Western Snowy Plover and California Least Tern Nesting Outcome Season Summary 2022 Ormond Beach, California

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Introduction

The abundance and productivity of the western snowy plover (WSP) (*Charadrius nivosus nivosus*) and the California least tern (CLT) (*Sternula antillarum browni*) was monitored at Ormond Beach in Oxnard, Ventura County, California from March 15, 2022 to August 23, 2022. The pacific coast population of WSP was federally listed as threatened under the ESA on March 5, 1993 (Federal Register 1993). The California least tern subspecies was listed as an endangered species under the Federal Register in 1970 (USFWS 1985) and as endangered by the state of California in 1980 (USFWS 1985). Nesting of both species has been documented at Ormond Beach since the 1970's, and these species have likely nested at Ormond Beach historically. Nest locations and outcomes have been reported in detail since 2003. The 2022 data completes 20 years of continuously collected nesting outcomes and nest locations. Ormond Beach is uniquely located at the urban/agricultural/wetland interface of Ventura County. It is part of a Globally Important Bird Area, has been designated WSP critical habitat by the USFWS and an Environmentally Sensitive Habitat Area (ESHA) by the Ventura County Local Coastal Plan.

Executive Summary

Western Snowy Plover

A total of 56 WSP nests were located; of those, 32 hatched (57%), 23 failed (41%) and 1 nest had an unknown outcome. Of the 23 failed nests, 15 failed because of a predator (65.2% of failed nests), 5 were abandoned (21.7%), 1 nest was lost due to take by a human (4.3%), one nest failed due to non-viable eggs (4.3%) and 1 nest failed for unknown reasons (4.3%). The number of breeding WSP was 39 during the last days of May. We sighted a minimum of 17 WSP fledglings confirmed to be from Ormond Beach nests.

Table 1. WSP 2022 Season Summary

First Nest Initiation	March 15
First Hatch	April 20
Period of Peak Nesting	May 30- June 1
Last Nest Initiation	July 5
Last Hatch	July 28

Table 2. WSP Nesting Outcome; Comparison of 2022 and 2021

Year	# Nests	Nest Outcome			Breeding Adults	Fledglings	Hatch Rate
		Hatch	Fail	Unknown			
2022	56	32	23	1	39	17	57 %

Threats to WSP Nesting Success: Predators, in all cases corvids (both ravens and crows), were the greatest cause of nest loss. Ravens also harassed nests fitted with predator exclosures and

were likely responsible for most nest abandonments. The greatest number of breeding adults occurred in late May, and just after reaching this peak, corvid predated most active nests in early June. Breeding numbers did not recover the remainder of the season.

Human disturbance was the other significant issue. One nest was directly lost due to a human encampment and in the north habitat the fenced nesting habitat was disturbed on a regular basis by humans crossing through the nesting area. Fences were vandalized weekly, rope used for fencing was cut and stolen, predator exclosures moved, and monitoring supplies, in particular trail cameras, were stolen from the field. Off highway vehicles were a threat, motorcycles illegally entered the beach, rode at high speeds at the tideline and entered the nesting habitat to ride in the dunes.

California Least Terns

Least terns first appeared on the south end of Ormond Beach on May 3, and on the north end on May 12. Nesting occurred in 2 colonies, one at the north end of the beach by Ormond Lagoon and one at the south end near the Pt Mugu fence line. The last CLT were seen on July 29 in the south and on August 9 in the north. A total of 34 CLT nests were found between the two colonies, south habitat (2 nests) and north habitat (32 nests). Overall, 7 nests hatched, 23 failed and 2 had unknown outcomes. Depredation accounted for 21 of the failed nests (84%) and 4 nests were abandoned (16%).

North Habitat: 23 nests failed (72%), 7 hatched (22%) and 2 had unknown outcomes. Of the failed nests, 19 were depredated by corvids (6 by American crows and 13 by common ravens and 4 late season nests were abandoned (17%). Between 6 and 10 chicks fledged from the north colony.

South habitat: Both nests were depredated by common ravens before hatching.

Table 3. CLT 2022 Season Summary

	North Colony	**South Colony**
Number nests:	32	2
First Nest Initiation:	May 23	June 7
First Hatch:	June 22	No nests hatched
Last Hatch:	July 19	
Number fledgling:	6-10	0

Table 4. CLT Nesting Outcome; North and South Colonies

		Nest Outcome			
Colony Location	**# Nests**	**Succeed**	**Fail**	**Unknown**	**Fledglings**
North	32	7	23	2	6 to 10
South	2	0	2	0	0
Total	**34**	**7**	**25**	**2**	**6-10**

Threats to CLT Nesting Success: Corvids and nest abandonment were responsible for all nests losses. American crows were present through early June and targeted nests, then common ravens depredated nests for the remainder of the season. The same human disturbances that impacted WSP also threatened CLT nesting success; walkers and people pushing bikes regularly

crossing through the middle of the nesting area, motorcycles and other off roaders, off leash dogs which were even brought through the fences into the nesting areas. Even if nests were not directly taken, human activity caused disturbances to adult CLT tending and attempting to establish nests and was responsible for attracting predators to the area.

Funding Status

Funding for the 2022 season was provided by a CDFW administered USFWS Section 6 grant, Ventura Audubon Society Raise the Roost fundraiser, materials donated by the Ventura office of USFWS and the Port of Hueneme. The Section 6 grant funded all monitoring efforts for Ormond Beach for 3 years, from 2020-2022. As of the writing of this report, funding for monitoring at Ormond Beach is uncertain for the 2023 nesting season.

Site Description

Ormond Beach is owned by three landowners that jointly manage the property with a Memorandum of Understanding (Figure 1). The landowners are the California State Coastal Conservancy (SCC), the Nature Conservancy (TNC), and the City of Oxnard (the City).

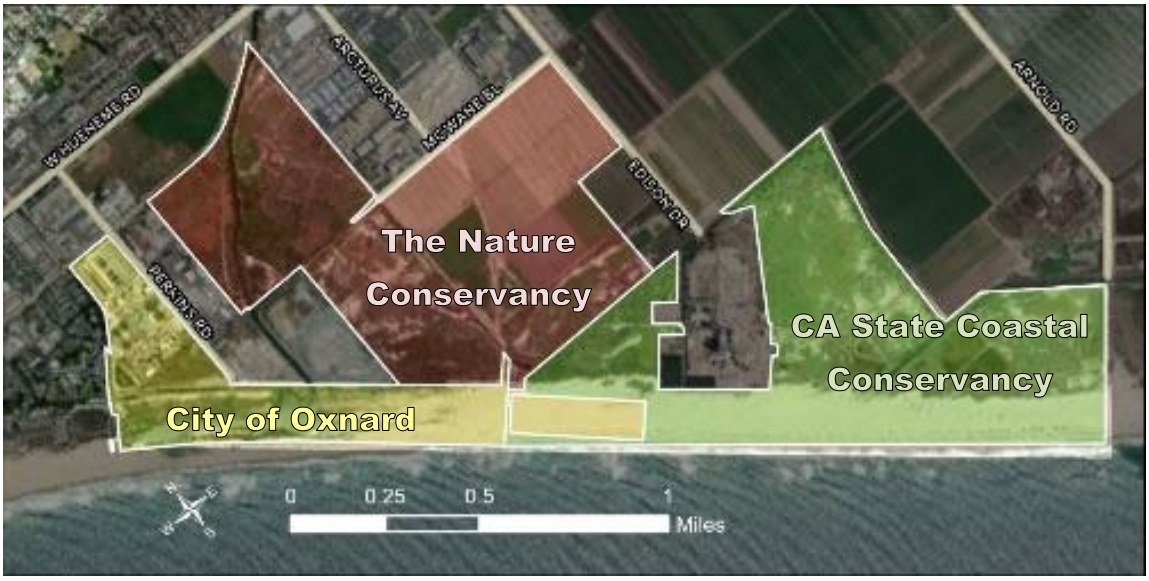


Figure 1. Ormond Beach landowners

Survey Area

The survey area encompasses 200 acres along 2 miles of coast. WSP and CLT nest in the sandy dunes along the entire length of the property, WSP also nest in the salt panne inland on the southern end. The area inland from the beach is zoned for agricultural or industrial land use.

Public Access: There are just 2 public access points 2 miles apart, at the far north and south ends of the beach. The north public access is via Hueneme Beach in the city of Port Hueneme (Hueneme Beach). The southern public access is via Arnold Rd which has a public parking lot for about 30 vehicles adjacent to the Point Mugu fence. There are other ways to access the beach, but these are on private property not open to the public. These access points are used illegally by trespassers.

Important Features: The Ormond Lagoon is just inside the northern boundary of Ormond Beach and it is used by breeding and migrating birds. The furthest north nests are found between the lagoon and the ocean. Moving south and just inland from the lagoon area is the former Halaco property. It was a metal smelting operation from 1965 to 2004 and was designated an EPA superfund site in 2007. More recently it is the site of illegal encampments. Further south there is fallow upland habitat owned by TNC, then a working power plant owned by Genon Energy. The southern end of the property has an inland salt panne used for nesting by WSP. Adjacent to this is a small property owned by a private hunting preserve, the Ventura County Game Preserve. Adjacent and inland from this is a yard waste composting operation owned and operated by Agromin Industries. The Ormond Beach southern boundary is a fence at the Naval Base Ventura County Pt. Mugu.

Figure 2. Ormond Survey Area

Habitat Protection

Fences demarcate nesting areas and significantly reduce disturbance to nesting birds and trampling of nests and chicks. Nesting areas are protected with the following fence types:

Mesh

The primary material used is black mesh Cintoflex-C fencing attached to metal T-posts. The mesh fencing has openings that are 1.75" square through which birds and small animals can easily move through, including WSP adults, WSP chicks and CLT chicks. The T-posts are placed every 10-20'. The fence is intended as a visual and physical demarcation of the nesting area, rather than a predator or human exclusion fence. It provides a physical barrier that is challenging, although not impossible, for humans to cross. It presents a significant barrier to dogs and is the fencing of choice in areas where beach goers disregard leash laws and let dogs off-leash. The bottom of the fencing is not buried, so natural openings occur. Sea mammals including sea lions and elephant seals can role under these fences. See Figure 3A below.

Symbolic

Steel anchor rod posts strung with cable wire or rope. This is strictly a visual fence, as it presents no physical barrier to animals and humans can easily step over or under it. This type

of fence is used as part of the annual fences in low areas that regularly have tidal over wash or where the dunes are growing and shifting. Figure 3B below.

Nest

This type of fencing is put up on an as-needed basis when nests are established outside of the annual fences. Fences are constructed of PVC posts strung with string. This material is light weight and can be carried by a few people long distances on the beach. It is inexpensive, easy to assemble and durable in the beach environment. We have found it to be effective as effective at protecting nests as symbolic post and cable fences. Figure 3C below.

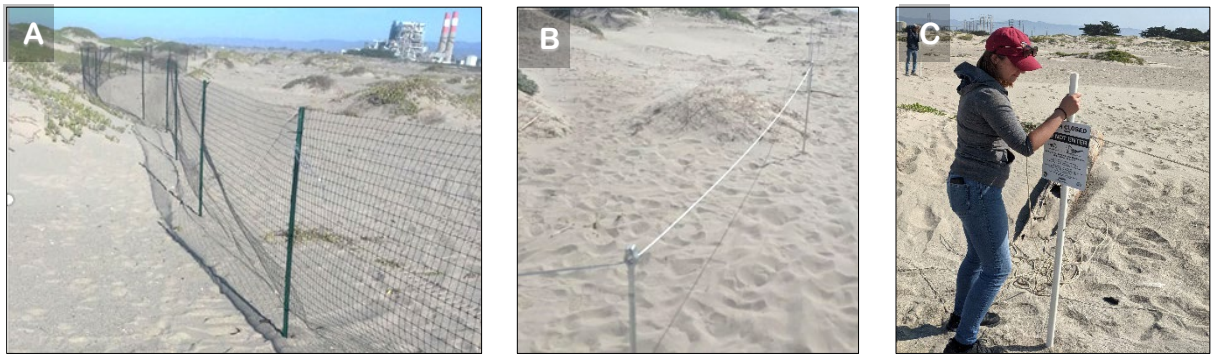


Figure 3. Types of fencing used on Ormond Beach to protect nesting areas or nests established outside protected habitat areas. Panel A - Mesh Fencing; Panel B - Symbolic Fencing; Panel C – PVC Nest Fencing

Fall Removal of Tideline Fence: Tideline fences are removed in fall and replaced in late winter. This entails pulling posts, rolling up the mesh and storing approximately 1.4 miles of fence. Just before nesting season in February the fencing is installed above the high tideline with a combination of salvaged fencing that was stored over the winter, or new fencing that replaced unsalvageable materials. Volunteers repair fences at the sides or back of the habitats. Fence lines were adjusted pre-nesting season based on changes to nesting patterns.

