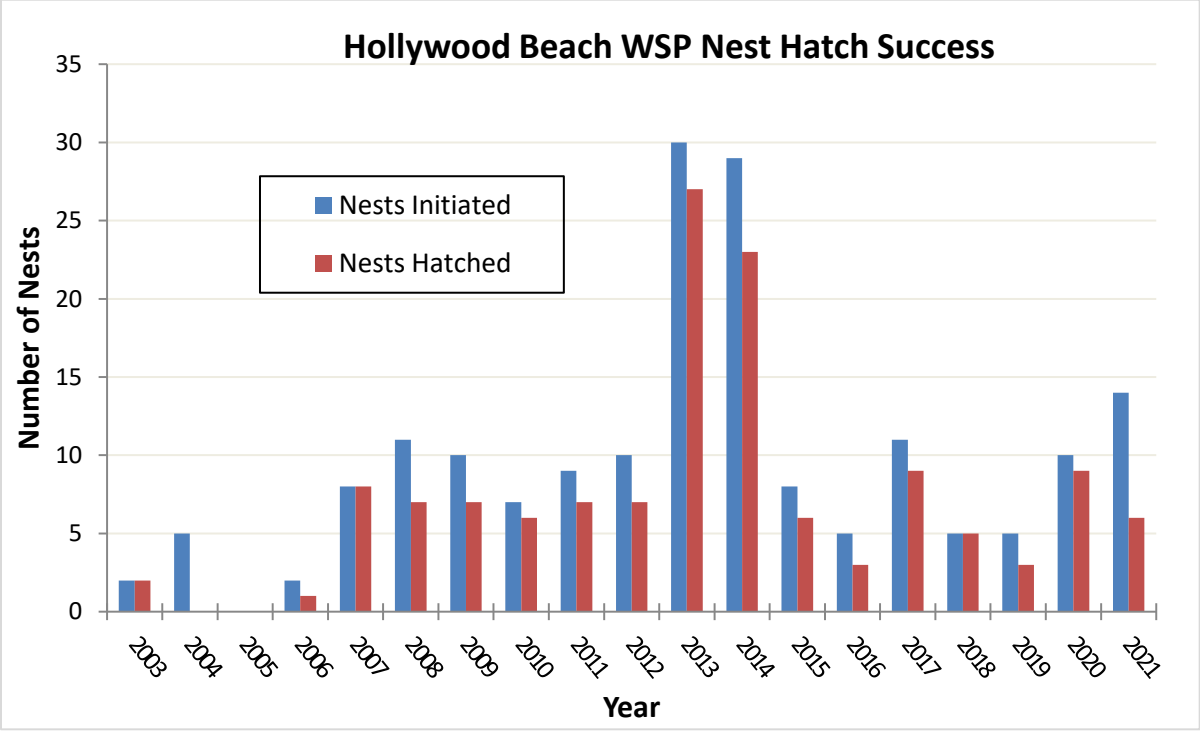

Figure 8. Hollywood Beach Nest Hatch Success Since 2003

CLTs - Population Abundance

CLT Adults and Nest Activity

CLT breeding activities and hatch success, when applicable, have been observed and recorded on Hollywood Beach beginning in 1996. Adult CLTs were counted during surveys, with adult flyovers first observed on May 14 and potentially heard the week before. Numbers observed and recorded combine those seen in the air and on the ground as best as possible. All CLT activity observations are included in the CLTE Data Reporting

Spreadsheet submitted electronically each year to CDFW. The table below summarizes observations on Hollywood Beach this year; no confirmed nests were recorded.

Date	# CLT	Behavior
5/7	?	Potentially heard CLTs calling in sky above
5/14	16	Observed foraging in nearshore water, and grooming on beach until dog flushed all
6/3	2	Flew over beach
6/18	2	Observed on sand in dunes, potentially making scrapes, which were GPS'd.
6/27	2	Flew over beach
7/2	2	Flew over beach

DISCUSSION

The distance from the dunes that WSPs chose to establish nests was greater this year than in 10 years of observations. There seems to be a relationship between amount of sand dredged and distance WSPs travel away from the sand trap to establish nests the following season. The amount of sand removed in 2020-2021 (2 million cubic yards) was the largest in many years and the distance traveled (0.5 mile) the largest as well. These nests established out on the barren sand far from cover, and even far from the tide and wrackline rarely are successful. Daytime observations post-hatching are that chicks are led towards the dunes with vegetation for cover and insect resources. For those that survive, they likely have access to the better wrackline resources after dark when the beach crowds thin out. Oddly, the oldest chick tracked this year (19 days) hatched from one of these distant nests. Adding driftwood and wrack debris seemed to help and was used by plovers within the symbolic fences. It was observed this year that all WSPS stood on top of beach debris more than in past years and this was attributed to the higher heat of the sand on those occasions.

