# Ormond Beach, California

## Western Snowy Plover and California Least Tern

## Nesting Outcome: 2019 Season Summary

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**Cynthia Hartley**
**Ventura Audubon Society**
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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 18, 2019 to September 19, 2018. 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 nesting locations and outcomes have been reported in detail since 2003. The 2019 data completes 17 years of continuously collected nesting outcomes and 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 Environmentall Senstive Habitat Area (ESHA) by the Local Coastal Plan.

# Executive Summary

## Western Snowy Plover

A total of 55 WSP nests were located; of those, 43 hatched (78%) and 11 failed (20%) and 1 nest had an unknown outcome (2%). Of the 11 failed nests, 7 were depredated, 2 were abandoned and 2 nests were vandalized by humans. The calculated number of breeding WSP was 39. Out of the 162 WSP eggs produced on Ormond Beach, 121 hatched and a minimum of 20 chicks reached at or near fledgling age (16% of hatched chicks).

| | |
|---|---|
| First Nest Initiation: | March 27 |
| First Hatch: | April 24 |
| Period of Peak Nesting: | June 12 |
| Last Nest Initiation: | July 11 |
| Last Hatch: | August 10 |

Threats to WSP Nesting Success: Predators, including ravens, coyote and squirrels, were the greatest cause of nest loss. A number of nests were protected by predator exclosures; so, nest losses due to depredation would have been higher without intervention. In particular, ravens visited exclosed nests daily in some areas and we have video evidence of ravens taking newly hatched chicks. The presence of homeless encampments increased dramatically this year near nesting habitat on the northern end of Ormond Beach, with at least 40 camps that had multiple inhabitants within walking distance. The habitat fences protecting the nesting area was vandalized on a weekly basis, and posts and mesh fencing stolen by the

encampments inhabitants and repurposed in their nearby camps. There was regular foot and bike traffic inside the nesting area, significantly more than documented in past years. Vandalism also increased this year, predator exclosures were kicked off nests, WSP eggs were taken and a camera stolen. Even in the south habitat, which has not had this sort of problem in past years, also had trespassing for the first time, including nest tampering and a stolen trail camera.

### California Least Tern

Least terns first appeared on the north end of Ormond Beach on May 15. The last CLT were seen on August 19. A total of 92 CLT nests were found, of those 31 hatched (35%), 60 failed (64%) and 1 had an unknown outcome (1%). Of the failed nests, 49 were predated, 2 were abandoned pre-term, 4 were crushed by humans pushing bikes through the nesting habitat, and 5 were brooded full term but failed to hatch.

| | |
|---|---|
| First Nest Initiation: | May 21 |
| First Hatch: | June 17 |
| Last Nest Initiation: | July 1 |
| Last Hatch: | July 23 |
| Date of first fledgling: | July 10 |

Threats to CLT Nesting Success: Coyotes were the greatest predators of CLT in 2019, taking 53% of all CLT nests. Squirrels and ravens also caused nest failure. Homeless encampments present the greatest risk, with nest tampering and regular presence of homeless with bikes and dogs in the nesting habitat.

# Site Description

## Beach Ownership

The boundaries of Ormond Beach are defined on the southeast by the Naval Base Ventura County Pt. Mugu, and on the northwest by the City of Port Hueneme. Ormond Beach is owned by three landowners that jointly manage the property under a Memorandum of Understanding. The land owners are the California State Coastal Conservancy (SCC), the Nature Conservancy (TNC) and the City of Oxnard (the City). The northern portion of Ormond Beach is owned by the City. The center and southern portion of the dunes and an inland salt panne are owned by the SCC. Inland on the northern end of the property is a parcel owned by TNC.

Nesting of the western snowy plover occurs on land owned by the City and the SCC. There are records of California least terns nesting on the northwest end of Ormond Beach since the 1990's. CLT have also nested on the southeast end of the beach regularly before 2012. This year CLT showed interest in this former nesting site, and the first nest in 7 years a nest was established on this end of the beach.

Inland on the north end is the former Halaco property, which was a scrap metal recycling operation designated an EPA superfund site in 2007. Southeast of the TNC property is a

power plant owned and operated by GenOn Energy. This parcel is encircled by SCC land and fronts the beach dunes where WSP nest. Adjacent to the salt pan is a small parcel owned by the Ventura County Game Preserve. Just inland from this is the Agromin Composting and Soil Amendment Facility property, which processes yard waste and food scraps into compost. See Map 1: Ormond Beach property owners and neighboring properties.

## Survey Area

The survey area is 2 miles in length and runs southeast along the coast covering approximately 200 acres. WSP nest in the dunes along the entire beach, and CLT have nested at the north and south extremes of the beach. The survey area varies in width from 100' by Ormond Lagoon on the north end to over 1000' wide at the south end in the location of the salt pan. The northern end of the survey area begins at the boundary line between City of Port Hueneme and City of Oxnard. The beach in this area is relatively flat and backed by Ormond Lagoon that drains runoff from Oxnard and Port Hueneme. The foredunes have formed a 4-10' tall dune ridge that begins just south of the lagoon and extends along the entire length of the beach to the south. The beach seaward of the dune ridge is flat and varies from 50'-100' wide. The width varies seasonally due to erosion or accretion induced by wave and tide influences. See Map 2: Ormond Beach survey area.

## Habitat Fencing

Fence Types: Nesting areas are enclosed with three types of fencing;

1.) Habitat Fence - Black mesh Cintoflex-C fencing attached to metal T-posts (Photo 1)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 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 loose dogs and is the fencing of choice in areas where the beach goers bring dogs and disregard leash laws. The bottom of the fencing is not buried, so natural openings occur depending on the topography of the beach. Larger mammals including sea lions, elephant seals and coyote are known to cross under the fence.

2.) Symbolic Fence - Metal eye posts strung with cable wire (Photo 2). This is strictly a visual fence, as it presents no physical barrier to animals and humans can easily step over or under it. We are using this type of fence in areas that experience tidal over wash (by the lagoon) and growing and shifting dunes (middle habitat). It is being used on an experimental basis adjacent to the tideline where dunes are growing the most, to replace habitat fence. We seek to determine if the public will comply with this type of fencing and are introducing it in areas where the public usually complies with dog restrictions.

3.) Temporary Symbolic Fence – Wooden post strung with rope (Photo 3) This type of fencing is put up on an as-needed basis when nests are found outside of the habitat fences. The materials are light weight and can be carried by several people long distance on the beach.

Three areas of nesting habitat are protected with fencing: On the south end of the beach, 1.4 miles of mesh fencing enclose 77 acres and is referred to as the "South Habitat". Southeast of the power plant, 0.5 mile of fencing encloses 7.4 acres encloses the "Middle Habitat". The fencing facing the ocean is composed of post and cable while the sides and back are mesh. The area directly in front of the power plant is approximately 18 acres and is unfenced. On the north end of Ormond Beach, 0.7 miles of mesh fence encloses 18 acres of dunes we call the "north habitat". A length of approximately 1000 feet of post and cable stretches along the south end of Ormond Lagoon and protects birds that forage at the water/sand interface and seek refuge the north habitat. See Map 3: Fences enclose 3 habitat areas.

### Signage

Seasonal closure signs in both English and Spanish were affixed to posts around the perimeter of the fenced habitat areas, as well as Audubon "Share the Shore" signs created by local school children.

# Methods

## Predator Exclosures for WSP

A 2'X2' square wire mesh cage design is used. Exclosures are made of galvanized wire with 2"X3" openings, wire spikes are attached to the top to discourage perching by other birds. 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. Exclosures are used when threats from predators are deemed to put nests at risk. Following placement of the exclosure adults are observed to ensure they return to brooding. Throughout the season several decoy exclosures (not on a nest) are left throughout the beach to confuse predators.

## Population Abundance

To cover the entire survey area each week, the beach was divided into different areas that were surveyed in blocks of 2-4 hours. This means that in some cases the entire beach was not surveyed on the same day. The different areas were: The tide line in front of the dune ridge from the Mugu boundary line to Hueneme Beach, the south nesting habitat fence, salt panne and dunes in front of the power plant and the north nesting habitat fence. Areas were covered simultaneously by different teams of monitors when possible, or on sequential days, and count totals for the were summed from each of the areas.

A total of 72 surveys were conducted over a 25-week period from March 18 through Sept 19. Monitoring in the dunes was conducted by walking wandering transects, the tideline was walked at the top of the wrack line. The entire beach was covered a minimum of once per week. All WSP observed were recorded by age and gender. Numbers of CLT adults and juveniles were recorded once weekly in a single effort.

# 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. Two camera models were used: 1) the Stealth Cam (Model G42) and 2) Browning Defender 940 (model# BTC-10D). Both cameras had “no-glo” night time infrared emitters and detectors, were motion activated and set to take 10-20 second video. Cameras were placed on the ground approximately 30-40 feet from nests. The 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 sand. Cameras were placed primarily on nests in the salt panne and south dune habitat because these locations had the least human trespassing. This year for the first time cameras were placed in the north habitat because of problems with predators in that location.

# Determination of Breeding Activity

## 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 again. 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 eggs were collected. Nests that had eggs disappear 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. 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. Unhatched WSP eggs and one dead adult WSP were submitted to the Western Foundation of Vertebrate Zoology (WFVZ) for analysis of incubation stage and for archive. Three WSP eggs from one nest were deposited with the Santa Barbara Zoo for incubation.