Methods

Population Abundance

The beach was surveyed by two biologists at the same time working in different areas of Ormond Beach, and another team walked the tideline to count adults and look for chicks. In some cases, the entire beach was not surveyed on the same day. When this occurred, surveys were conducted on subsequent days when possible. A total of 47 surveys were conducted over a 25-week period from March 15 through August 23. Monitoring for nests and population counts in the dunes was conducted by walking wandering transects, the tideline was walked at the top of the wrack line the entire length of Ormond Beach. Observed WSP were recorded by age and gender. Numbers of CLT adults and juveniles were recorded each time the colony was visited and entered in the CLTE Data Reporting spreadsheet provided by CDFW for data tracking. Chicks were aged according to Aging Classification Chart included in the spreadsheet package. The entire beach was surveyed a minimum of once per week for both species.

Banded Birds

During weekly surveys WSP were examined for leg bands through binoculars. Field cameras watching nests also captured band combinations of nesting birds. All band combinations seen on WSPs were reported to the "SNPL Band Reporting Band sighting" list serve. CLTs were also monitored for bands and/or transmitters. The legs of any carcasses found were also examined for the bands. Banded CLT were reported to the North American Bird Banding Program and to CDFW.

Trail Cameras

Camera traps were used to remotely monitor the nesting area to document the presence of predators, predation events, nest hatching and human disturbance. Several camera models were used: 1) Browning Defender 940 (model# BTC-10D), 2) Meidase SL122, 3) Campark T45, 4.) Campark T100 and 5.) Ezetai E2. All cameras had "no-glo" nighttime infrared emitters and detectors, triggered by motion activation and recorded either a photo and/or a 10-20 second video. Cameras were placed on the ground approximately 10-30 feet from nests. SD cards were switched out on a weekly basis.

To minimize the risk of theft, camera bodies and cases were camouflaged using "stone creations bleached stone" spray paint, which coated the cameras in a sand-colored heavy texture paint that blended with beach environment. Cameras were anchored into the sand with 15" earth auger rods that could be drilled into the ground when it could be done without disrupting the area around the nest, and when the substrate allowed. A padlock secured the camera to a metal loop at the top of the auger. Using indelible markers, the cameras were labeled with identifying information and VAS contact information. Camera software was programed with a password lock that is required in order to activate the cameras.

Trail cameras are used on WSP nests, but not on CLT nests. This was due to risk of theft and of risk calling attention to the CLT nests in the north fenced areas that CLT favor. This area had a high amount of trespassing and theft.

Nest Fate

When a nest was found, it was approached to collect GPS coordinates. The date found and number of eggs was recorded. For WSP, the sex of brooding adult WSP was noted. Because of the presence of ravens, when an adult WSP could be observed brooding a previously marked nest from a distance it was not approached. CLT nests were marked with a numbered <6" long piece of driftwood or other natural beach debris and placed no closer than 4 feet from the nest. WSP nests that had exclosures did not require markers. Those that did not have exclosures were marked by 6" to 1' pieces of beach wood or debris placed vertical or at an angle in small dunes on either side of the nest at a distance of at least 10' from the nest. If no adult was observed brooding from a distance, the nest was approached to check for the presence of eggs. Each nest was followed until hatching or failure. Once a nest no longer contained eggs, a 2-meter area around the nest was examined for eggshell fragments, egg yolk, tracks of birds or predators or any other disturbance. The nest scrape was examined for prints and shell fragments. Nest hatching was determined by locating a pip shell (1-4 mm) within the hatched nest, by observing displaying behaviors of adults, noting whether footprints in the nest were

from plovers/terns, or other animals, and locating chicks when possible (Mabee 1997). Any nest that had at least one egg was determined to have hatched and was categorized as successful.

If eggs remained in the nest for more than the expected gestation time after discovery (28 days for WSP, 21 days for CLT) and no adult was observed nearby it was tested for continued brooding by placing an egg on end and rechecking within 3-7 days to see if an adult was in attendance. If eggs remained in the same position and no fresh plover/tern footprints could be found in the nest, the nest was determined to have failed due to abandonment. Eggs that disappeared before the end of the full gestation period where determined to have failed if no signs of hatching were evident and signs of tracks from animals other than plovers/terns were at the nest site. Nests were determined to have unknown outcome if the eggs were gone after being brooded for the full gestation period but did not have any signs of hatching or depredation, and no chicks were seen in the nest vicinity.

Nest Initiation Date

Nest initiation dates were calculated for nests confirmed to have hatched by subtracting the expected gestation period for the species plus 2 days from the hatch date. This accounts for the time it takes a pair to start laying the first egg until clutch completion. Hatch dates for nests with a newly hatched chicks inside the nest scrape were the same day as the chick observation. If chicks were observed after they left the nest and could be associated with a given nest, hatch date was estimated based on the age of the chick. If a nest was determined to have hatched but no chicks were observed, hatch date was estimated to be 2 days following the last date of observed brooding for both WSP and CLT. If eggs were abandoned or depredated, the last day the nest was active was determined as the day of the last survey when an adult was observed brooding the nest, and nest initiation was estimated to be date the nest was discovered minus 2 days.

Breeding Adult Calculation

Western Snowy Plover: Total number of breeding adults for the season were calculated from the survey that yielded the highest number of breeding adults, derived by attributing a male and female pair to each active nest and 1 breeding male to each clutch with at least 1 chick. This method is essentially a window count for breeding adults and assumes that all the breeding adults recorded on the count are representative of the entire breeding population.

California Least Tern: Unlike WSP data which we track in detail on our internal spreadsheets, we submit a year end spreadsheet required by CDFW. Because the CLT is a listed as a California State Endangered species, CDFW is the lead agency and manages the data submitted by all nest site managers.

Chick and Fledgling Observations

Western Snowy Plover: Once a nest hatched, chicks were looked for each week and as much as possible tracked until fledging. Care was taken to document the same chick only once per week so chicks' survival could be followed until fledgling age. All chick sightings were recorded on an ArcGIS Pro field map built to document chick observations on Ormond Beach. Using a mobile device, the GPS location was recorded as close as possible to the location where chicks were

either directly observed or reported by volunteers. Each week all chick observation and the approximate age of the chicks was documented. Fledglings were determined to be from Ormond Beach if they had been observed regularly in the same area and were observed to be accompanied by a guarding adult prior to reaching fledge age. Hatch year chicks that did not meet these criteria were assumed to be from other beaches and were recorded separately.

California Least Tern: Nests were checked a minimum of once per week. Chicks were re-sighted and associated with nests as much as possible. If we confirmed that a nest had hatched from a distance and a chick was present or still being brooded by an adult, we avoided approaching the nest. The number of fledglings were calculated as per CDFW instructions by adding the daytime counts of fledglings every 3 weeks starting 2 weeks after the first fledglings were sighted (method 3WD from the CA Department of Fish and Wildlife report spreadsheet).

Nest and Habitat Protection

Fences

As described in the previous Habitat Protection section, different types of fencing was used. See Table 5 below for detailed fence statistics. See Figure 4 for the fence map . The specific locations protected with fencing include:

- South Habitat and Salt Panne: On the south end of the beach, 1.5 miles of mesh fencing encloses 78 acres. This fence also encloses the salt panne which is just inland of the south habitat dune area.
- Middle Habitat: Southeast of the power plant, 0.5 mile of fencing encloses 8 acres.
- Power Plant Habitat: Just northwest of the power plant, 0.3 mile of fencing encloses 3.5 acres. In both the Middle and Power Plant habitats, the fencing facing the ocean is composed of post and cable symbolic fence while the sides and back are mesh
- North Habitat: On the north end of Ormond Beach, 1 mile of mesh fence encloses 25 acres. Part of the tideline side is symbolic fencing. The rest is T-post and mesh.
- Lagoon: In 2022, 1,000 feet of steel rod and cable was installed, extending from the end of the north habitat fence toward the south end of the lagoon. This fence protects foraging and resting birds, and the clutches of WSP and CLT that gravitate to this area. More fencing was added during the season because nesting occurred there as well.

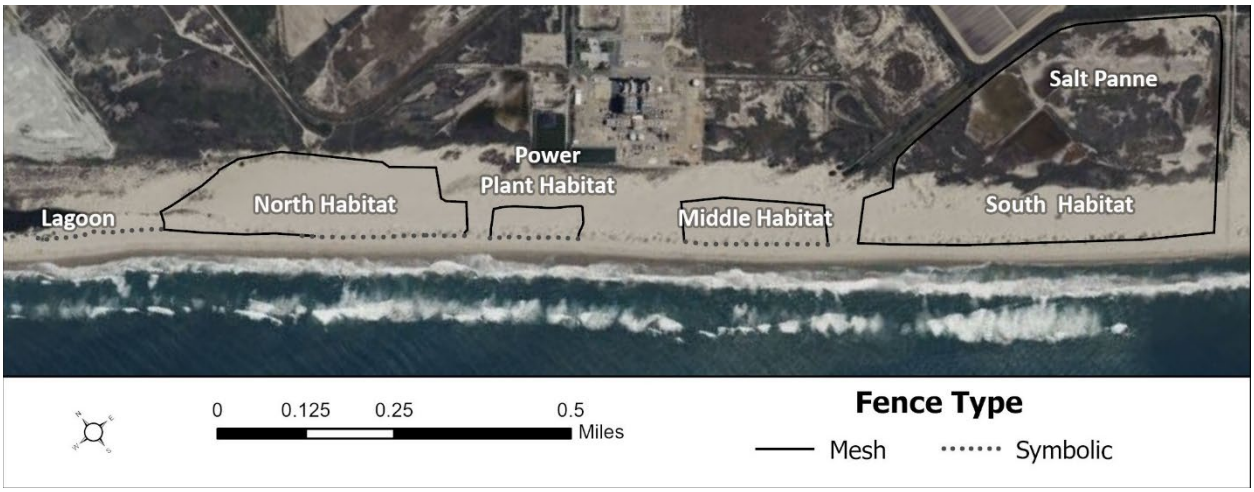


Figure 4. Annual fencing during the 2022 nesting season

Table 5. Fence statistics in 2022

Ormond Beach Fenced Areas	Area (acres)	Perimeter (ft)	Perimeter (miles)
Lagoon	n/a	1,000	0.2
North	25	2,500	1
Power Plant	3.5	4,000	0.3
Middle	8	732	0.5
South/Salt Panne	78	7,800	1.5
Total	**115**	**16,032**	**3.5**

Signs

We use several sign designs to inform the public about nesting birds and the ordinance provisions. Signs were fabricated in metal with anti-graffiti coating and holes predrilled to allow attachment of signs to fence posts with either cable ties or in places where theft was a problem, with metal screws and Loctite. We affix signs to the metal posts around the perimeter of the fenced areas and at the main entrances to the beach, both the public and the unlawful entry ways. See Figure 5 for sign images.

A. Children's "Share the Shore" are signs were created by school children as part of an Explore the Coast grant in 2017, and at previous VAS Share the Shore programs over the past 10 years. Elementary school children created these signs after a classroom presentation and a field trip to either Hollywood or Ormond Beaches.

B. Enforcement "Do Not Enter" signs list Federal, state and municipal codes that protect nesting endangered birds and the penalties for entering nesting areas. These signs were fabricated in both English and Spanish. Signs also list seasonal closure dates for the nesting season.

C. Educational signs focus on the protection of birds and appeal to beach visitors to help nesting WSP and CLT.

D. We designed and printed metal “No Dog” signs to have an educational component. No Dog signs have been the most frequently stolen signs and we tried to make them “friendlier”. These signs were posted regularly on the tideline to assist police with the enforcement of the no dog rule at Ormond Beach. Dog owners typically claim not to know about the dog ban and our intention was by posting signs along the fence they would have better exposure.