Reasons for the high nest and egg abandonment are more difficult to diagnose. A recurring incident of a low-flying, loud motorized paraglider was observed to cause an incubating parent to leave her nest. CalTIPS was notified about this including where the glider was launched and a CDFW ranger spoken to who said he would patrol the launch area occasionally. This nest was later permanently abandoned. Other disturbances near nests that were observed included kite-flying, dogs playing, and sand tractors working. The extreme wind event in May also caused egg abandonment in two nests, which hasn't occurred here in several years. In other nests active and buried during that wind event, the parents both dug up eggs themselves and accepted those dug up by the monitor.

The primary loss of chicks on Hollywood Beach has historically been due to depredation by American crows. It is suspected that two breeding pairs of crows remain dominant on the southern end of the beach. They forage in dunes and along wrack line and opportunistically depredate chicks when they recognize hatching occurring and chicks leaving exclosures or an adult plover guarding a brood. Even though they weren't observed as often or in numbers as in past years, they were vigilant enough to be present very soon after two and perhaps three nests hatched and chicks walked out of the predator exclosures to depredate them. Tracks of crows, adult and tiny plovers, and even some feathers were found near newly hatched nests.

No CLT nests were established this year, which was not unexpected. The preferred large, flat area in front of the dunes preferred by CLTs in the past was not present after winter dredging. There are always CLTs that fly over during the season, perhaps scouting potential "back-up" nest areas in case things go sideways at their typical nest beaches.

The habitat that had begun to form dunes and where native beach plants had germinated early last year north of the dune field was all but gone by spring this year. The combination of extra vehicles driving over (County Covid patrols last year), continual pedestrians, and perhaps winds moving sands inward buried plants and smoothed out the new topography leaving flat, barren beach. There was an unusually high tide wrack debris line approximately halfway from shoreline to houses that many WSPS used for roosting and several used for nest sites (Figure 9). This demonstrates the disproportionate importance of even the smallest debris presence for this species. After requests from Ventura Audubon members, the HD continues to avoid areas east of Las Palmas for winter beach grooming and the private sand-mover primarily stays on the inland half of the beach.

Figure 9. High tideline wrack used by WSPs for roosting and several nests.

Ongoing Threats

Every year I ask USFWS to send a letter to local airports to alert them of nesting season and of airspace restrictions over known nesting areas; I received no confirmation that this was done this year. It is common to see unauthorized vehicle tracks in and around the dunes during the breeding season. Whether this is occurring during the day or even more dangerously, after dark, the threats to new and unmarked nests, defending adults, and flightless chicks is very large. Monitors have asked the County about adding gates or signs to the 13 available access points from Ocean Street between homes along the beach. So far, there has been no consensus or progress towards resolution for these requests. As a result, people in golf carts, ATVs,

motorized wagons, and other off-road vehicles can easily enter the beach and claim they saw no signs prohibiting entry.

A good relationship and interactions continue with the sand-moving tractor operator hired by residents. She calls the monitor before jobs near nesting areas and usually has avoided working near active nesting/hatching areas. This year with the extended nest area, more conflicts occurred. The fact that residents are allowed to hire her to move sand during the breeding season will always be a problem and a threat to nests and chicks. With nests now more frequently appearing in the open sand areas, this practice is of concern as monitors are only present for short periods and don't always find new nests and hatching chicks immediately. This is true for all threats and disturbances, that monitors are only present on twice-weekly, 1 to 2-hour surveys; it can be assumed similar events occur with regular frequency and cause numerous incidences of disturbance to breeding birds.