### 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 couple days 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.

### Western Snowy Plover Pair Estimates

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.

## Chick and Fledgling Observations

Western snowy plover: Once a nest hatched, chicks were looked for each week. When possible observed weekly until fledging. Fledglings were determined to be from Ormond Beach if they had been observed for several weeks in the same area prior to reaching fledge age and if a guarding adult accompanied them. Hatch year chicks that did not meet these criteria were assumed to be from other beaches.

California least tern: Nests were checked a minimum of once per week. Chicks were re-sighted and associated with nests as much as possible. In order to avoid disturbing the colony after chicks hatched, we observed the colony with a scope from dunes overlooking the nesting area as much as possible. If we confirmed with the spotting scope that a nest had hatched and a chick was present or still being brooded by an adult, we avoided approaching near the nest. The number of fledglings were calculated 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).

# Results

## Western Snowy Plover

### Spatial Distribution and Abundance

Adult Abundance and Dispersal: In 2019, there was a higher number of adult WSP throughout the breeding season compared to past years. In past years mid-season numbers of adults was between 10-30. This year the counts remained between 30-60. On the May 23 spring window count there were 41 adult WSP (21 males, 14 females and 6 unknown adults). The population in from May through early August was frequently 2 to 3-fold greater than has been seen in past years (Figure 1).

Spatial patterns of WSP were consistent this year as with past years, in which the birds formed flocks at the beginning and end of nesting season, and during the nesting season they dispersed along the entire length of tide line and in the dunes.

Nest Locations: Nests were located the entire length of Ormond Beach, from the Mugu fence to the north habitat and in the salt panne. Nests were dispersed over Ormond Beach from the Pt Mugu fence to the interior of the north habitat including the salt panne, which is inland from the south habitat dunes (Figure 4). Nests were dispersed as follows:

| ***Habitat Location*** | ***North*** | ***Open Dunes*** | ***Middle*** | ***South*** | ***Salt panne*** |
|---|---|---|---|---|---|
| # nests | *22* | *5* | *4* | *16* | *8* |

### Breeding Adults

The estimated number of breeding WSP adults was 39, which occurred on the June 12 survey. On this date there were 17 active nests, with 5 clutches of chicks on the beach. This year the spring window survey (May 23) was almost a month before the peak of nesting season activity. On this day there were a total of 20 breeding adults (9 nests and 2 clutches of chicks).

### Nesting Outcome

Nest Chronology: The first nest was established on March 27 and the last nest hatched on August 9 (Figure 2). There were 2 waves of nesting activity, the first in early May, then a second one in mid-June. The second wave had nearly twice as many nests. After the June peak, nesting numbers dropped to a level that was still higher than the May wave and remained stable through the end of the month, then dropped quickly to zero in early August.

Nest Fates: This year 55 nesting attempts were documented, of those 43 nests hatched, 11 failed and 1 had an unknown outcome (Map 4. and Figure 3). Of the 11 nests that failed, 7

were depredated, 2 had the all the eggs taken by human vandals and 2 nests were abandoned.

### Failed Nests

Depredated: Ravens depredated 5 nests and squirrels and coyotes took one nest each. Our trail cameras also documented ravens regularly harassing nests with predator exclosures, especially in the salt panne. The adult plovers always returned to their nests however, and all nests with exclosures hatched in the salt panne. We also caught at least 2 snowy plover chicks being eaten by ravens the day they hatched, the ravens waited at the edge of the exclosures and plucked the chicks out when they could reach them. Both nests were in the salt panne.

Vandalized: Humans kicked over the predator exclosures on two nests in the north habitat. They also took all of the eggs from these nests. Objects were placed in these nests after the eggs were taken. Another nest in the south habitat had an unhatched, non viable egg taken and replaced with a rubber ball. Later we believe this egg was placed in a hatched nest and a pentagram was drawn in the sand around the nest. Two trail cameras were also stolen, one from the south and one from the north habitat.

Abandoned: One of the abandoned nests (WSP18) had all 3 eggs blown out of the scrape during a wind event a week after it was discovered. No adult WSP were observed near the nest the entire morning of the survey when the eggs were discovered out of the scrape (5/21/19). After permission was granted by UWSFW, all 3 eggs were collected and taken to the Santa Barbara Zoo. The eggs hatched on June 3 and 4$^{th}$, the were chicks fostered until reaching fledgling age, banded as juveniles (Table 2) and released on July 18, 2019 at the Coal Oil Point Preserve in Goleta CA.

The second abandoned nest (WSP48) was brooded for 29 days after the first egg was laid. At 33 days the brooding bird was not seen again, so one of the 2 eggs were tipped on end. It remained unchanged in the same position after 2 days. At 35 days after the first egg was laid the eggs were collected and submitted to the WFVZ. Analysis of the eggs indicate one egg was infertile and the other egg and a medium embryo that failed to develop.

See Figure 4. Causes of WSP Nest Failure

## Egg Fates

A total of 162 eggs where produced during the nesting season. Out of those 119 hatched for a 73% hatch rate. Of the 43 failed eggs, 21 were depredated, 6 were taken by humans from two nests, and 3 had an unknown outcome. Three were counted as “failed” since they did not hatch naturally, but those were the abandoned eggs that were taken to the Santa Barbara Zoo, successfully hatched and later released back to the wild. The remaining 10 eggs that failed to hatch were from nests that were incubated full term and had successful outcomes (other eggs hatched from the nests). All of these eggs were either infertile or failed at some point in development.

There were 52 nests with 3 eggs, and 1 nest had just 2 eggs. The remaining two were undiscovered nests, so it was not possible to verify the actual egg count. One was seen with 2 chicks just days old, and the other was discovered as a scrape with 1 unhatched egg and pip shells, so both nests had at least 2 eggs.

## Chick and Fledgling Observations

The first chicks were seen on April 24, 2019 near the north habitat and the last chick that reached flight age was observed on Sept 19, 2019 in the same location. Young chicks (< 1 week old) were often seen near their nests of origin, but as they aged sightings were less frequent. Clutches with older chicks (<2 weeks) were more frequently observed at the tideline. They were seen near the habitat fences and moved between the open tideline and dune habitat behind the fences. The greatest number of chicks and fledglings were seen in the salt panne, and the next greatest number of chicks was the corner of the north habitat nearest the lagoon.

A total of 20 chicks reached fledgling age (or were last seen within days of flight). One clutch succeeded in fledging all 3 chicks, and 3 clutches had 2 chicks survive to flight age. Five clutches had one chick survive. The most productive area for fledglings was the salt panne, each of the successful multi-chick clutches occurred in this location. The clutches that succeeded on the outer beach were able to fledge just one chick. For a map of locations where chicks were observed on nest surveys, see Map 5.

## Comparison to previous years

Nest numbers and outcomes for WSP have been carefully tracked and recorded since 2003 (table below). The number of WSP nesting attempts and successful nests in 2019 was higher compared to all previous years on record. See Figure 5 for a graph of all years.

# California Least Tern

## Spatial Distribution and Abundance

Adult Abundance and Dispersal: On May 4th we sighted the first CLT of the season, when a pair were observed flying over the dunes of the north habitat. At this time, they did not display interest in landing. On May 15, 22 CLT were observed landing and beginning to make scrapes in the dunes. The adult population increased over the next 3 weeks until reaching a number that fluctuated between 40-60 individuals through the end of June. The maximum survey count was 60 individuals on June 23. Following a loss of CLT nests due to predators between June18 and 23rd, the population decreased to between 10-20 individuals thereafter until the last half of August. Within a week of the nest losses CLT were seen flying over and landing in south habitat for the first time in 6 years. Their population in the south reached a peak of 20 adults over the next month, during which time one nest was established. The last adults were seen in the north habitat on August 19. See Figure 6 for a chart of season chronology.

Nest Locations: CLT utilized most of the area within the north habitat fence for nesting. The first nests were established closest to the Ormond Lagoon and as more nests were established, they spread south. Three nests were located outside of the north habitat fences on the southern end. One nest was established in the south habitat fence after the depredation event in a second wave of nesting. See Map 6 for nest locations.

## Nesting Outcome

Nest Chronology: CLT were observed to be courting and scraping in the north habitat on the May 15 survey, and the first two nests were found on May 21. These nests were quickly depredated by ravens. A small number of additional nests were established the following week between May 26 through June 1, then nest numbers increased rapidly after June 2nd. Nest numbers reached a maximum of 78 concurrent nests by June 18. Then approximately 50 nests where depredated between the surveys conducted on June 18 and June 25th, and the number of nests dropped from 78 to 21. After this nest numbers never rebounded, although there was a small second wave of nesting. Through July 22nd there were between 6-13 active nests. One nest was established in the south habitat and several other CLT pairs were seen scraping in the area, but did not established nests. The south habitat nest successfully hatched in late July, although the chicks did not survive to fledge. See Figure 7 for the nest chronology.

Nests Fates: A total of 92 CLT nests were found, of those 31 hatched (35%), 60 failed (64%) and 1 had an unknown outcome (1%), see Figure 8. Of the failed nests, 49 were depredated, 1 was abandoned pre-term, 4 were crushed by humans pushing bikes through the nesting habitat, and 6 were brooded full term but failed to hatch.