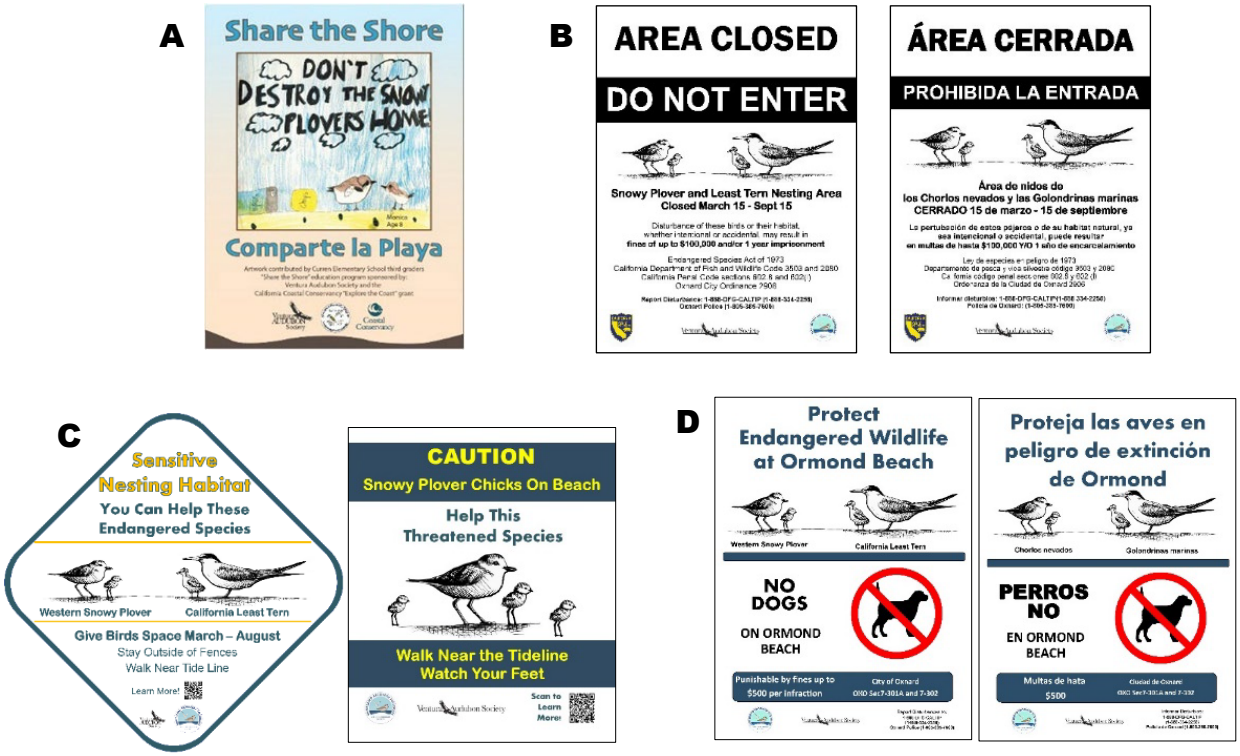


Figure 5. Sign Designs Used in 2022

Mini Exclosures (ME)

Both a 2’X2’ and a 3’X3’ square wire mesh cage design is used on WSP nests, but never on CLT nests. ME’s are made of galvanized coated wire with 2”X3” openings. A small sign is affixed to the exclosure to warn would-be vandals from moving or tampering with the exclosure. The exclosures are anchored to the ground with 6- inch landscape staples. ME’s are used when threats from predators are deemed to put nests at greater risk then if the nest is left unprotected. Placement of exclosures is conducted in less than 10 minutes, after which adults are observed from a distance to ensure they return to incubating nests. Trail camera data is carefully monitored to look for predators that target incubating adults WSP, or for humans that show up on video in closed nesting areas.

If predators are deemed a risk to adults the use of ME's is stopped. On Ormond Beach such predators include owls, coyote and loggerhead shrikes.

Habitat Assessment

Utilizing literature on analyzing WSP nesting and habitat characteristic for reference (Mabee 2000, Powell 2009, Riensche 2015, and Saalfeld 2012) a protocol was developed to gather micro habitat data for nesting WSP on Ormond Beach.

A 1-meter quadrant was centered over nest scrapes and a photograph was taken from a 1.5-meter height above the nest with the camera centered over the scrape. This was done as soon as possible after the nest hatched, or if possible while it was still active if it could be done without disturbing the nesting adults. This process could be completed at the nest site in less than 1 minute. For all nests, measuring vegetation height data was collected after the nest hatched because it was a more disruptive procedure. Utilizing Adobe Photoshop, the quadrant photo was divided into 400 equal squares yielding grid squares 2.5mm in size. Each square was reviewed and assigned a predominant cover type (>50% coverage). The ground cover types include Barren Ground, Vegetation, Woody Debris or Other. These cover types are further subdivided.

Barren Substrate was subcategorized into sand, rock and shell. Using a Munsell Soil Chart and Sand Grain size chart for reference, sand is categorized into fine grain (1/16 -1/4 mm) and coarse grain (1/2-2.0mm). Rock cover is subdivided into pebbles (< 8cm) or large rocks (> 8cm). Silt/clay is identified as fine substrate smaller than sand (< 1/16 mm). Barren substrate represents the total percent of area covered by all sand, silt/clay, shell and rock features.

Vegetation includes ten different plant species found around nests and control points. These include native plants : Beach Bur (*Ambrosia chamissonis*), Beach Primrose (*Camissonia cheiranthifolia*), Beach Morning Glory (*Calystegia soldanella*), Beach Saltbush (*Atriplex leucoph*), Pickle Weed (*Salicornia Pacifica*), Red Sand Verbena (*Abronia maritima*), Salt Grass (*Distichlis spicata*) and non-native and/or invasive plants: Cobweb Bush (*Plecostachys serpyllifolia*), Ice Plant (*Carpobrotus edulis*) and Sea Rocket (*Cakile maritima*). The maximum vegetation height is measured as well. The total vegetation cover represents the aggregate of all plants within the 1-meter nest area. Height represents the maximum vegetation height in the 1-meter square.
Woody Debris includes driftwood, *Arundo donax* or dried kelp.

Other includes metal, plastic or bone.

A color was assigned to each cover category, the number of squares added and used to calculate the percent cover. Contents of the actual nest were excluded due to the WSP behavior of bringing objects to line their nest scrape (pebbles, shells etc.) and thus significantly altering that part of the nest habitat.

Control points were generated in ArcGIS Pro and uploaded to a field map. The points were located with a mobile device and a photo is taken of the quadrant laid over the approximate area and analyzed using the same protocol used for nests.

Results

Western Snowy Plover

Adult Population Abundance

The number of adult WSP fluctuated between 24 and 65 individuals (Figure 6). During the spring window count on May 23, 2022 a total of 57 adult WSP were counted. The following week on May 31 it was 65, which was also the peak of breeding activity and the highest count of the season. The average population count over the entire season was 37±10. Following the highest count on May 31, ravens depredated most active WSP nests. There was a corresponding 50% drop in population to 30 adult WSP on the subsequent survey the week of June 7.

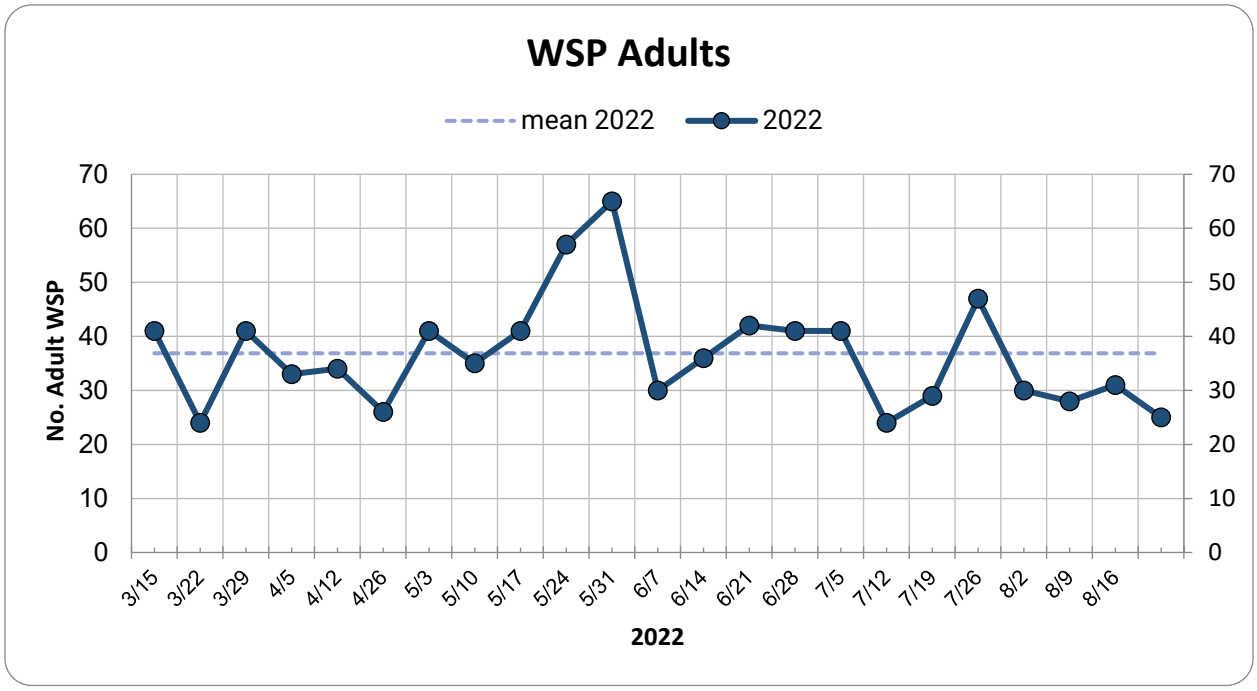


Figure 6. Weekly WSP adult population numbers

Banded WSP

A total of 7 banded WSP were sighted during the 2022 nesting season. Five of the birds nested on Ormond Beach, 3 had one nest and 2 re-nested after an initial nest success. Of the birds that had a single nest, two were depredated by ravens and one hatched. The other two birds were sighted foraging at the tideline and were never associated with a nest. See Table 5 for details.

Nesting birds came from Santa Barbara and San Diego Counties in California and Coos County in Oregon. One of the nesting birds was captive reared by the Santa Barbara Zoo and had been released at Coal Oil Point Preserve in 2021. One of the non-nesting birds came from Vandenberg and is a bird seen before at Ormond in 2016 and 2017. The other bird is of unknown origin.

Table 6. Banded birds sighted at Ormond Beach

Band Combo	Sex	Year Banded	Fledging Beach	Behavior/ Nests and Outcomes
O:yy	male	2018	Camp Pendleton	Nest OB22WSP21 hatched on 4/21/22
py:ga	female	2021	SB Zoo reared, released July 2021	Nest OB22WSP30 depredated by ravens
Op:wa	male	2021	Naval Base Coronado	Nest OB22WSP32 depredated by ravens
ns:ow	female	2019	Vandenberg, Surf North	Nests OB22-WSP02, OB22-WSP23 hatch: 4/25 and 6/10 The last nest had 1 nonviable egg
y/w:y	male	2020	New River Coos County, Oregon - hatched 6/11/2020	Nests OB22WSP07, OB22WSP28 1st nest hatched on 4/21; 2nd nest - all 3 eggs non-viable
ny:yg	male	*unknown*	*unknown*	Foraging south habitat tideline, one time 4/10/22
an:ny	male	2015	Vandenberg	Foraging and roosting north habitat tideline, in March and August

Breeding Adults

The USFWS recovery target for breeding WSP on Ormond Beach is 50 individuals. This year the estimated number of breeding WSP adults was 39, which occurred on May 30 (Figure 7). This was the survey with the highest number of calculated breeding birds derived from the combined number of nests and active clutches. On this date there were 15 active nests and 9 clutches on the beach. On the May 23 spring window count there were a total of 29 breeding adults (12 nests and 5 clutches of chicks).

Nest Chronology

The first nest was established on March 15, two weeks earlier than the first nest in 2021 (April 2, 2021). There were three waves of nesting, with one each in April, May and June. Each subsequent wave peaked at a lower number of nests (18, 15, 4, respectively). See Figure 7. The second wave of nesting occurred when there were a larger number of males with clutches on the beach. The sharp drop of nest numbers and breeding adults in June correspond to widespread nest depredation by ravens.