Other vehicles driving on the beach during breeding season observed this year were Oxnard Police Department ATVs traveling along the wrackline, where chicks forage. I have contacted them in the past and they said this beach was not even within their jurisdiction (it is County) so that practice would stop, however it hasn't. On a day that I observed 2 people on horseback traveling the length of the beach near the homes, I found an active nest in between the horse tracks and quickly protected it with fence and exclosure (report cover photo).

Other, usual threats to breeding success have been documented during each survey on Hollywood Beach. People bringing dogs after the 9 a.m. restriction time (posted on signs) and allowing them to run off-leash continued on a daily basis. On two occasions this year, dogs were observed chasing adult WSPs that were brooding chicks. I have had discussions with the County and Harbor Department about the lack of enforcement for dog regulations over the years and they say that County Animal Control is responsible. Every year I phone Animal Control during especially egregious activities and enforcement or even an officer's presence has never been observed to occur. Also, the presence of American crows is noted on most every survey. The constant crow presence and human/dog disturbance together magnify threats to chick survival on this beach. Monitors have observed chicks being displaced from hiding places and separated from adults by off-leash dogs and then crows waiting nearby flying in to depredate. So whereas having either dogs or crows may be a nuisance, having both has been observed to be disproportionately adverse to chick survival once they leave the exclosures.

The Junior Lifeguards program continues to set up large gatherings of kids and vehicles at the wrackline near the dunes, which is high-quality WSP foraging areas, for 5 hours per day for 2 four-week sessions each summer. This effectively blocks access to wrack resources during the days of accelerated human activity.

CONCLUSIONS

WSP nest attempts on Hollywood Beach this year were above the average (seven) based on the history of data gathered but the exact number was obscured by egg movement after winds and several were likely re-nest attempts. Depredation by crows, weather events (wind, heat), and unexplained abandonment were responsible for the majority of reduced WSP breeding success this year. These were exacerbated by the post-dredging configuration of the beach causing unsuitable nest placement. WSP nest locations continue to

expand from in front of the remnant dunes out to sparsely vegetated flat areas of beach. This area lacks adequate cover or food resources for newly hatched chicks forcing parents to lead chicks back to the established dunes from 500 to over 2,600 feet away immediately after hatch. Hatching success dropped to record lows and chick survival was difficult to determine but likely low. Without individual banding, WSP fledging success cannot be verified. No CLTs established nests this year.

Winter population counts remain high and wrack amount landing on beach is fairly consistent with its function as a sand trap.

Human use of the beach remained popular and may even be growing. With essentially no dog regulation enforcement, it has become a frequent destination for dog walkers and during nesting, this continues to be a source of stress for incubating and brooding plovers.

It was new to see the prolonged effects of heat on adults, who often stood on objects to avoid being directly on hot sand, and on young chicks, two of which were assumed to die of exposure. Nest abandonment increased this year, hopefully not a trend. In recent years, when plovers experienced nest or chick loss, they seemed to leave this beach to likely re-nest elsewhere and the season ended prematurely. This year WSPs appeared to keep trying to re-nest on this beach without increased success. WSP beach fidelity seems strong despite failures. The preferred nesting sites seaward of the dunes may also be shrinking with not only increased amounts of sand moved during dredging years but with sea level rise as well.