### Failed Nests

Depredation: Coyotes depredated 32 nests, squirrels took 8 nests, ravens were responsible for 7 lost nests and 2 nests were lost to an unknown predator. There were numerous squirrel

dens within the colony, but this is the first year coyotes were responsible for a large number of nest losses. See Figure 10: Predators of CLT Nests.

Vandalized: Individuals cut the habitat fence and crossed inside the nesting area with bikes to either cross from the back to the tideline, or to take shortcuts to reach encampments. Bike tracks road over 4 nests and crushed the contents of the nests.

Abandoned: A single nest that had one egg was left after 2 weeks. This nest was located outside of the habitat fence in an area with heavy foot traffic. More than likely this nest was abandoned due to disturbance.

Non-viable: Six nests were brooded full term, but the eggs did not hatch. Presumedly the embryos died during development. Three of these nests were in the 2nd wave of nesting which just had 9 nests (33% non-viable).

Unknown Fate: One nest had the marker stolen and the nest was never re-found.

Figure 9: Causes of CLT Nest Failures.

## Egg Fates

A total of 165 eggs were laid, 53 hatched, 89 were depredated, 7 were destroyed by humans, 2 were abandoned pre-term and 12 were incubated full term but failed to hatch.

## Chick and Fledgling Observations

A total of 38 downy chicks were directly observed within days of hatching and at least 18 reached fledgling age. Fledglings were present for just over 5 weeks. The final number of fledglings were combined from the count on July 23 (12 CLT fledglings) and the count taken 3 weeks later on August 15 (6 fledglings). This represents the fledglings that survived from the 1st and 2nd waves of nesting. See Figure 11.

## Comparison to previous years

This year had the greatest number of CLT nests since 2005, continuing an upward trend in CLT nesting on Ormond Beach since 2015 when there were zero nesting attempts. However, in 2019 there was also a large increase in depredation of nests. As a result, there were half as many successful nests in 2019 compared to 2018, despite more nesting attempts. See Figure 12: CLT Outcomes for the past 15 Years, 2005-2019.

# Predators

Many predators of WSP and CLT were observed during surveys. Thirteen avian predators were observed. Several non-avian predators were present, primarily evident from tracks. Coyote, ravens and squirrels were the primary predators that caused nest loss of both WSP and CLT nests. See chart below for a list of all predators documented March - Sept 2019.

Coyote (*Canis latrans*) Coyotes were seen in the salt panne and in the north habitat. They were especially damaging to CLT nesting success, taking 53% of all CLT nests (49 out of 92 nests). In the north habitat where plover nests where mixed with the CLT colony, one WSP nest was also lost to a coyote at the same time that all of the CLT nests were depredated.

Common Raven (*Corvus corax*) Ravens where caught on camera harassing WSP nests that had predator exclosures, and pulling chicks out of exclosures within hours of hatching. Ravens were especially persistent harassing nests in the salt panne area. Without predator exclosures in this area it is likely that no nests would have succeeded.

California Ground Squirrel (*Otospermophilus beecheyi*) Squirrels established dens inside the north habitat and consistent with past years also depredated CLT nests.

Horned Lark (*Eremophila alpestris*) Although there is no evidence that WSP nests were depredated by horned larks, trail cameras captured horned larks landing on predator exclosures causing defensive behavior by WSP (ducking on nest). Two CLT eggs were found with puncture holes, which may have been horned larks.

Loggerhead Shrike (*Lanius ludovicianus*) There is also no evidence that loggerhead shrikes depredated WSP adult or nests, but trail cameras captured shrikes landing on predator exclosures and in one case pinning down and attacking an adult WSP. The WSP survived and the nest later hatched. Shrikes were seen only in the south habitat.

Great Horned Owl (*Bubo virginianus*) A trail camera captured a great horned owl attacking a WSP while brooding a nest during the night. The nest was protected with a predator exclosure, so the owl hit the exclosure and knocked it off of the nest. The adult WSP escaped and was later seen in the vicinity of the nest. However, the camera never captured an adult brooding the nest again, and a couple days later the eggs were depredated by a raven (also caught on trail camera).

| **Predators** | |
|---|---|
| American Crow (*Corvus brachyrhynchos*) | Opossum (*Didelphis virginiana*) - tracks |
| Common Raven (*Corvus corax*) | California Ground Squirrel (*Otospermophilus beecheyi*) |
| Great Blue Heron (*Ardea herodias*) | Coyote (*Canis latrans*) |
| Great Egret (*Ardea alba*) | Long Tail Weasel (*Mustela frenata*) |
| Great Horned Owl (*Bubo virginianus*) | Raccoon (*Procyon lotor*) - tracks |
| Horned Lark (*Eremophila alpestris*) | Rattlesnake (*Crotalus atrox*) |
| Loggerhead Shrike (*Lanius ludovicianus*) | Domestic dog (*Canis lupus familiaris*) |
| Northern Harrier (*Circus cyaneus*) | Domestic cat (*felis catus*) |
| Peregrine Falcon (*Falco peregrinus*) | |
| Red-tailed Hawk (Buteo jamaicensis) | |
| Snowy Egret (Egretta thula) | |
| Turkey Vulture (Cathartes aura) | |
| Western Gull (Larus occidentalis) | |

## Threats to Nesting Success

### Homeless Encampments

In 2019 we had the greatest amount of intentional human destruction of nests that we have had in 17 years of nest monitoring on Ormond Beach. This includes 2 WSP that had the eggs taken and 4 CLT nests that were run over by bikes. In addition to outright nest destruction, there was nest tampering in both the north and south habitats.

North Habitat: There were approximately 40 encampments, most with multiple individuals, nearby throughout the season. Tampering in this location includes removal of predator exclosures from WSP nests and addition of miscellaneous beach materials to nest scrapes (such as rubber balls), and removal CLT nest markers from nests in the north habitat. Nest markers where found as far as half a mile away from nests, but more often they were picked up thrown away from the nests. At least one nest was never re-found because the marker was missing, so the nest was recorded as having an unknown outcome. We do not know how many of the abandoned nests were lost because of disturbance to the nesting habitat due to human traffic near nests. It is also possible that the increase in predation this year was due to the human activity in and near the nesting habitat, including a large amount of trash and human waste.

South Habitat: An unhatched egg was taken before we could collect it and replaced with a rubber ball. An WSP egg of unknown origin was placed in another nest that had previously hatched. A pentagram was drawn in the sand around the later nest. One individual in particular was seen repeatedly crossing through the nesting habitat who believe may be responsible for this activity.

In addition to nest vandalism and tampering, habitat fencing was cut on the north habitat, despite regular patching, to enable crossing the nesting area with bikes and carts. T-posts and fencing were removed on the side nearest the encampments of the north habitat and re-purposed to encircle nearby tents, 2 trail cameras were stolen, and materials were pilfered from the Arnold Rd entrance to Ormond Beach. Two trail cameras were stolen directly off of nests.

All of these incidences were reported to USFWS, CDFW (vis the Cal-tips hotline) and the Oxnard Police department. However, throughout the nesting season no one from any of these agencies responded on site to any of our calls or reports.

# Discussion

The season of 2019 was a season of extremes. Both species monitored had record numbers of nests. We documented more nests this year than in any year since we began tracking nest numbers in 2003. In particular the WSP had a banner year. Not only did we have a total of 55 nests (compared to an average of 30 nests per year between 2003 to 2019), but we also had a

very high hatching rate of 78%. WSP laid 162 eggs this year, of those 72% hatched and we had a record number of fledglings survive. Ironically, CLT had one of the worst years yet, despite record numbers of nests because of heavy depredation.

More ominous then depredation losses, however, is the addition of at least 40 homeless encampments to the list of threats to nesting success. This is the worst year we have ever experienced regarding the presence of homeless on the beach. Not only does this introduce disturbance and nest destruction to the nesting habitat, but it impairs our ability to monitor and protect these species. The presence of homeless threatens the safety of our volunteers, student workers and paid biologists. We reduced the area of monitoring this year to avoid an isolated area where encampment inhabitants behaved in threatening ways toward our monitors. Trail cameras provide critical information that informs our program about the presence of predators, but if homeless regularly search the nesting habitat for things to steal we cannot put out cameras. Likewise, if our fencing is regularly stolen, we cannot fence nesting habitat.

Significant improvements to the homeless encampment problem need to occur before next season, otherwise these problems will only escalate and further impact nesting outcome.

# Recommendations and Objectives for 2020 Nesting Season

1. **Beach Encampments**

   **Issue**: Homeless encampments near nesting habitat. Since the end of the nesting season both Cities, Hueneme and Oxnard, have conducted homeless abatement. Unfortunately this moved some of the homeless onto the former Halaco site which is privately owned.
   **Solution:** Continue to work with local authorities to identify and remove trespassing homeless encampments.

   **Issue:** Homeless accosting biologists and volunteers.

   **Solution:** Provide an emergency contact card for each volunteer and send out biologists and volunteers in group of a minimum of two.

2. **Better protection for nests and chicks**

   **Issue**: Changes to the nesting fences have left some nesting areas unprotected by fences.
   **Solution:** Increase the use of “post and cable” fencing where practical and limit use of more expensive materials

3. **Public Education**

   **Issue**: Many beach goers are unaware that there are federally listed nesting birds on the beach and that their activities can cause stress and reduced reproductive success. Also, they have little or no understanding of the VAS Shorebird Recovery efforts.