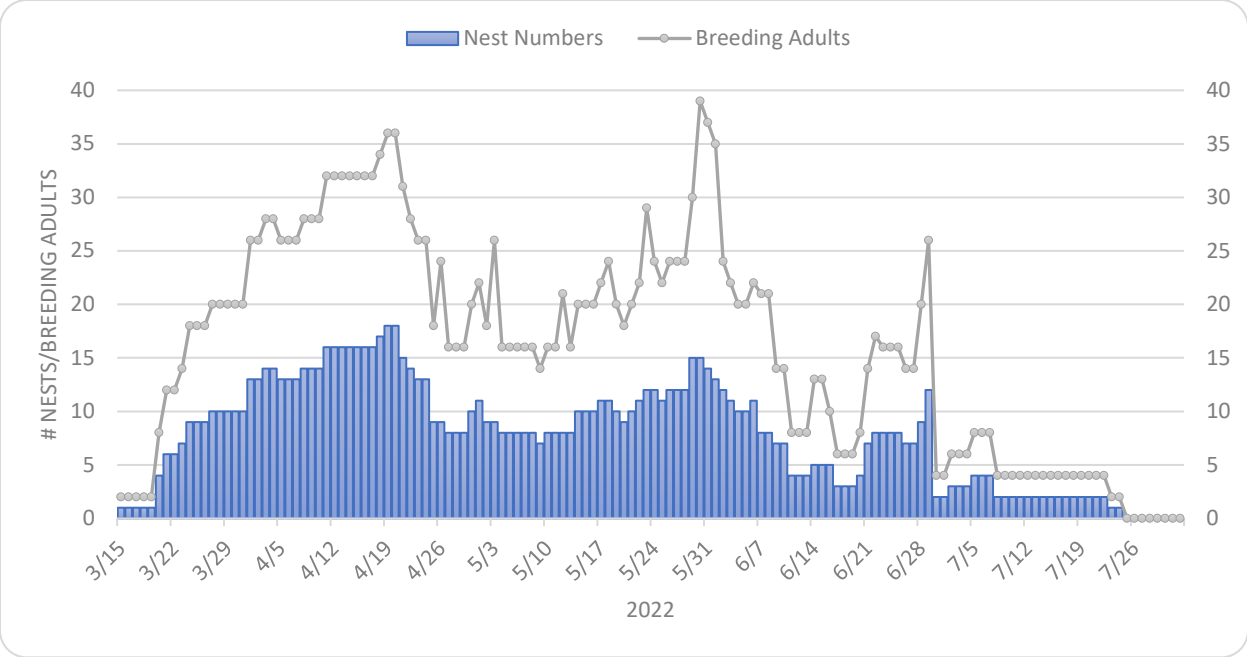


Figure 7. Breeding adults and nest number chronology during the 2022 nesting season

Nest Locations

Fifty-six nests were established along the entire length of Ormond Beach, from the Mugu fence to Ormond Lagoon. Nests were concentrated primarily in the north and south fences (19 and 14 nests, respectively). The remaining nests were distributed between the power plant, middle and salt panne fences (7, 9 and 5 nests). There were 2 additional nests by the south end of the lagoon (plus a CLT nest, therefore 3 nests total). See Table 5 and Figure 8 below.

Table 7. Distribution of WSP in the habitat areas of Ormond Beach

Habitat/Area	Lagoon	North	Power Plant	Middle	South	Salt Panne
No. Nests	2	19	6	10	14	5

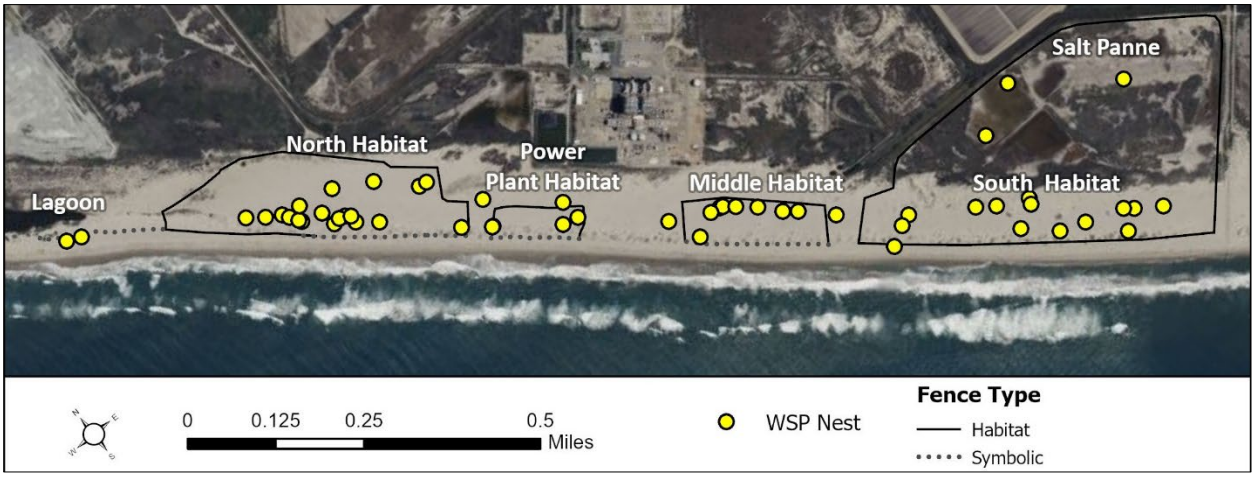


Figure 8. WSP nest locations on Ormond Beach

Undiscovered Nests: Two of the 5 salt panne nests were not found before they hatched, the actual locations were not known. The salt panne floods during annual winter rains and can be inaccessible in the early part of the nesting season, which happened again this year. Hatchlings from two nests were discovered as days old chicks guarded by males in the salt panne early in the season. No other nests were known to have had hatched in the south dunes where plover clutches could have come from. These nests are not displayed on the Figure 8 (map above).

Nest Fates

There were 56 nests in 2022; 32 hatched (57%), 23 failed (41 %) and 1 had an unknown outcome (2 %). See Figure 9 for a map of hatched and failed nests. There was no clear spatial pattern to explain nest losses.

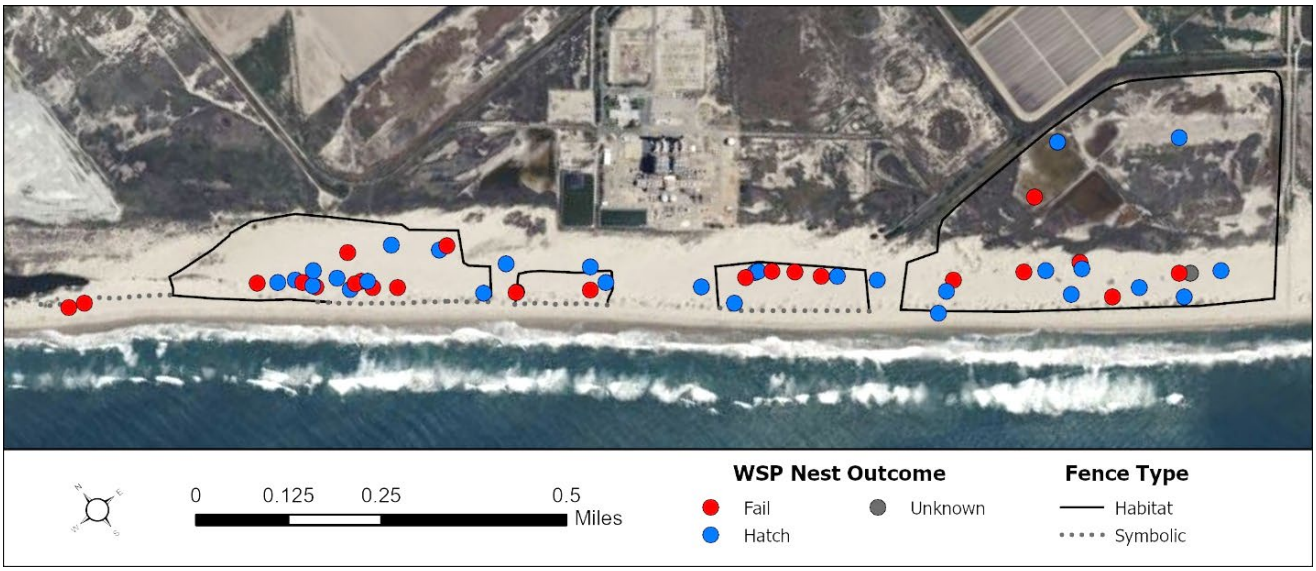
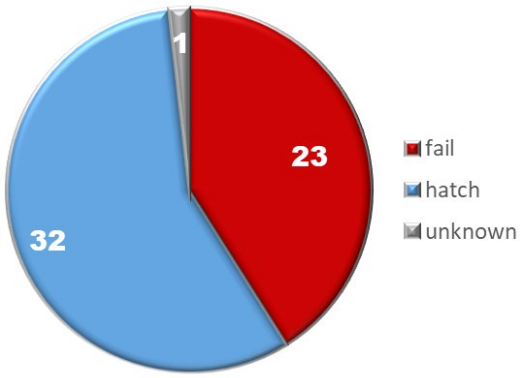


Figure 9. Map of WSP nest outcomes



Failed Nests

Out of the 23 failed nests, 15 were lost to depredation (65%). See Figure 10 chart and Figure 11 map. All predations were by corvids. Eleven of those nests are confirmed to have depredated by common ravens. The other 4 nests may have been lost to American crows. One nest each was lost to either human take (4%), non-viable eggs (4%, all 3 eggs) and one failed from unknown causes (4%). The nest with an unknown cause of failure was a salt panne nest and all

3 eggs disappeared in the night. There was a trail camera, but it was not triggered.

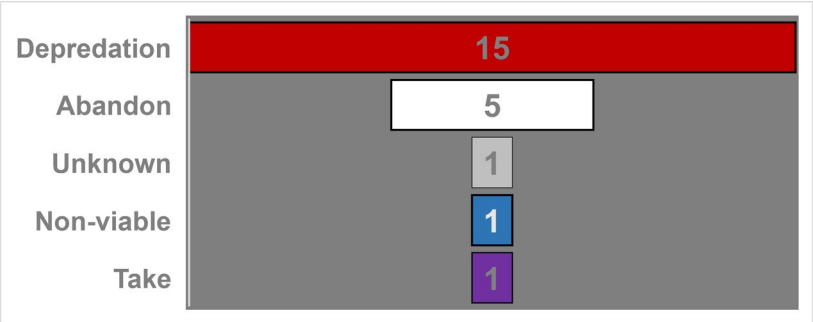


Figure 10. Chart of WSP nest losses

Corvids depredated nest in all areas of Ormond Beach. The 2 nest abandonments in the middle habitat were likely due to ravens harassing nests with predator exclosures. Cameras on these nests were triggered by a group of young ravens visiting the nests daily. One nest in the north habitat was buried during a wind event. The other 2 nests were also in the north habitat and did not have trail cameras due to risk of theft, but these also might have been due to harassment by corvids or by depredation of the adults.

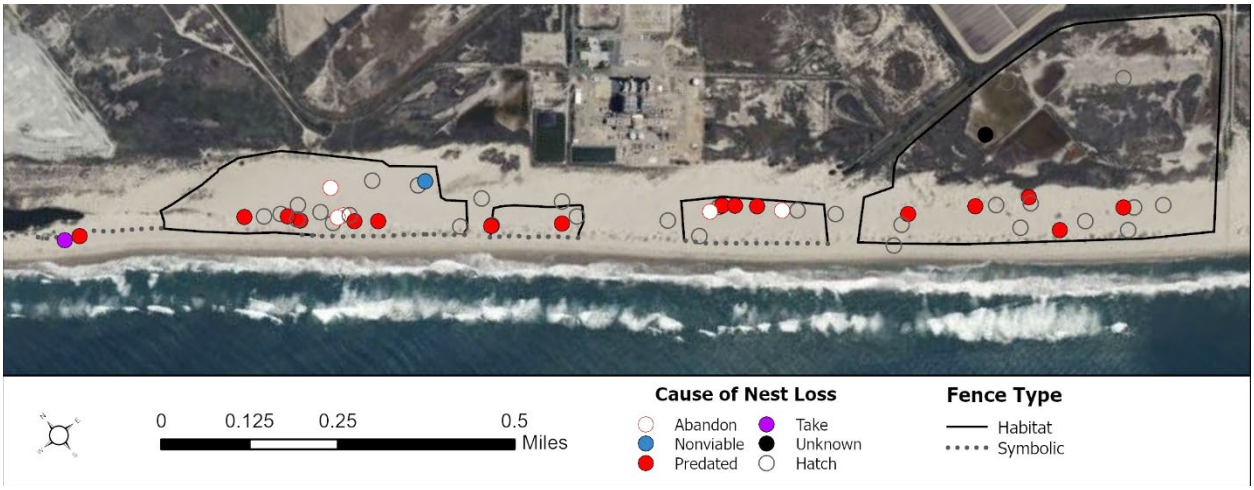


Figure 11. Map of WSP nest losses

A Gantt style plot below (Figure 12) shows ravens were not present on Ormond Beach before the end of May. No nests had ME's and during this time 18 nests hatched, 2 failed (1 take and one abandoned) and one had an unknown outcome. Up until this point ravens had not been observed on surveys, nor had they been seen near nests on trail cameras. But beginning on May 30th common ravens began targeting nests. By June 16 a total of 11 nests had been depredated. During this time and throughout the end of the nesting season ME's were used on new nests as ravens were present the remainder of the season. Nesting recovered marginally with a smaller third wave of nesting. With the use of ME's many of these late season nests hatched in July. Ravens learned to reach into the smaller ME's and succeeded in predating some nests, and they also predated other nests before they could be protected. Several nests were abandoned at this time, likely because of harassment by ravens.