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APPENDIX A

Table A-1. 2021 Hollywood Beach Western Snowy Plover Nesting Season Survey Data

Date	Total[1]	Fe-males	Males	Unk/ Hatch Years	Active Nests	No. of Eggs	Chicks Seen (age in days)	Potential Preda-tors	Notes [2]
05-Mar	15			15				CAFA13	No fresh wrack. Dredge has re-moved all beach in front of dunes.
12-Mar	35	5	7	23				CAFA6, AMCR6	No wrack.
19-Mar	24		8	16				CAFA3, AMCR3	No wrack, beach edge steep
26-Mar	15	5	5	5				CAFA4, AMCR1	Some new wrack near dunes, 3 apparent pairs
1-Apr	16	4	5	7				CAFA9, AMCR4	Two pairs observed, OPD traversing beach wrackline in ATV. Unaccompanied local pitbull on beach, seen before.
9-Apr	38	2	11	25				CAFA3, AMCR1	Large roosting number for this time of year. Little new wrack.
16-Apr	18	7	7	4				CAFA5	Little wrack. Kids on motorized wagons, horse manure.
17-Apr					1	3			Citizen found nest, no counts today just fenced, and exclosed nest. Female very close by.
19-Apr	16	6	6	4	1	3		CAFA2, AMCR1	Female very attentive to nest, even when I was close to check on it.
23-Apr	4	3	1		1	3		CAFA6, AMCR3	Female off HB01 for over an hour. Kite flying nearby. Another pair scraping – I fenced that area.
26-Apr	8	3	5		1	3		CAFA4, AMCR1	Still a group roosting at high tideline. A pair foraging near dunes, HB01 off nest, dogs playing nearby, didn't return.
30-Apr	4	4	1		2	4		CAFA7, AMCR1	New HB02 has dark female (seen last year). HB01 no adults or tracks. Potentially abandoned.
3-May	5	4	1		3	6		CAFA7, AMCR1	HB01 still no adult-POE 1E and assume abandoned. Expanded fencing around new scrapes and new HB03. 44 fence posts up as of today.
7-May	4	2	2		3	9		CAFA1, AMCR4, RTHA1	Crows mobbed RTHA across beach. OPD on ATV again. Another WSP pair scraping near HB01 likely abandoned. ACOE started rock revetement repair at south CIH jetty.
10-May	3	2	1		3	9		CAFA1	HB01 1E still POE.
14-May	2	2			2	6		CAFA3, AMCR3	16 LETE observed to land on beach at sand trap. Moto-glider caused 2 WSPs to leave nests with low flights. Called CALTips.
17-May								CAFA3	Window Survey.
19-May					3	9			New HB04, fenced and exclosed, no survey. Collected 1E and buried 2E from HB01 (abandoned). Moto-glider flew over nests twice.
21-May	4	4			3	9			Too windy to survey, repaired fences. Females on all 3 nests.

Date	Total[1]	Fe-males	Males	Unk/ Hatch Years	Active Nests	No. of Eggs	Chicks Seen (age in days)	Potential Preda-tors	Notes [2]
24-May	5	4	1		3	8		CAFA5, AMCR2	New HB05 closest to dunes, 2E. HB03 1E visible and 2E unburied, no recent tracks. HB04 no eggs present or found under sand.
28-May	10	7	3		3	11		CAFA1	New nest HB06 adjacent to where HB04 was lost to wind. POE 1E from HB03.
31-May	3	3	0		4	13		CAFA6	New HB07, 1E. HB03 likely abandoned.
3-Jun	6	3	3		4	11		CAFA5	New HB08, 1E. HB02 3H, (3 pips). HB07 likely abandoned.
6-Jun					4				New HB09, no survey. Exclosed and fenced.
7-Jun	5	4	1		4	11		CAFA1, AMCR1	Found large pellet near HB09.
11-Jun	7	6	1		4	11		CAFA7	Wind covered HB05 1E, I dug up. F returned to nest.
14-Jun	4	4	0		4	11		CAFA4	HB09 likely abandoned.
18-Jun	4	4	0		5	14		CAFA7, AMCR4	New HB10, 3E near where HB01 and HB03 failed.
21-Jun	6	5	1		4	14		CAFA3	Wrack mostly in sand trap area – far from nests.
25-Jun	11	7	3	1	4	14		CAFA7	M near HB05, close to hatch. Dog chased F from HB08. 2 kites near 08 and HB06 also.
27-Jun	8	3	2	1	4	12	2 (<1)	CAFA12	HB05 2C hatch, only F present, monitored them for over 4 hours but didn't make it to the dunes yet.
28-Jun					4	10	1 dead		No survey, chick and nest check. New HB11 (1E) +F near HB09. HB06 2H, 1E remained. Suspect predation - crow tracks near chick tracks. Dead C from HB05 3rd E found.
2-July	12	7	3	2	4	8	1 dead		Dead C from HB05. HB08 due to hatch. Male with 2 HYs from another beach observed.
3-July					4	12			No survey, nest check. HB08 F still on 2E. Added wood & kelp nearby.
5-July	18	2	1	13	3	10	2 (<1)	CAFA20, AMCR1	HB08 hatched 0.5-mi from dunes. I walked with M, F+2C to dunes, took 1.25 hr. A 4th E appeared in HB09, called it HB12.
9-July	39	2	1	35	2	9	1 (4)	CAFA10	Only time I saw a F on 4E HB12. HB11 suspect abandoned.
12-July	35	2	1	31	2	9	1 (7)	CAFA2	Now F on HB11, not on HB12.
16-July	42	1	1	39	2	6	1 (11)	CAFA5	HB10 hatched 3E, crow tracks all around exclosure, no chicks seen. F on HB11. Jr LG taking up prime sand trap beach wrack.
19-July	47		1	45	2	6	1 (14)	CAFA14	Neither HB11 or 12 have adults present.
23-July	46		1	44	2	6	1 (18)	CAFA5	Removed HB06 fence. POE 1 of 2E on HB11; HB12 still has POE.
24-July							1 (19)		Not a complete survey – gave Alecia a tour.
26-July					3?	7			Removed HB07- 08 fence. Found new nest HB13, 1E; likely not active, no plovers seen in weeks. Not a complete survey due to rain.