**Solution:** Continue to recruit, train and deploy volunteers from the community to greet visitors at Arnold Rd on weekend days during the summer.

**Issue:** Though dog traffic has dramatically decreased since the dog ordinance, people are still bringing dogs through Arnold rd and Port Hueneme.

**Solutions:**

i. Collect data on the timing and numbers of dogs entering Ormond Beach beginning in February 2020 and continue data collection through the summer
ii. Meet with Hueneme and Oxnard enforcement representatives and City of Oxnard before nesting season to communicate the need to enforce dog restrictions
iii. Continue Ventura Audubon's commitment to conduct public outreach through the Volunteer Naturalist program and CSUCI partnership

4. **Predation**

**Issue: Predator pressure continues to impact nesting success**

**Solutions:**

i. Continue to use predator exclosures case by case, based on the nature of predators and nest locations.
ii. Deploy trail cameras pre-season, on trails and on nests that are within the habitat fences to try to determine which predators are present and which are approaching nests and predating them.
iii. Increase monitoring time in the colony.

# Acknowledgements

This work was made possible by an Audubon in Action Grant from Audubon California and a Summer Undergraduate Research Fellowship from CSUCI. We would like to thank the landowners California Coastal Conservancy and the City of Oxnard for all of your support and assistance.

We would also like to thank the 'Steward or Ormond Beach' Walter Fuller, Ventura Audubon Vice-President Bruce Schoppe, Volunteer Naturalist Alecia Smith, my Student Undergraduate Research Fellows from CSUCI Alissa Goldberg, Clara McNamara, Tanya Saxena and student volunteers Jason Suddith, Zach Adkins and Matt Wells.

GenOn has made available access to their private contractor's parking lot which provides us safe access to the middle and north nesting habitats, as well as a storage container in the same parking lot for our north end supplies. The Nature Conservancy has made available use of an access road through their property that allows us safe passage and parking close to the least tern nesting area in the north habitat.

Finally, thank you to the Ventura USFWS office for your support and guidance as we navigate the complex landscape of Ormond Beach.

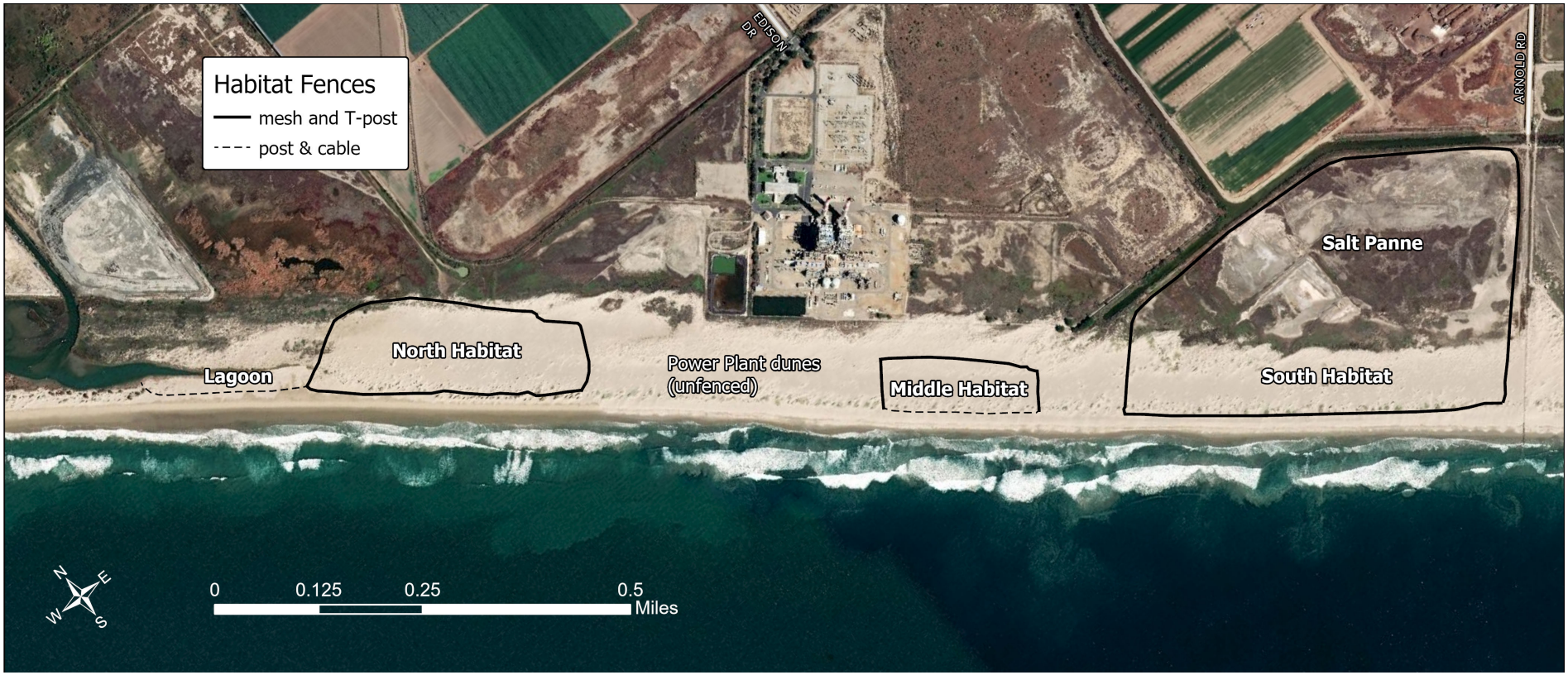
In memory of Reed Smith, our mentor and friend who began Ventura Audubon's work on Ormond Beach over 20 years ago.

# Appendix A: Maps

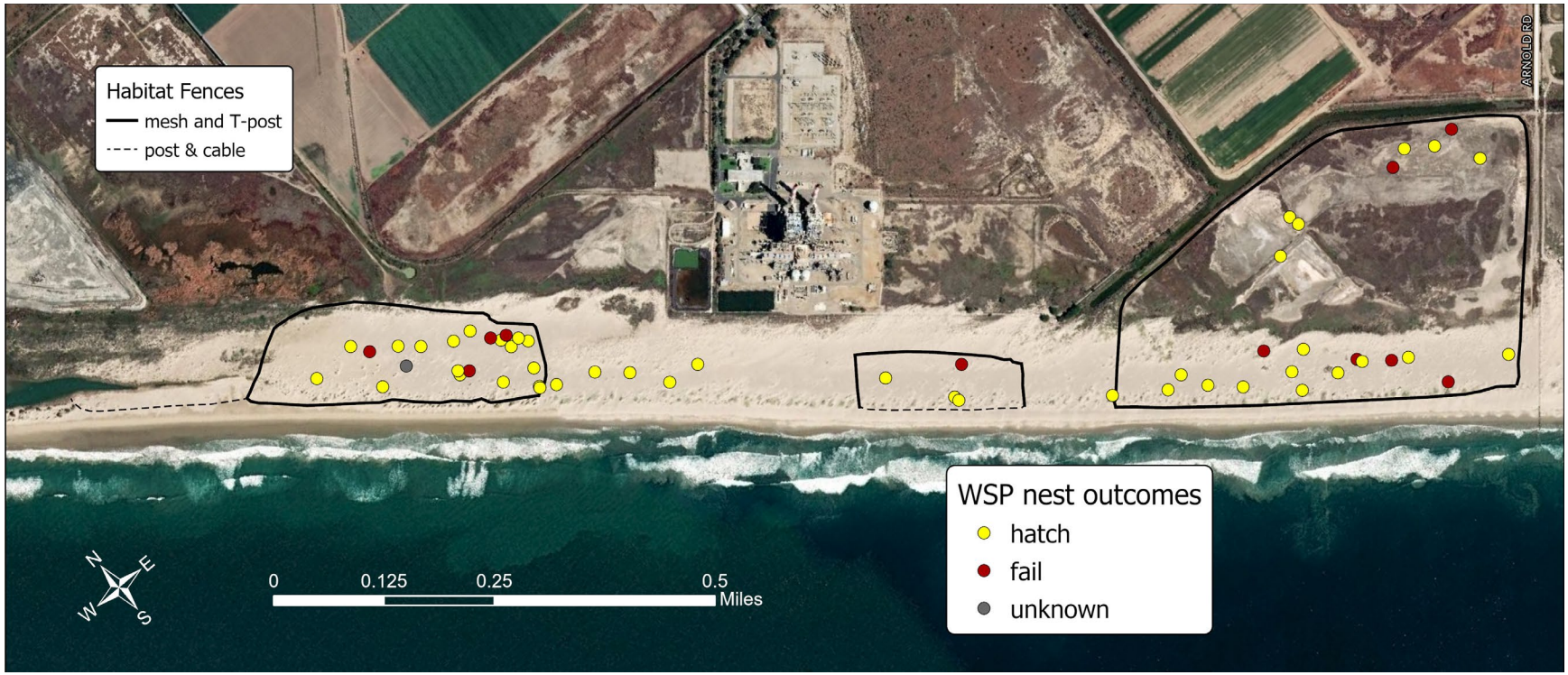
Map 1: Ormond Beach property owners and neighboring properties