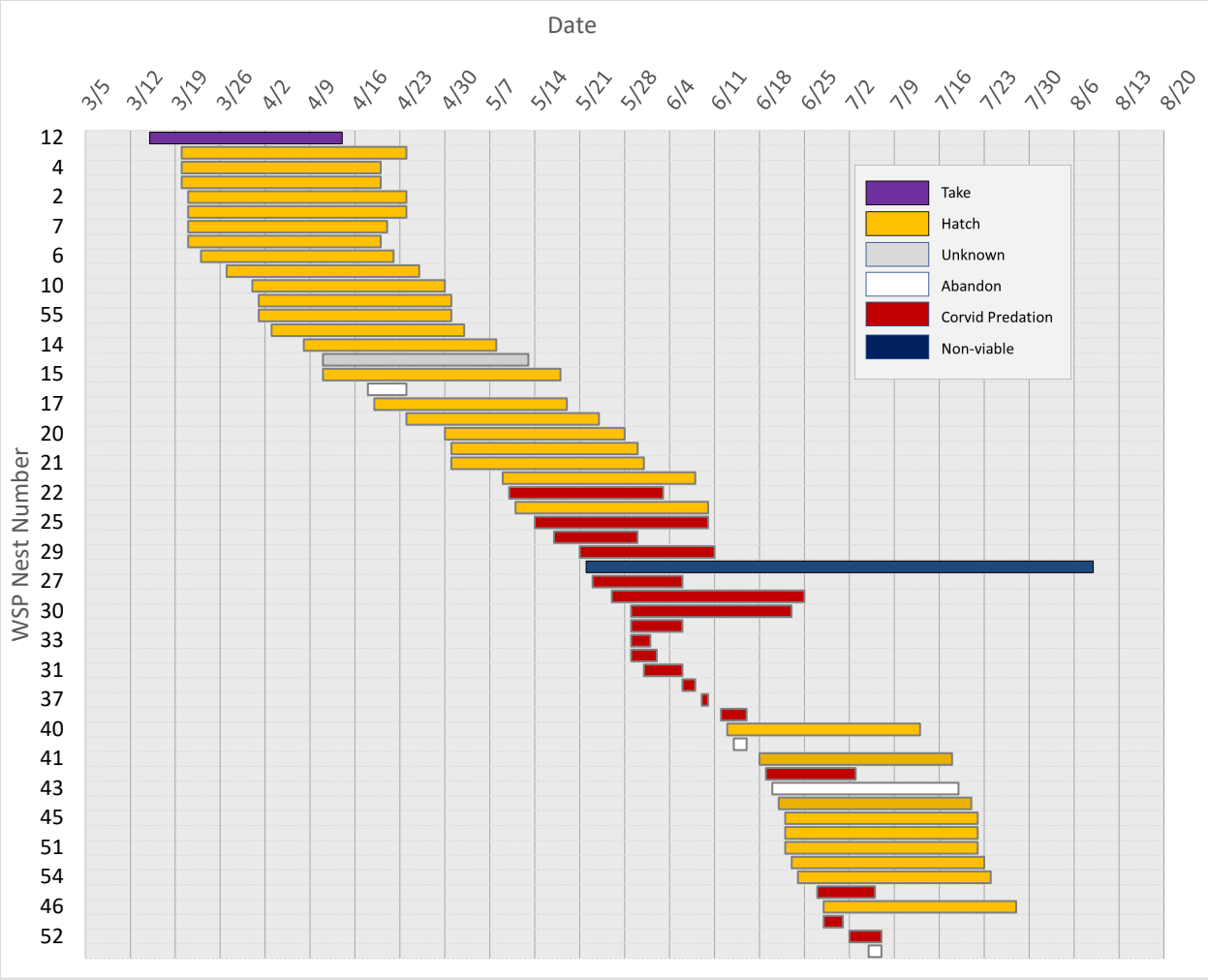


Figure 12. Gantt chart of WSP nest duration and outcomes

Human Take: Santa Barbara Zoo Reared WSP

The first nest of the season was established on March 15, 2022. Subsequently, a beach encampment was established 100 feet away from it, we discovered the encampment on April 5th. It was reported to Oxnard police who cleared the encampment a couple days later. In anticipation of the police activity and because fencing the nest put it at risk for retaliation, USFWS allowed the eggs to be transferred by the lead biologist (Hartley) to the Santa Barbara Zoo for captive rearing. The eggs hatched on April 14th and were released at Coal Oil Point Reserve on June 7th. The birds were banded with the color combinations:

- 2022.01 = py:ao (left leg pink over yellow, right leg aqua over orange)
- 2022.02 = py:ay (left leg pink over yellow, right leg aqua over yellow)
- 2022.03 = py:yw (left leg pink over yellow, right leg yellow over white)

The summer following the release py:ao was seen regularly at COPR. py:ay was reported at Bolsa Chick Ecological Reserve (BCER), Camp Pendelton and COPR. py:yw has been reported at BCER (6/29/22), McGrath State Beach and San Buenaventura State Beach.

Chick and Fledgling Observation

Chicks were sighted inside fences near nests normally within the first few days of hatching. The exception to this is nests that hatched in the salt panne. Ponds remain in the salt panne most of the summer and chicks stayed at the pond edges until they reached fledgling age. The south end of the lagoon also attracted clutches and chicks of all ages through fledgling were sighted in this area. Chicks also were seen foraging near the high tideline. See Figure 13 below for a map of chick locations. As chicks age they had heavy attrition. Forty-five chicks were seen within 1-week of hatching on weekly surveys. This number dropped each week of age and just twelve 4-week-old chicks were sighted on the same surveys. This is a 75% loss of WSP chicks. After 4 weeks of age the chicks can fly on their own and are considered fledglings. Their father will often stay with them, but they are considered independent. We record them as "5 week" of age at this point.

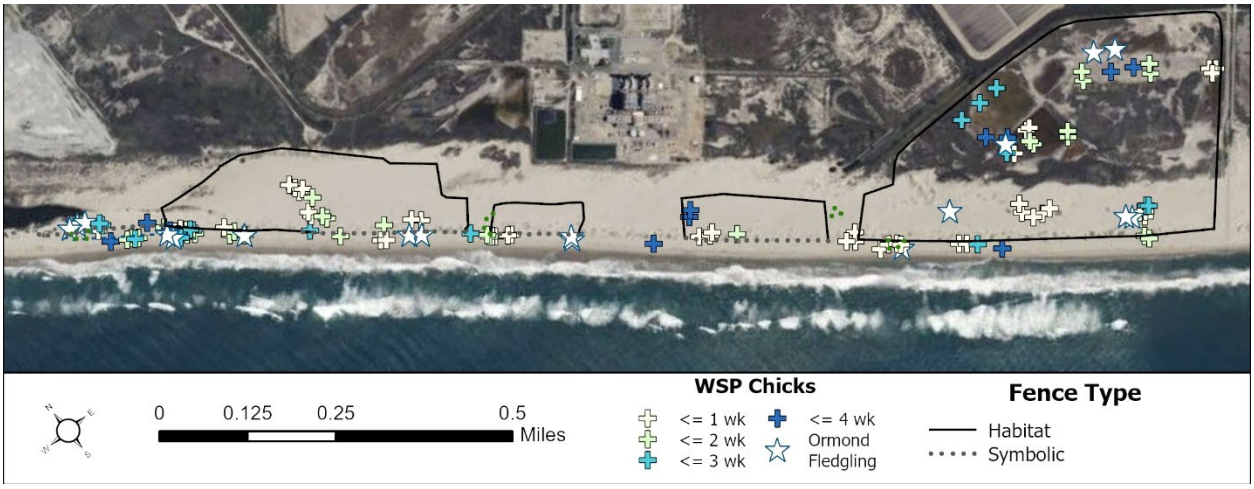
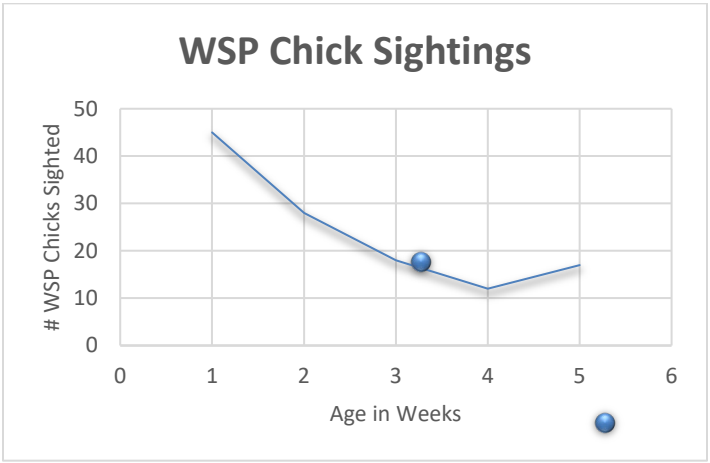


Figure 13. WSP chick sightings during weekly surveys



Habitat Assessment

Following is the result of our habitat assessments:

Table 8. North Area - Habitat Assessment

Habitat or Nest	Substrate Type %	Substrate Tot. %	Veg Type %	Veg Tot. % (Average Height)	Other %
North Habitat(Overall)	50.74% CS 15.01% FS 3.00 % Pebble	79.47%	7.42% SB 7.50% BB 4.01% SV	18.93% 6.5 cm	.47% Wood .12% Other
Nest 6	60.25% CS 7.5% FS	67.75%	31.25% SB	9.5 cm	0.00%
Nest 7	75.5% CS 15% Rock	90.50%	8.5% SB	5 cm	0.00%
Nest 15	65.5% FS	65.50%	32.5% SV	6 cm	1% Wood
Nest 16	67.75% FS	67.75%	29% BB	8.5 cm	2.25% Other
Nest 19	98% CS 1% Rock	99.00%	0.00%	0.00%	0.00%
Nest 20	26% CS 73% Rock	99.00%	0.00%	0.00%	0.00%
Nest 21	87.25% CS 6.25% FS	93.50%	5.5% SB	5.5% 6.5 cm	0.00%
Nest 24	90% CS 4% Rock	94.00%	0.00%	0.00%	5% Wood
Nest 25	55.25% FS	55.25%	43.75% SV	43.75% 6cm	0.00%
Nest 28	75.75% CS 1.75 % Rock 15% Shell	92.50%	6.5% SB	6.5% 5 cm	0.00%
Nest 29	46.5% FS	46.50%	52.5% BB	52.5% 9 cm	0.00%
Nest 31	87.5% CS 5% Rock	92.50%	6.5% SB	6.5% 5 cm	0.00%
Nest 37	12.5% CS 83.5% Rock	96.00%	0.00%	0.00%	3% Wood
Nest 43	87.5% CS	87.50%	11.5% SB	11.5% 5cm	0.00%
Nest 44	36.5% FS	36.50%	1.5% SB 61% BB	62.5% 8.5 cm	0.00%
Nest 46	93.5% CS 5.5% Rock	99.00%	0.00%	0.00%	0.00%
Nest 45	62.5% CS 36.5% Pebble	99.00%	0.00%	0.00%	0.00%
Nest 51	25% cs 20.5% Pebble	45.50%	53.5% SB	53.5% 5.5cm	0.00%
Nest 52	82.75% CS	82.75%	16.25% SB	16.25% 5.5 cm	0.00%

Key: Course grain sand 0.5-2.0MM(CS), Fine grain sand 125µ-0.5MM(FS), Pebble (<8mm diameter) , Rock(>8cm diameter), Silt/Clay (S/C). Red Sand Verbena:Abronia maritima (SV), Pickle Weed: Salicornia Pacifica (PW), Sea Bindweed: Calystegia soldanella (SB), Salt Grass: Distichlis spicata (SG), Salt Bush: Atriplex leucophylla (SS),Ice Plant: Carpobrotus edulis (IP), Beach Burr: Ambrosia chamissonis (BB). Woody (driftwood,arundo stalks) Other(bone, metal , plastic, etc)

Table 9. . Power Plant and Middle Area - Habitat Assessment

Habitat or Nest	Substrate Composition %	Barren Substrate Tot. %	Veg Composition %	Veg Tot. % (Average Height)	Other %
Power Plant (Overall)	49.25% CS 21.11% FS	70.360%	18.99% SB 4.50 % BB 1.96 % SS 1.25 % SV	26.11% 6.7 cm	2.54% Wood
Nest 5	86.5 % CS	86.50%	8.75 % SV	8.75% 6.5 cm	3.75 % Wood
Nest 14	90.5 % CS	90.50%	5.5 % SB	5.5% 5 cm	3% Wood
Nets 23	59.25 % FS	59.25%	8.25% SB 31.5 % BB	39.75% 8.5 cm	0.00%
Nest 26	74.25 % CS	74.25%	13.75% SS	13.75% 6.5 cm	11% Wood
Nest 41	93.5 % CS	93.50%	5.5 % SB	5.5% 6.5 cm	0.00%
Nest 42	16.25 % FS	16.25%	82.75 % SB	82.75% 9 cm	0.00%
Nest 50	72.25 % FS	72.25%	26.75 % SB	26.75% 5 cm	0.00%
Middle (Overall)	32.88% CS .50% FS 60.47% Rock	93.850%	.81% SB 1.50% SBB .19% BB .69% SV	3.19% 4.87 cm	.09% Other 1.88% Wood
Nest 4	93.4% CS	93.40%	5.5% SV	5.5%	0.00%
Nest 10	30.0% CS 62.25% Rock	92.25%	1.5% BB	6.5cm	5.25% Wood
Nest 11	89.25% CS	89.25%	0.00%	0.00%	9.0% Wood .75% Other
Nets 35	9.25% CS 4.0% FS 79.75% Rock	93.00%	5.25% SBB	5.25% 7cm	0.00%
Nest 36	16.25% CS 79.5% Rock	95.75%	3.25% SBB	3.25% 6cm	0.00%
Nest 39	11.5% CS 87.5% Rock	99.00%	0.00%	0.00%	0.00%
Nest 49	4.25% CS 91.25% Rock	95.50%	3.5% BB	3.5% 6cm	0.00%
Nest 53	9% CS 83.5% Rock	92.50%	6.5% SB	6.5% 7cm	0.00%