Date	Total[1]	Fe-males	Males	Unk/ Hatch Years	Active Nests	No. of Eggs	Chicks Seen (age in days)	Potential Preda-tors	Notes [2]
30-July	44		2	42	3?	7		CAFA4, AMCR3	No adults seen at 3 nests.
1-Aug	53	1		52	3? +1	10			New nest HB14 with F on 3E.
6-Aug	56	1		55	1	4		CAFA5	Collected 2E from HB11 and 4E from HB12.
9-Aug	19	1		15	0	0	3 (1)	CAFA6	Last nest HB14 hatched 3C, only one adult was pale, presumed F. Was also not know-ledgeable about chick safety at tideline (many people and dogs there).
13-Aug	10	1		8	0	0	1 (5)	CAFA4	
16-Aug	69	1		67	0	0	1 (8)	CAFA8	One dog chased F with C, she diverted and reunited with C. Didn't see them again.
23-Aug	56			56	0	0		CAFA13	Many shorebirds arriving to forage in good wrack coming onto beach.
27-Aug	63			63	0	0		CAFA3	Good wrack at sandtrap and many shorebirds.
3-Sept	67			67	0	0		CAFA4	
10-Sept	34			34	0	0		CAFA3	Sand-moving near typical roost site may have reduced numbers.
17-Sept	30			30	0	0		CAFA7	Sand-moving near typical roost site may have reduced numbers.
24-Sept	52			52	0	0		CAFA2	

Notes: [1] Not a daily count, observations during a typical 2-hour survey. CAFA = *Canis familiaris* (domestic dog), AMCR = American crow. [2] Abbreviations: C = chick, E = egg, H = hatch, inc. = incubating, M = male, F = female, HB## = nest number.

APPENDIX B: Issues and Recommendations

1. Resident Crow Depredation

Issue: Corvids are considered a human-subsidized native species and are increasing where people leave trash and feed birds. Crow depredation of least tern eggs and of newly hatched snowy plover chicks, as well as flushing adults off nests and chasing have been observed on this beach.

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

Crow near active nest in exclosure

2. Unenforced Dog Regulations

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, adults to leave nests and to use energy to distract, separation of broods from adults, and perhaps nest/chick abandonment or losses. Monitors observed two incidences in 2016 of newly hatched WSP chick broods separated from adults by off-leash dogs.

Solutions: The agency responsible for enforcement is Ventura County Animal Control. If they could perform 1 or 2 visits per week, talk to dog owners and perhaps give citations, it would decrease scofflaws and at a minimum get leashes used more consistently. Perhaps the hours allowed for on-leash dogs could be adjusted/increased if 100 percent leash use was obtained and enforced, especially during non-breeding season.

3. Vehicle Access

Issue: Illegal and uninformed authorized vehicle access onto the sand by golf carts, ATVs, and full-sized vehicles through openings off Ocean Street is especially dangerous during nesting season, threatening unfenced nests, flightless chicks, and all beach roosting birds, especially after dark when some joy-riding is suspected.

Solutions: 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, which would at least clarify the rules. There seems to be confusion about who enforces illegal access. Ventura Audubon Society provided HD with a training video to enhance their knowledge of potential vehicle effects to nesting birds.