Map 2: Ormond Beach survey area

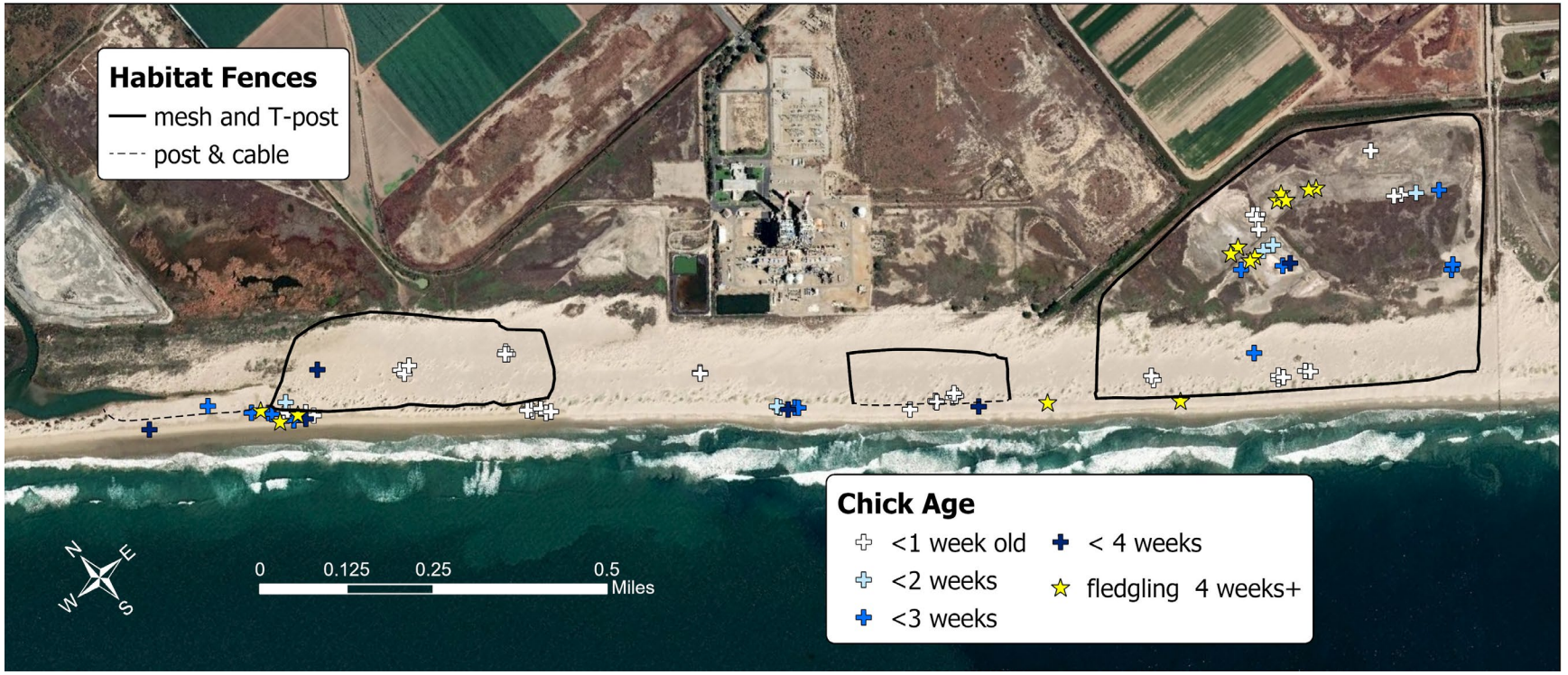
Map 3: Fences enclose 3 habitat areas



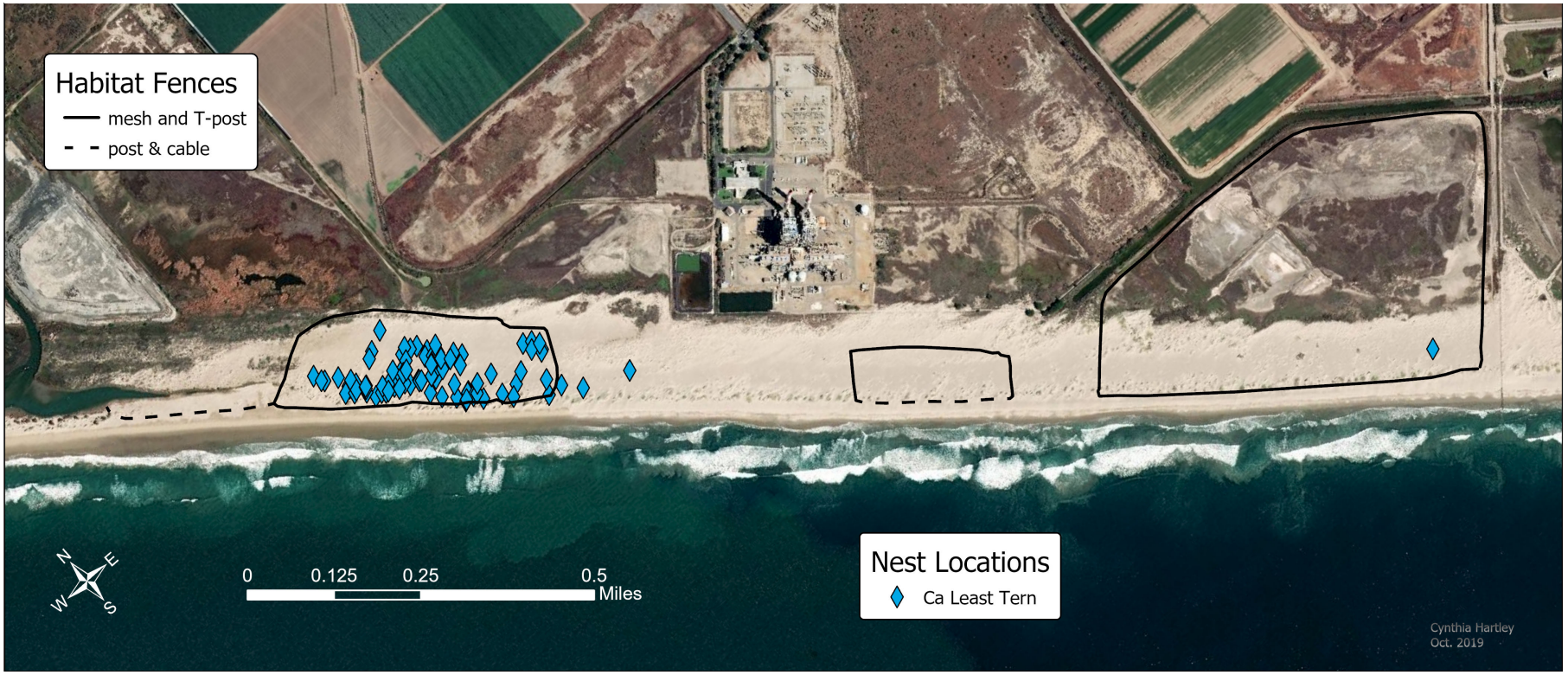
Map 4. 2019 WSP nest locations and outcomes relative to fence boundaries



Map 5. Location of WSP chicks and fledglings



Map 6. Locations of CLT nests



# Appendix B: Tables

Table 1. WSP population data and survey dates

| Week | Last Survey of the Week | Total: adults | Total: all ages | ♂ | ♀ | Unknown sex/age | Chick | Fledgling (Ormond) | 1st yr birds | # clutches |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3/22/2019 | 85 | 85 | 46 | 39 | 0 | 0 | 0 | 0 | 0 |
| 2 | 3/31/2019 | 118 | 118 | 66 | 52 | 0 | 0 | 0 | 0 | 0 |
| 3 | 4/4/2018 | 73 | 73 | 0 | 41 | 32 | 0 | 0 | 0 | 0 |
| 4 | 4/13/2019 | 60 | 60 | 0 | 3 | 57 | 0 | 0 | 0 | 0 |
| 5 | 4/20/2019 | 40 | 40 | 13 | 18 | 9 | 0 | 0 | 0 | 0 |
| 6 | 4/26/2019 | 76 | 82 |  | 33 | 2 | 6 | 0 | 0 | 2 |
| 7 | 5/2/2019 | 44 | 48 | 31 | 12 | 1 | 4 | 0 | 0 | 2 |
| 8 | 5/10/2019 | 23 | 31 | 19 | 4 | 0 | 8 | 0 | 0 | 3 |
| 9 | 5/14/2019 | 29 | 33 | 17 | 11 | 1 | 4 | 0 | 0 | 3 |
| 10 | 5/23/2019 | 41 | 44 | 21 | 14 | 6 | 3 | 0 | 0 | 2 |
| 11 | 5/30/2019 | 63 | 70 | 39 | 24 | 0 | 3 | 4 | 0 | 2 |
| 12 | 6/4/2019 | 52 | 58 | 32 | 17 | 3 | 6 | 0 | 0 | 2 |
| 13 | 6/13/2019 | 63 | 71 | 39 | 24 | 0 | 8 | 0 | 0 | 5 |
| 14 | 6/18/2019 | 49 | 54 | 27 | 16 | 1 | 4 | 1 | 0 | 3 |
| 15 | 6/26/2019 | 30 | 41 | 15 | 15 | 0 | 9 | 2 | 0 | 6 |
| 16 | 7/6/2019 | 38 | 52 | 23 | 15 | 0 | 2 | 3 | 9 | 2 |
| 17 | 7/11/2019 | 35 | 44 | 23 | 12 | 0 | 9 | 0 | 0 | 4 |
| 18 | 7/18/2019 | 53 | 66 | 32 | 21 | 0 | 11 | 2 | 0 | 7 |
| 19 | 7/24/2019 | 48 | 55 | 28 | 20 | 0 | 5 | 2 | 0 | 2 |
| 20 | 7/30/2019 | 42 | 51 | 9 | 8 | 25 | 8 | 1 | 0 | 3 |
| 21 | 8/6/2019 | 41 | 44 | 12 | 28 | 1 | 1 | 2 | 0 | 1 |
| 22 | 8/15/2019 | 44 | 47 | 2 | 0 | 42 | 3 | 0 | 0 | 2 |
| 23 | 8/22/2019 | 18 | 25 | 2 | 0 | 16 | 6 | 1 | 0 | 3 |
| 24 | 8/28/2019 | 43 | 45 | 0 | 0 | 43 | 1 | 1 | 0 | 1 |
| 25 | 9/9/2019 | 66 | 67 | 0 | 0 | 66 | 1 | 0 | 0 | 1 |
| 26 | 9/12/2019 | 49 | 50 | 0 | 0 | 49 | 1 | 0 | 0 | 1 |
| 27 | 9/19/2019 | 35 | 51 | 0 | 0 | 49 | 0 | 1 | 1 | 1 |