Key: Course grain sand 0.5-2.0MM(CS), Fine grain sand 125µ-0.5MM(FS), Pebble (<8mm diameter) , Rock(>8cm diameter), Silt/Clay (S/C). Red Sand Verbena:Abronia maritima (SV), Pickle Weed: Salicornia Pacifica (PW), Sea Bindweed: Calystegia soldanella (SB), Salt Grass: Distichlis spicata (SG), Salt Bush: Atriplex leucophylla (SS),Ice Plant: Carpobrotus edulis (IP), Beach Burr: Ambrosia chamissonis (BB). Woody (driftwood,arundo stalks) Other(bone, metal , plastic, etc)

Table 10. South Area - Habitat Assessment

Habitat or Nest	Substrate Composition %	Barren Substrate Tot. %	Veg Composition %	Veg Tot. % (Average Height)	Other %
South Habitat (Overall)	69.87% CS 7.87% FS 6.63% Pebble 2.33% Rock 2.65% Shell	89.34%	1.27% SB 6.19% BB 1.17% SV	8.63% 5.6 cm	.92% Wood .42% Other
Nest 1	90.75 CS 4% Shell	95%	0%	0%	4.25% Wood
Nest 2	67.75% CS 12.5 % FS .5% Rock	81%	14% BB	14% 8 cm	3.75% Wood .5% Other
Nest 9	91.5% CS 4.5% Shell	96%	0%	0%	3% Wood
Nest 13	72% CS 7.25% Pebble 13.75% Rock 5.25% Shell	98%	0%	0%	.75% Other
Nest 17	79% Pebble 4.75% Rock 11.5 % Shell	95%	3.75% SB	3.75% 5 cm	0%
Nets 18	82.5% CS	83%	16.5% BB	16.5% 7 cm	0%
Nest 22	80.25% CS 3.5% Shell	84%	15.25% SV	15.25% 5 cm	0%
Nest 27	75.75% CS .75% Rock 1.75% Shell	78%	20.75% BB	20.75% 8cm	0%
Nest 32	88% CS 7% Rock 4% Shell	99%	0%	0%	0%
Nest 33	77.25% CS	77%	1.75% SB 20% BB	21.75% 6.5	0%
Nest 34	94.5% CS 3.5% Rock	98%	0%	0%	1% Wood
Nest 40	88% CS	88%	11% SB	11% 5.5	0%
Nest 48	89.75% FS	90%	9.25% BB	9.25% 8 cm	0%
Nest 8	82.0% CS 3.0% Shell	85%	14.00% BB	14% 8.5 cm	0%
Canal Path : Nest 3	96.00% CS	96%	3% SB	3% 5.5 cm	0%

Key: Course grain sand 0.5-2.0MM(CS), Fine grain sand 125µ-0.5MM(FS), Pebble (<8mm diameter) , Rock(>8cm diameter), Silt/Clay (S/C). Red Sand Verbena:Abronia maritima (SV), Pickle Weed: Salicornia Pacifica (PW), Sea Bindweed: Calystegia soldanella (SB), Salt Grass: Distichlis spicata (SG), Salt Bush: Atriplex leucophylla (SS),Ice Plant: Carpobrotus edulis (IP), Beach Burr: Ambrosia chamissonis (BB). Woody (driftwood,arundo stalks) Other(bone, metal , plastic, etc)

Table 11. Salt Panne Habitat Assessment

Habitat or Nest	**Substrate Composition %**	**Barren Substrate Tot. %**	**Veg Composition %**	**Veg Tot. % (Average Height)**	**Other %**
Salt Panne Overall	58.50% S/C	58.500%	40.50% PW	40.50% 9.75 cm	0%
Nest 38	21.25% S/C	21.25%	77.74% PW	77.74% PW 10 cm	0%
Nest 47	55.25% S/C	55.25%	43.75% PW	43.75% PW 9.5 cm	0%
Nets 54	99% S/C	99%	0%	0.000%	0%

Key: Course grain sand 0.5-2.0MM(CS), Fine grain sand 125µ-0.5MM(FS), Pebble (<8mm diameter) , Rock(>8cm diameter), Silt/Clay (S/C). Red Sand Verbena:Abronia maritima (SV), Pickle Weed: Salicornia Pacifica (PW), Sea Bindweed: Calystegia soldanella (SB), Salt Grass: Distichlis spicata (SG), Salt Bush: Atriplex leucophylla (SS),Ice Plant: Carpobrotus edulis (IP), Beach Burr: Ambrosia chamissonis (BB). Woody (driftwood,arundo stalks) Other(bone, metal , plastic, etc)

California Least Tern

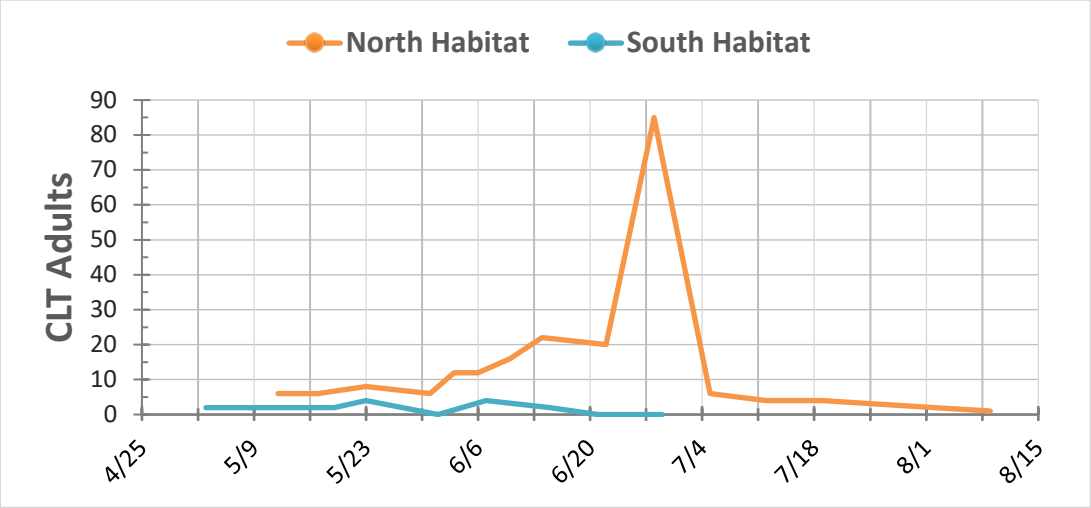
In 2022 CLT nested in both the north and south of Ormond Beach. Because the nesting areas are separated by 0.5 mile they are regarded as separate colonies. Breeding adults are calculated by CDFW.

Adult Population Abundance

The CLT typically appears annually at Ormond Beach in early May to breed and rear chicks and depart in late July to early August as they start their annual winter migration to South America. They nest in two areas of Ormond Beach, which are treated as separate nesting colonies. Three dead CLT were found, but in each case the carcasses where too decayed to collect. No apparent sign of cause of death could be determined. One was banded (see Banded CLT section below).

South Colony: The first CLT of the season were sighted in the south habitat on May 3rd, when approximately 2 adults were observed flying over and landing on the sand. Thereafter the adult numbers fluctuated between 2-4 individuals through the end of June. CLT were last seen on June 29, 2022.

North Colony: On May 12th, 6 adult CLT were seen flying over and landing in the north habitat, and on May 23rd the first nest was found. During June the adult population in the north habitat varied between 12 and 22 individuals, but on the June 28 survey 85 adults were seen. This was a onetime increase in population. The number dropped rapidly in July, with just 6 adults seen the following week in July. The last CLT was seen on August 9 foraging alone in the Ormond Lagoon.



Fledglings

We estimate there were between 6-10 fledglings in the north colony. No fledglings were produced in the south colony.

Banded CLT

A dead CLT was discovered at the tideline in front of the middle habitat. It had the bands 1841-97510. It was reported to USGS (https://www.pwrc.usgs.gov/BBL/bblretrv/). It was banded at

Naval Base Coronado on June 6, 2005. The carcass was not recovered.

Another CLT was photographed in flight on July 2, 2022. A yellow and green band is visible on what appears to be the left leg, but both legs were not visible.

Photos by summer intern Alex Vaca

Nest Locations

In 2022 there were 32 in the north, a single nest near the lagoon and just 2 nests in the south (Figure 14). The north habitat nests were concentrated in the central part of the fenced area, closer to the tideline. A single nest near the lagoon was outside of any fences. In the south habitat the two nests were located close together near the dune ridge just inside the northern end of the south habitat fenced area.

Figure 14. CLT nest location Nesting Outcome

Nests Fates

North Colony: A total of 34 nests (7 hatched, 25 failed, and 2 had unknown outcomes). In the north there were 32 nests (7 hatched, 23 failed, and 2 had unknown outcomes) and the 2 nests in the south colony both failed due to raven predation.

South Colony: Both nests were found in early June and were depredated by ravens within days of being established.

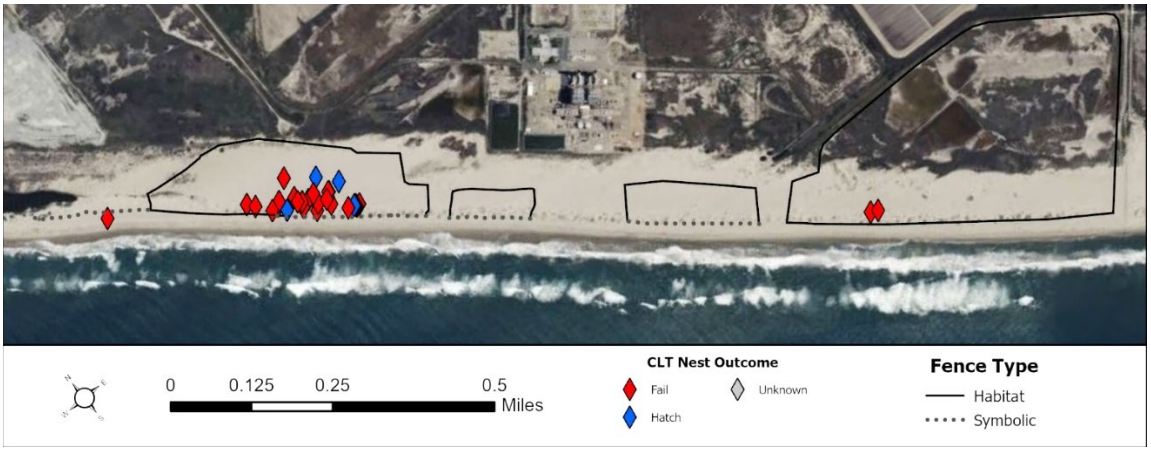
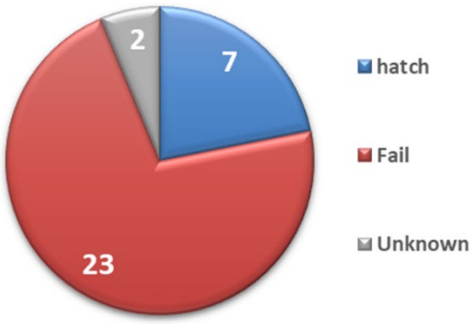


Figure 15. Map of CLT nest fates



Failed Nests: This year predation was high. Twenty-one nests were depredated, all by corvids. Fifteen nests lost to common ravens (13 in north and 2 in the south colonies) and 6 to American crows in the north colony. Five nests were either non-viable or abandoned. Four of the 5 were late season nests that were likely abandoned because the eggs were non-viable, or the adults began their migration before the eggs hatched.