Some of 13 access points between houses off Ocean Street.

Missed nest

4. Nesting Habitat Loss due to Dredging and Nonnative Plant Spread

Issue: During bi-annual dredging years, suitable nesting beach habitat is lost. In addition, nonnative beachgrass is present and spreading in dunes, causing them to grow taller. Birds avoid thick vegetation and high dunes for nesting so grass spread is further reducing suitable nest locations.

Partial Solutions: In my role with the Ventura County Resource Conservation District, I submitted a grant proposal to CDFW Environmental Enhancement Fund for the nonnative plant removal and dune reshaping project for this beach. Our project lost out on funding in 2021 by less than 1 point and we were encouraged to reapply in January 2022, which I plan to do. It is primarily to stop the spread of beachgrass (*Ammophila* sp.) and iceplant and to restore unnaturally tall dunes to normal heights. This may increase suitable nesting habitat for plovers, especially in post-dredge years so they don't have to nest so far from cover and food resources.

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

5. 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 and survival of unknown nests and flightless chicks outside fences and can bury essential natural constituents (e.g., vegetation and driftwood) effectively eliminating cover and invertebrate (food) sources for WSPs. This is becoming more important as WSPs move their nests into open beach.

Partial Solutions: Ventura County included more ordinances in the 2018 LCP update to designate ESHA buffers around dunes and limit sand moving during the WSP nesting season (March-Sept 15th). There was some discussion about allowing natural spread of native plants and dune growth to occur to the north of the dune field, which should expand suitable habitat for summer and winter bird populations. At this time, that sand is regularly scraped (homeowner-funded). Monitors have not seen designated ESHA buffers enforced. We do maintain a good relationship with the current regular tractor driver who has cooperated to call us and clear an area before sand moving, sometimes skipping those areas close to nests. Other operators may not be so careful.

(Left) Private sand-moving tractor; (right) after sand moving (background), WSPs using remaining wrack in foreground

6. Harbor Department Beach Grooming

Issue: Winter sand grooming by Ventura County removes vegetation, driftwood, wrack and essential natural constituents that provides cover and primary food supply for over-wintering and migratory WSPs that occupy the entire beach often numbering over 100 during the non-breeding season. Vegetation and beach debris are also the catalysts for new dune formation that is prevented where grooming removes them.

Partial Solutions: Grooming is not done before October or after March and operators are leaving some fresh wrack at the high tideline. Grooming less beach area near the dunes has allowed more of the native plants to grow and wrack to remain, which has benefited WSPs and other over-wintering shorebirds. Allowing new dune formation could actually trap more windblown sand before it reaches the homes and streets.

7. Homeowner and Visitor Education

Issue: Some of the public are not attuned to the idea of sharing the shore with wildlife including sensitive nesting birds, native vegetation, natural debris, or dunes as habitat. Some of the local homeowners don't realize that most of the beach is County Open Space land, that two bird species have federal protection, and that their activities can cause stress and reduced reproductive success.

Partial Solutions: Ventura Audubon held a "Beaches as Habitat" public informational meeting in 2016 nearby. Continued seasonal educational sign use. Volunteer VAS naturalists' presence during nesting season helps answer questions and explain disturbances, especially to dog owners. Additional outreach by County and HD would help educate residents on these and other (e.g., sea level rise) issues.

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

Issue: Helicopters, low-flying and loud aerial hobbyists near the nesting colony cause distress of incubating birds exhibited by adults leaving the nest. Nesting birds perceive these as predatory threats. Least terns may actually dive at the object and hurt themselves, pilots, or aircraft.

Partial Solution: The USFWS has sent a memo with map to local airports reminding pilots to fly above 500 feet in nest areas during the nesting season. Letter may need to be resent every year and to U.S. Coast Guard facility at NBVC.

Motorized paraglider and ultralight observed over Hollywood Beach

9. July 4th Celebration and Illegal Fireworks

Issue: City-sponsored July 4th festivities draw huge crowds, loud noises, and lights of fireworks audible/visible from nesting area that disturbs breeding birds at a high chick presence time of the season. Also, private (illegal) fireworks launched into dunes endanger birds and nests.

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

Illegal fireworks found on Hollywood Beach