Spring Window Count
Peak Breeding Activity

Table 2. Zoo raised WSP chicks - release and band information

| Release Date | SBZ ID | Arrived From | Hatch Date | Left:Right Band Combos | code | |
|---|---|---|---|---|---|---|
| 18-Jul | 2019.8 | Oceano Dunes | 29-May | VV: Aqua over violet | vv:av | |
| 18-Jul | 2019.9 | Oceano Dunes | 29-May | VV: Blue over orange | vv:vo | |
| 18-Jul | 2019.12 | Ormond | 3-Jun | VV: Yellow over violet | vv:yv | seen at Malibu Lagoon, Sept 2019 |
| 18-Jul | 2019.13 | Ormond | 3-Jun | VV: Pink over violet | vv:pv | |
| 18-Jul | 2019.14 | Ormond | 4-Jun | VV: White over violet | vv:wv | |
| 18-Jul | 2019.2 | Oceano Dunes | 3-Jun | VV: White over orange | vv:wo | |
| 18-Jul | 2019.21 | Oceano Dunes | 3-Jun | VV: White over blue | vv:wb | |

# Appendix C: Figures

Figure 1. Weekly WSP Adult Population Counts

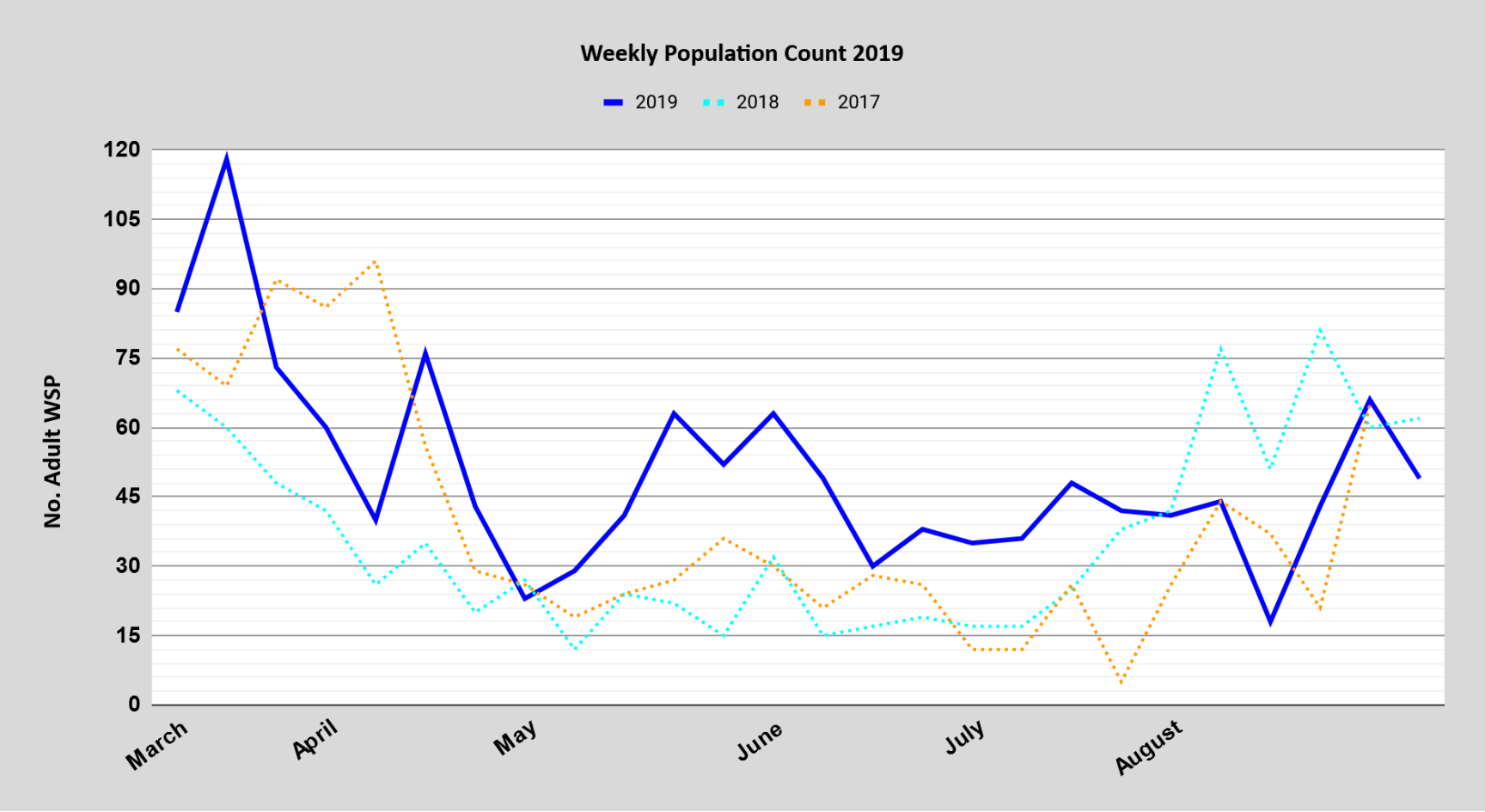


Figure 2. WSP Nest Chronology, breeding activity peaked on June 12

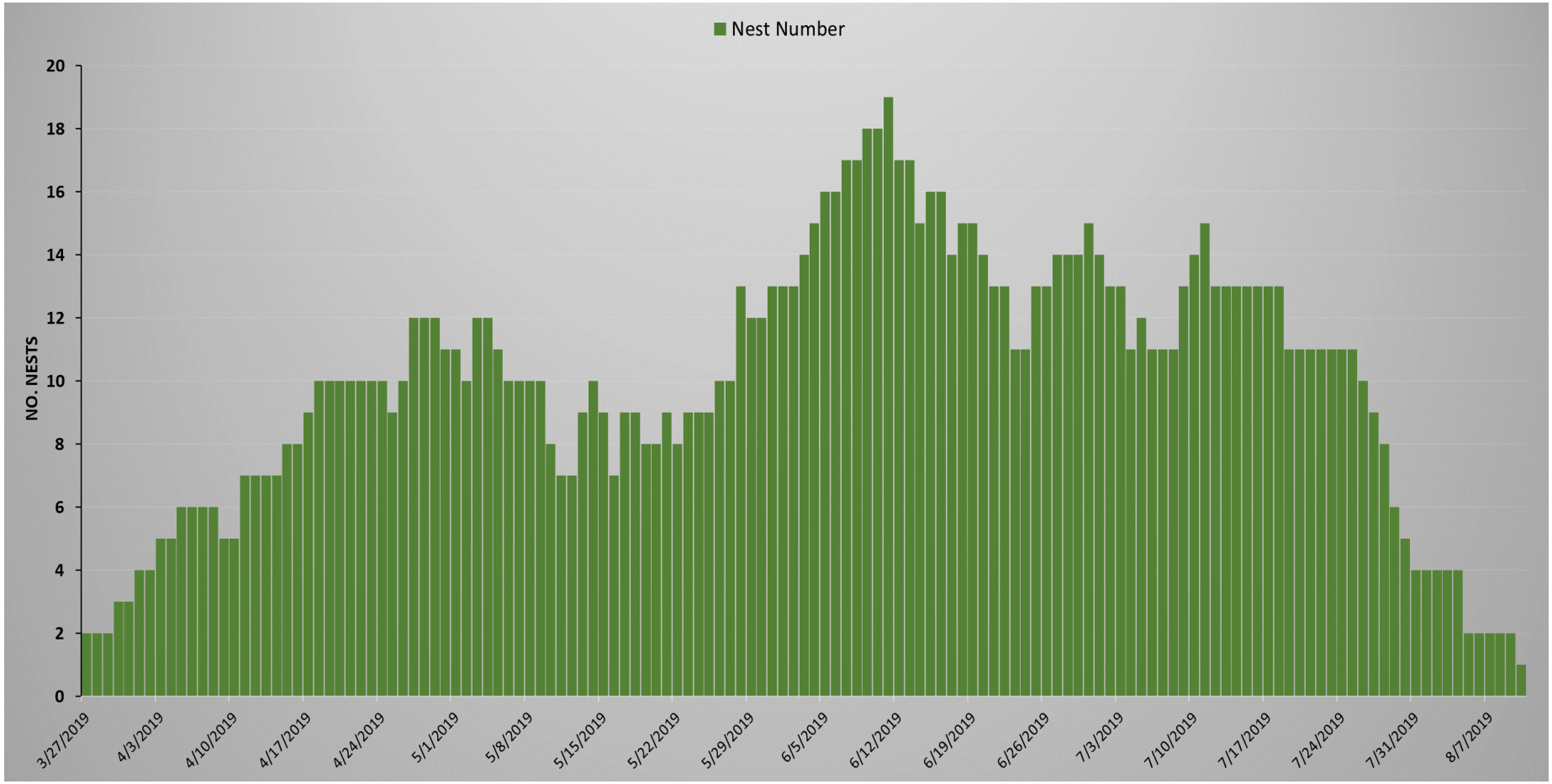


Figure 4.  WSP Nest Outcome