Figure 16. Cause of CLT nest failures

Impacts to CLT nesting success

A common problem every year is regular foot traffic and individuals pushing bikes trespassing in the fenced nesting area in the north habitat (Figure 17). This happens despite there being a mesh habitat fence and signs that post the area as closed during nesting season, in English and in Spanish. The fences are regularly cut open. This location is close to homeless encampments, which is part of the reason for the foot traffic. In the area directly behind the tern nesting habitat a jeep trail ends at the fence at the back of the dunes. This is where the foot traffic enters. It is private land owned by The Nature Conservancy (TNC) and it is posted with No Trespassing signs, and TNC hires a security company to patrol the area. Despite this and our signs and fence, there is regular trespassing between the beach and the road (Figure 18) In the past, nests have been trampled. However, bike tracks passed each year within feet of tern nests. Not only does this regularly disturb the colony, but the activity most likely attracts the attention of ravens and coyotes which have caused the most nest losses in 2022.

Figure 17. Bike trails and human footprints crossing the tern nesting area

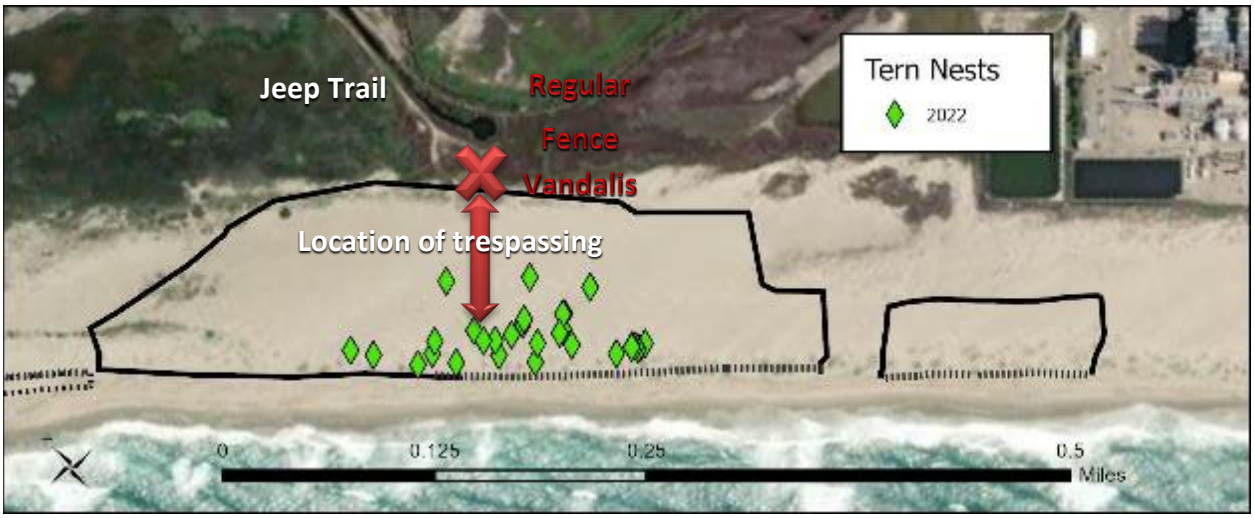


Figure 18. Area of trespassing and vandalism in north fenced area

Predators of WSP and CLT

The predator of both WSP and CLT nests were corvids, primarily common ravens (CORA), although American crows (AMCR) were present and depredated CLT nests. Our trail cameras also documented CORA and AMCR regularly harassing WSP nests with predator exclosures, which was probably the cause of nest abandonment.

Other predators were present but did not depredate any nests. Our trail cameras captured the following predators at WSP nests: loggerhead shrikes, great horned owls, red tail hawks, California ground squirrels, mice (unknown species) and coyote. This year we also captured a skunk on a trail camera, although it was not near a nest.

Table 12. Predators sighted in 2022

Common Name	Scientific	Abbreviation	Sightings in 2022
American Crow	(Corvus brachyrhynchos)	AMCR	Depredated nests
American Kestrel	(Falco sparverius)	MAKE	X
California Ground Squirrel	(Otospermophilus beecheyi)	CAGU	took partial egg clutches
Common Raven	(Corvus corax)	CORA	Depredated nests
Cooper's Hawk	(Accipiter cooperii)	COHA	X
Coyote	(Canis latrans)	CALA	caught by nest on trail camera
Great Blue Heron	(Ardea herodias)	GBHE	X
Great Egret	(Ardea alba)	GREG	X
Great Horned Owl	(Bubo virginianus)	GHOW	caught by nest on trail camera
Horned Lark	(Eremophila alpestris)	HOLA	X
Loggerhead Shrike	(Lanius ludovicianus)	LOSH	X
Long tail weasel	(Mustela frenata)	MUFR	X
mouse - unknown species		Mice	caught by nest on trail camera
Northern Harrier	(Circus cyaneus)	NOHA	X

Opossum	(Didelphis virginialis)	DIVI	tacks
Peregrine Falcon	(Falco peregrinus)	PEFA	X
Racoon	(Procyon lotor)	PRLO	tracks
rattlesnake	(Crotalus atrox)	CRAT	X
Red-tailed Hawk	(Buteo jamaicensis)	RTHA	caught by nest on trail camera
Snowy Egrets	(Egretta thula)	SNED	X
Striped Skunk	(Mephitis mephitis)	MEME	caught by nest on trail camera
Turkey Vulture	(Cathartes aura)	TUVU	X
Western Gull	(Larus occidentalis)	WEGU	X
White-Tailed Kite	(Elanus leucurus)	WTKI	X

X = sighted on nest surveys

Trail Cameras

We put cameras on 43 our of 56 WSP nests. Habitat cameras recorded the interactions between WSP and CLT (WSP attacking CLT), and we recorded CLT tending to chicks. Cameras on nests confirmed 9 WSP nest hatches and 9 nest predations by ravens. Cameras documented the presence of the following predators: loggerhead shrikes, great horned owls, red tail hawks, California ground squirrels, mice, skunk and coyote. They also documented illegal a motorcycle off-roading illegally by a nest, fence theft, two people walking off leash dogs inside fencing and joggers.

Three cameras were stolen, including one cabled to a rod. The rod was in soft sand and the person who took it was able to pull it out of the ground. Twelve batteries were stolen. Three cameras were destroyed by high winds when the lenses scoured by sand.

Table 13. Trail camera statistics

	Total No. Nests	No. Nests with Cameras	Hatches caught on camera	Habitat cameras
2022	56	43	9	3

Trail Camera Samples:

- Snowy plovers brooding its 3 chicks at night (Figure 19A)
- Snowy plover on nest watching police Polaris go by (Figure 19B)
- Raven predating a plover nest (Figure 19C)
- Motorcycle riding right by a nest (Figure 19D)
- Jogger running by nest – we saw the same jogger in the nesting habitat every Thurs and Sun evening for a couple months (Figure 19E)

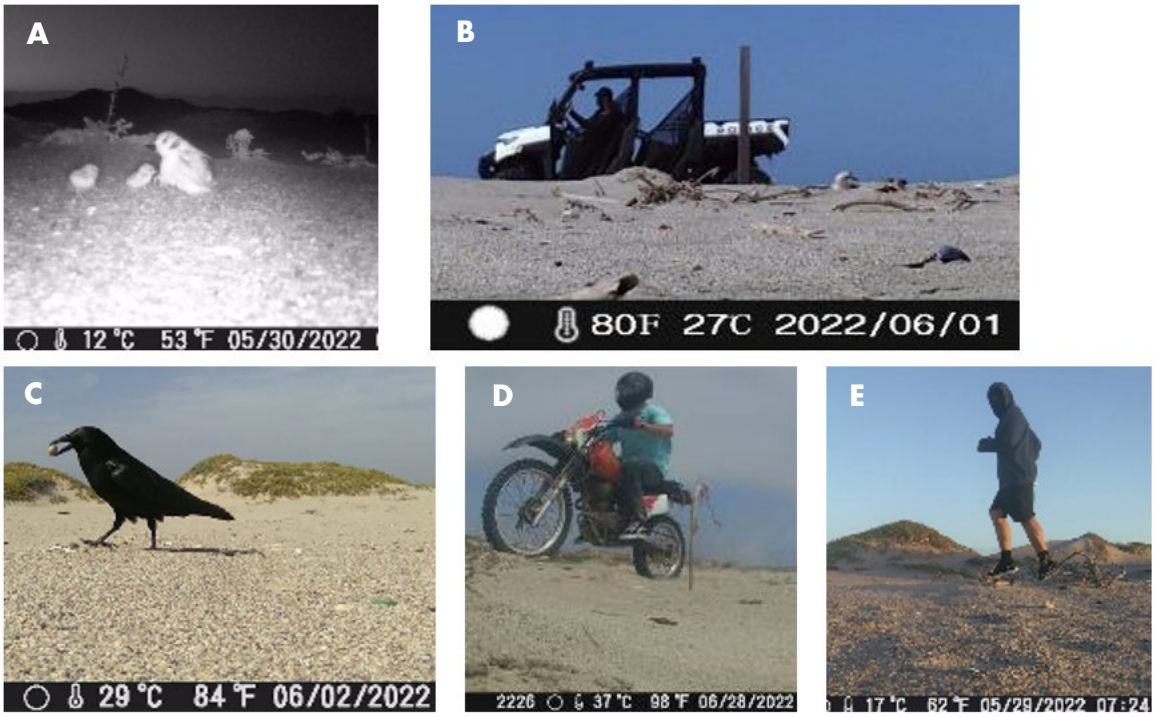


Figure 19. Trail camera screen shots

Habitat protection

Annual Fencing

Our contractor work team and volunteers accomplished the following fence construction and repairs in 2022:

- Feb 22-25, 2022: Contractor installed 0.5-mile metal symbolic and 0.6-mile mesh habitat fencing. Volunteers repaired 0.6 mile of mesh habitat fencing: Total 1.8 miles repaired and installed.
- Sept 26-29, 2022: Contractor removed 1.4 miles of metal symbolic and mesh habitat fencing and stored salvaged materials for the winter.
- In 2022 volunteers donated 305 hours of labor conducting regular repairs to fences

Symbolic nest fencing

A total of 4 fences were built with interns and volunteers to protect 5 nests outside of annual fences that were at risk of being trampled. Materials used were primarily PVC posts and lightweight rope. We ran out of PVC switched to wooden posts mid-way through the season. We deployed 900 feet of fencing which protected 0.75 acre of area.

- 5 plover nests were protected with symbolic fencing, each within 1 day of discovery. Three nests were found outside of habitat fences, and 2 were inside but within 5 feet of the fence line. The latter two nests (#5 and #26) were sequential nests established in

the same scrape, so the same fence was used for both nests.

- Three of these nests hatched and 2 failed because of raven predation.
- Four other nests were established outside of habitat fencing but were not fenced. Three of these nests were in areas with low foot traffic and fencing was determined to be unnecessary. Three of these nests hatched, There was one additional nest that had to be transferred to the Santa Barbara Zoo for captive rearing.

Theft of fencing and nest monitoring equipment

This season saw continued theft of fencing and monitoring equipment. A total of 1500 feet of rope and cable was stolen off symbolic fencing. This includes 225 feet of rope taken off fencing that protected a nest outside of mesh fencing by the lagoon. The fencing was taken 2 nights after it was installed at 10pm (captured on trail camera). Three trail cameras were stolen, including batteries and SD cards. Two cameras that were secured with anchor posts were opened and the batteries taken.

Discussion

20 Year WSP Trends

The number of nests and more importantly the number of hatched nests has been increasing over the last 20 years on Ormond Beach. The 20-year average for total nests is 33.2 and the mean for hatched nests is 20.6. Total and hatched nest numbers have been above these averages for the past 6 years (Figure 20 below). Breeding adult WSP numbers is also increasing over time, although they have not reached the FWS recovery goal of 50 WSP (Figure 21).

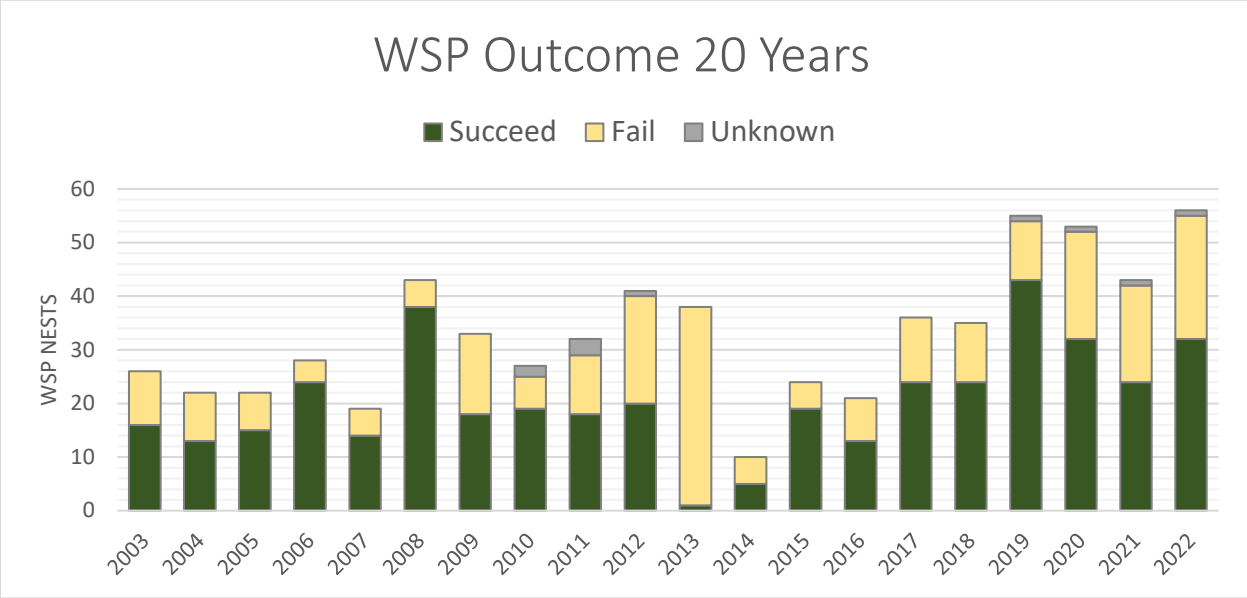


Figure 20. Twenty years of plover nesting data at OB

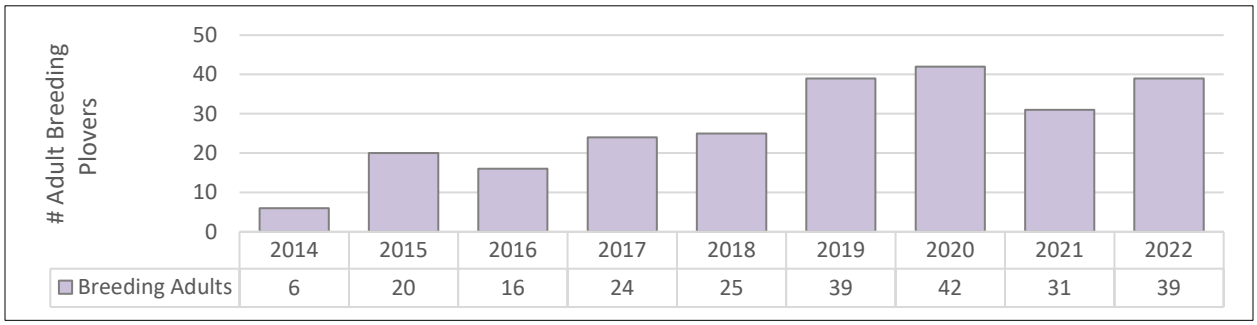


Figure 21. Breeding adult plovers at WSP. FWS recovery goal is 50 breeding birds.

20 Year CLT Trends

Unlike WSP, CLT nesting outcomes have varied widely at Ormond Beach, and in the past 4 years have done poorly. The number of nests over the last 20 years has fluctuated from a high of 93 nests in 2019, to 0 nests in 2015 and 2003. The 2022 season had amongst the highest depredation and lowest hatch rates of all years recorded. The cumulative effects of predators and human disturbance prevents this species from successfully nesting at Ormond Beach. This colony nesting bird needs a safer, more protected habitat than Ormond Beach currently provides.

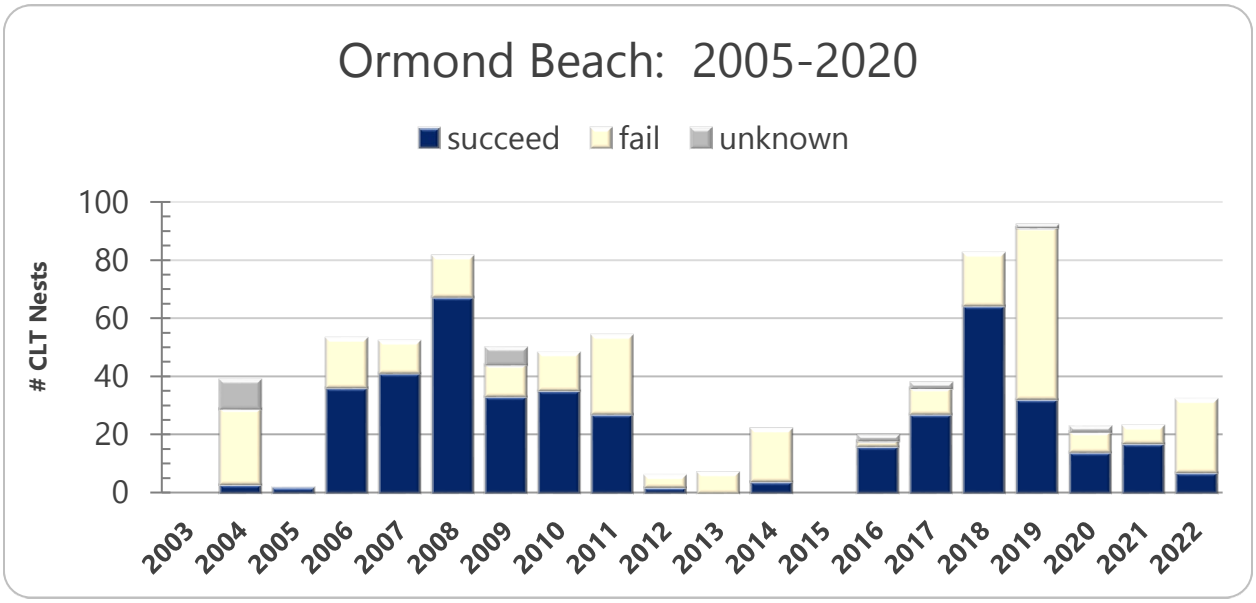


Figure 22. Tern nesting at Ormond Beach from 2003-2022 (north and south colony data combined)

Negative Impacts to Nesting Success at Ormond Beach

Predators

Corvids are the leading cause of WSP and CLT nest loss, and each year that percentage is increasing. Other predators are increasing as well, including coyote, skunk and loggerhead shrikes. We do not have sufficient tools to protect nesting birds from these predators. Human

activities contribute to this problem, in particular homeless encampments accumulate trash near nesting areas.

Homeless Encampments Near Nesting Habitat

In 2022 homeless encampments and the foot and bike traffic they generate in the nesting habitat continued to be a problem for WSP and CLT. This has been an escalating problem since 2016. Homeless encampments have been cleared out in the non-nesting season, but encampments typically re-appear in other areas near the nesting habitat.

Although there was no direct nest vandalism in 2022, disturbances in the nesting habitat was high. This attracts predators, and 2022 raven predation on nests in this area caused the most nest losses in 10 years, in particular to nesting CLT. The risk of theft or of attracting attention to nests in the north fenced area impairs our ability to monitor and protect nests. Decisions to not use ME's for WSP or cameras due to this risk have been made solely as loss mitigation attempts. The trash and activity of the encampments attracts corvids.

Violations of the Ormond Beach Ordinance

Ormond Beach is designated an Environmentally Sensitive Habitat Area (ESHA) as defined by the California Coastal Commission. It is also designated critical habitat for WSP. In 2016 the Ormond Beach Ordinance (Ordinance 2906) was passed to protect this habitat. Not only does it ban domestic animals, but it also restricts many other activities harmful nesting WSP and CLT. It is probably not a coincidence that all indicators of nesting success for WSP have improved since 2016. However, we see violations of the ordinance on each nest survey. Our outreach program is designed to educate the public about nesting birds, how the ordinance protects beach wildlife and to recruit the community to engage in stewardship. But there are several areas of concern where we need support from local authorities:

To bring, walk (whether leashed or unleashed), ride or release any domesticated animal including but not limited to cats, dogs, horses and pigs

Dogs: It is rare we do not see a dog each week during nest surveys. Our biologists and volunteers approached dog owners to educate them about the impacts dogs have on birds and about the dog ban. We believe our attempts to educate dog owners are the only efforts being conducted to enforce this aspect of the ordinance. We have even created No Dog signs out of our program funds (page 12) and posted them on our fences. We are unaware of any instances of police, code enforcement or animal control officers engaging dog owners. The City of Port Hueneme also has a dog ban, but they also do not enforce their ordinance.

Horses: We are aware that a local riding instructor conducted regular horseback riding lessons on Ormond Beach in 2022. We reported the information we had to police, but this activity continued throughout the summer. We captured a horse back rider on a trail camera.

To go within or interfere with any protected habitat area as designated by fencing, signage: Humans crossing the nesting habitat introduce regular disturbance to nesting birds and attracts the attention of predators that follow human activity. This activity in particular is harming nesting CLT. Our trail cameras have captured walkers with off leash dogs near nests inside fences, joggers regularly running among nests, weekly vandalism to fences and theft of fence materials.

To operate any motorized vehicle: Each year we have motorcycles riding inside the nesting habitat and along the tideline. So far, we have been fortunate not to have nests run over, but loss of chicks is a possibility. Even without directly destroying nests, it introduces disturbance to nesting birds. If this problem continues nest losses could occur, and it could cause the loss of an entire least tern colony. We are also seeing an increase in electric bikes which is a concerning trend.

Funding Status

2022 Season

The following funding was provided for the 2022 nesting season:

1. USFWS Section 6: CDFW administered FWS grant provided funding for monitoring, data collection, habitat assessment and public outreach from 2019- 2022.
2. Ventura Audubon: VAS held a Raise the Roost fundraising event in April 2022 that provided partial funding for the fencing, nest monitoring labor and supplies and a converted shipping contain for a new volunteer headquarters office at Ormond.
3. USFWS Ventura: In fall 2021 the Ventura USFWS office provided fence and monitoring supplies (Cintoflex fence materials, cable rope, trail cameras). This material was used for the 2022 season
4. The Port of Hueneme: The port provided partial funding for the office described in bullet #2.

2023 Season

As of the writing of this report, there is no funding for the activities funded by the Section 6 grant. VAS will host another Raise the Roost fundraiser, proceeds will be used to fund as much of the monitoring as possible.

Recommendations to improve nesting success

The Shorebird Recovery Program at Ormond Beach has established requirements and processes for improving WSP and CLT nest success. The following are recommendations to continue and improve nest performance at Ormond Beach.

1. A stable source of funding for monitoring, data collection and public outreach: The increased monitoring and outreach efforts provided by Section 6 grant funding from 2020-2022 increased a consistent presence “boots on the ground” at Ormond. During the three years on the grant nest outcomes, volunteer hours and data collection increased significantly and improved net outcomes. There is currently no secure replacement for this funding and monitoring efforts may stop entirely.
2. A funded predator management plan: Predators, in particular ravens, need to be removed because ME’s are a poor solution to this predator problem, and we know they cause the death of nesting adult WSP. NBVC Point Mugu has a predator removal program, this program successfully reduces the numbers of predators observed at the south breeding habitat. The Mugu predator control has little to no impact on the north breeding habitat.

3. Zero tolerance to camping and illegal activities in and around Ormond Breach: Camping and trespassing is a persistent problem at Ormond Beach. These activities are not only a threat to WSP and CLT nest outcomes, they also present a safety risk to biologists working near these encampments. Regular trespassing in the restricted area cannot be tolerated by either pedestrians or vehicles. Nore theft of fencing and monitoring supplies. cannot be tolerated near nesting CLT and WSP. A robust relocation program is needed to remove all current encampments along with regular visits by homeless advocates to prevent future camping. Regular police patrols along with the issuance of citations for off leash dogs, trespassing, and Off-highway vehicles would improve net outcomes and reduce the safety risk to staff and volunteers.
4. Zero tolerance to theft of nest monitoring supplies and fencing: Regular theft inhibits our ability to protect CLT and WSP. Fencing supplies are taken and used in the homeless encampments. Not only does this impair the boundaries of the fences that protect the nesting area, it drains our limited funds and consumes labor hours that would otherwise be used to do nest monitoring.

Acknowledgements

Thank you to our Ventura Audubon Society Shorebird Recovery Team at Ormond Beach; Kat Whitehouse, Alecia Smith, Joan Tharp and summer interns Spencer Hardt, Vineta Sonders and Alex Vaca.

This work was made possible by a Section 6 ESA grant from CDFW and USFWS and the many community members who donated to our Shorebird Recovery Fund and the Raise the Roost Fundraiser.

We would like to thank the landowners California Coastal Conservancy and the City of Oxnard for your support and assistance. Thanks also to The Nature Conservancy who has made available the use of an access road through their property allows us to transport fencing materials to the least tern nesting area in the north habitat.

GenOn has made available the use of their private contractor's parking lot which provides us safe and easy access to the middle and north nesting areas.

A huge thank you to the many volunteers who have donated many hours to make this effort possible.

In memory of Reed Smith, my mentor and friend who began Ventura Audubon's work on Ormond Beach almost 30 years ago.