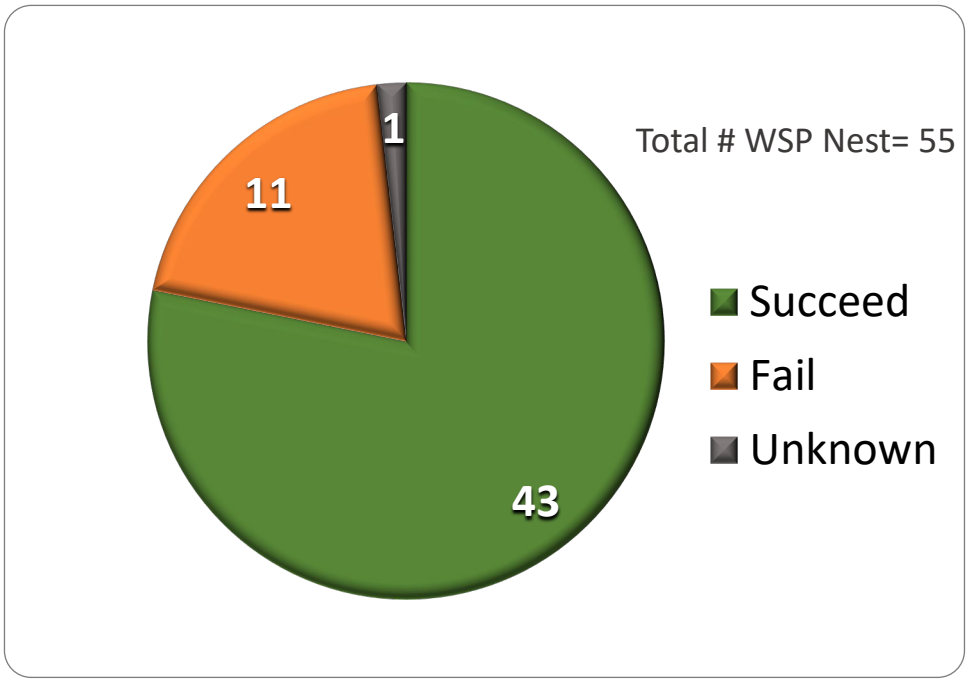



Figure 3. Causes of WSP Nest Failures

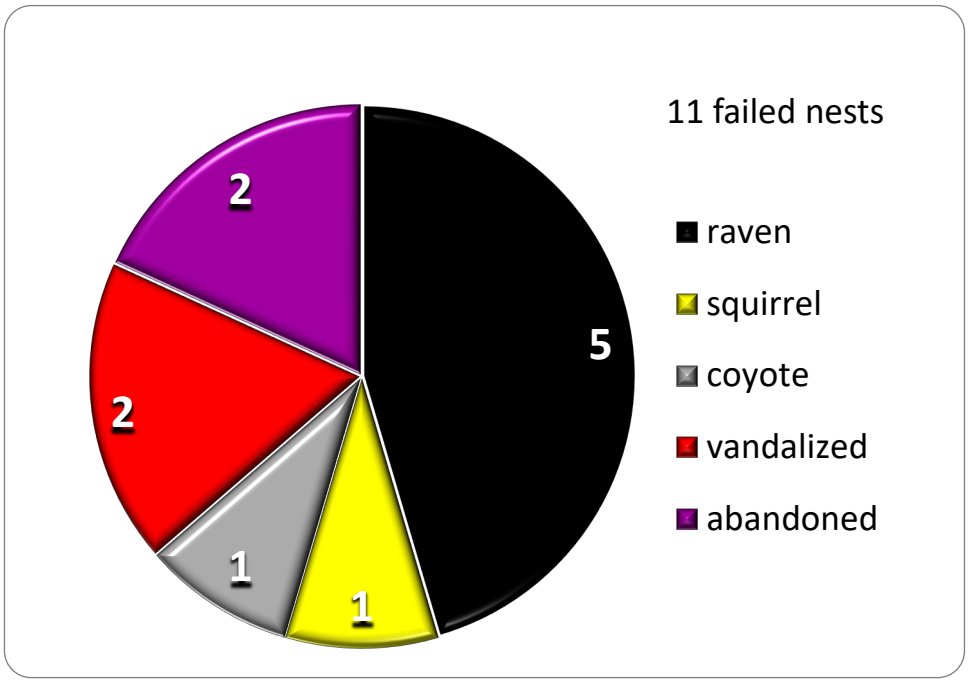


Figure 5: WSP Outcomes for the past 17 Years, 2003-2019

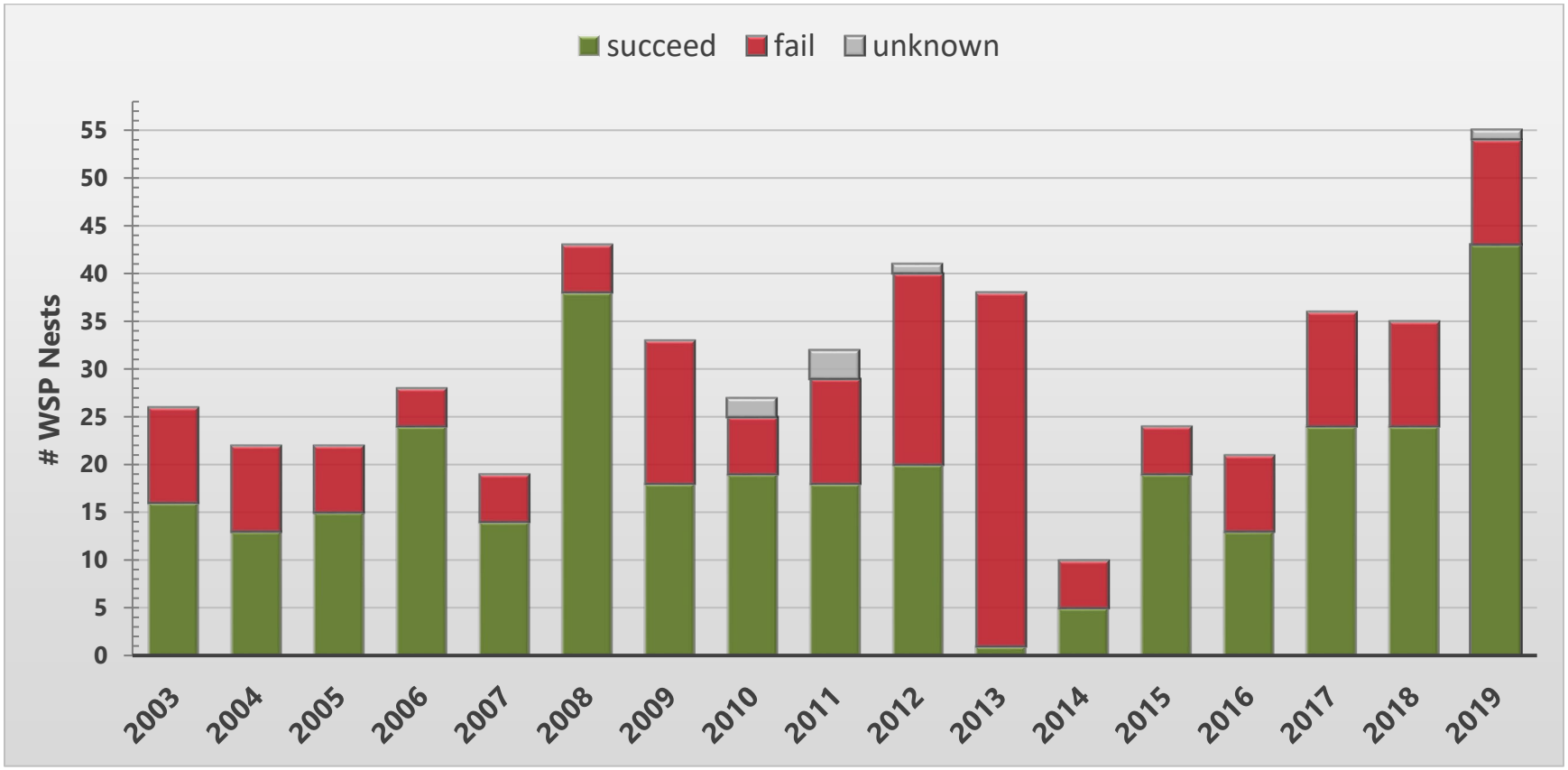


Figure 6. CLT Season Chronology

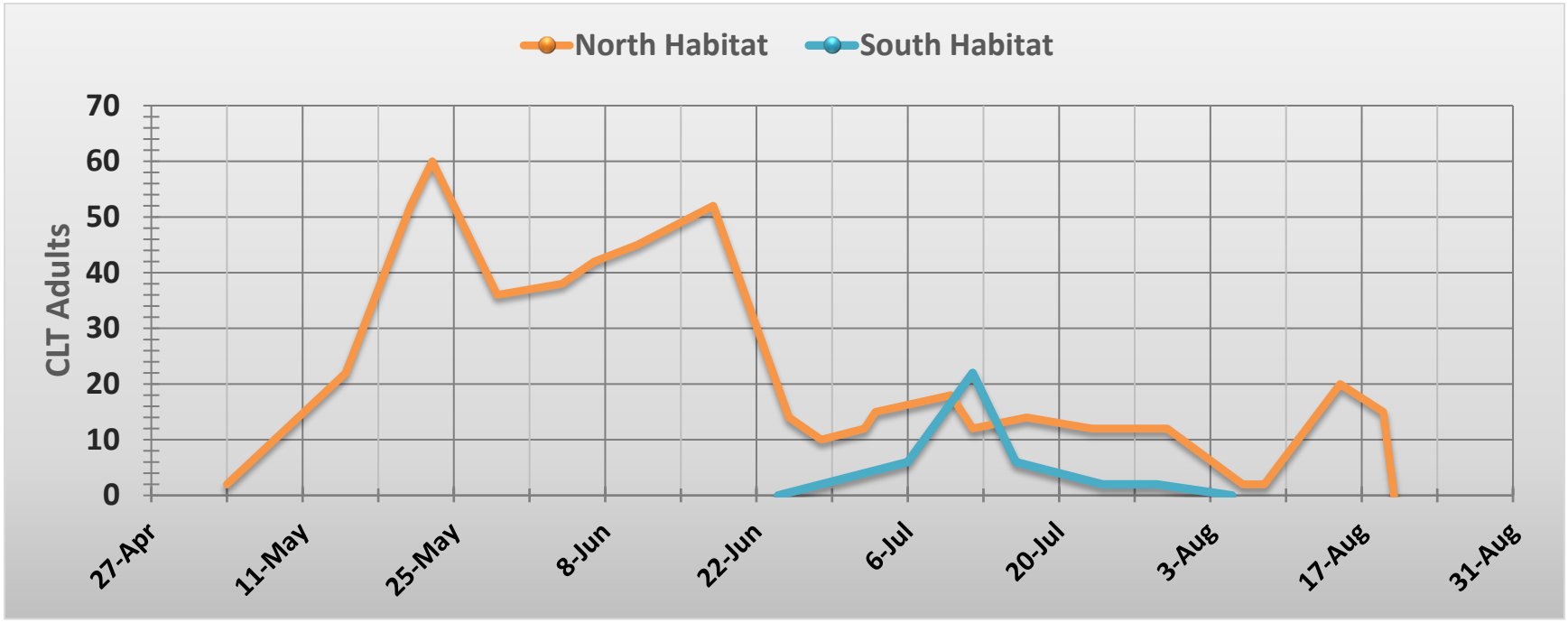


Figure 7. Nest numbers California Least Terns

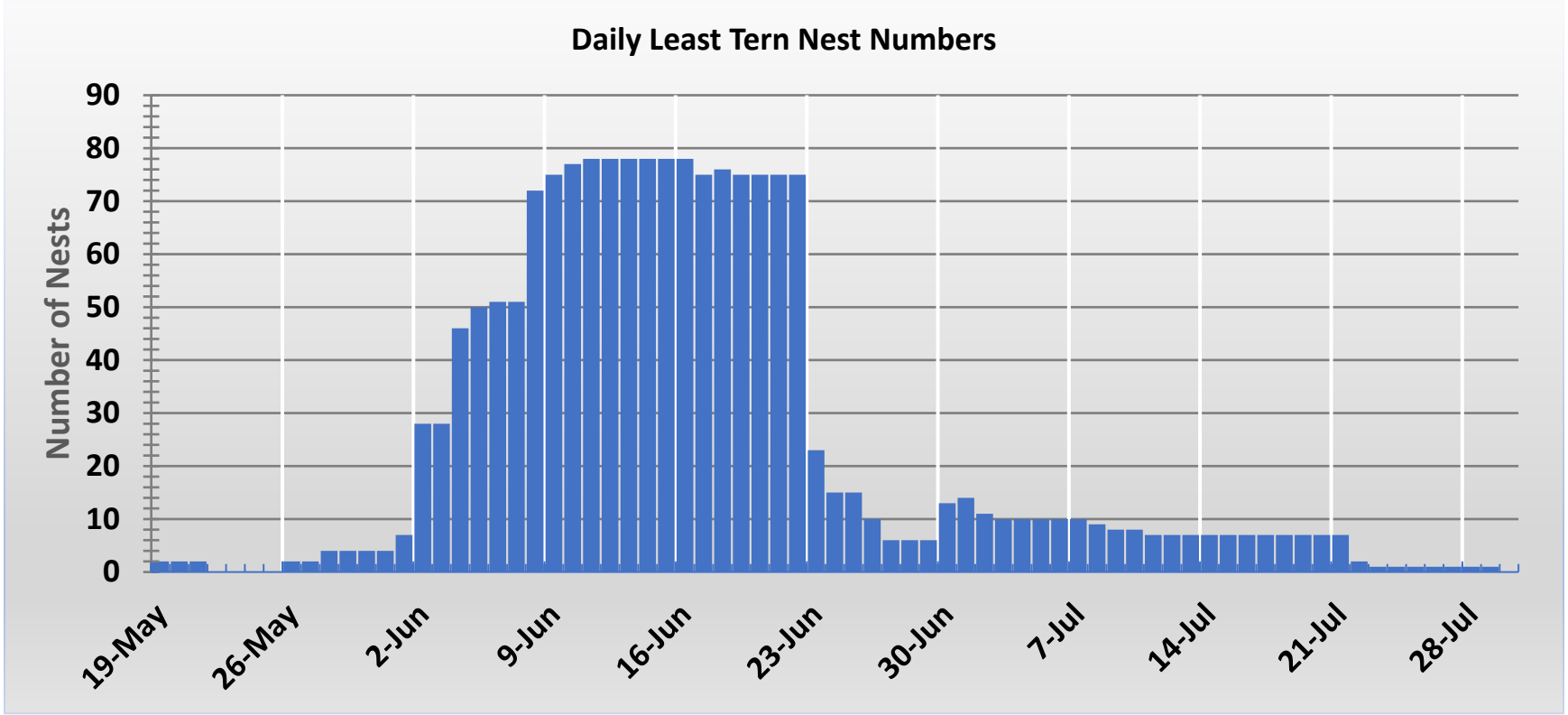


Figure 8:  Nesting outcome for Least Tern nests

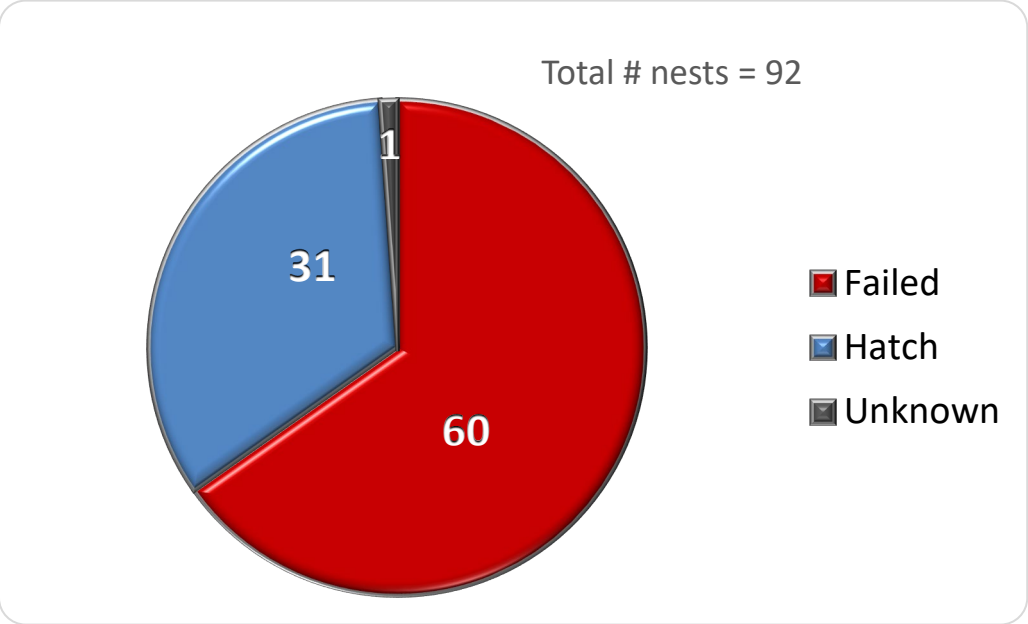



Figure 9: Causes of CLT Nest Failures

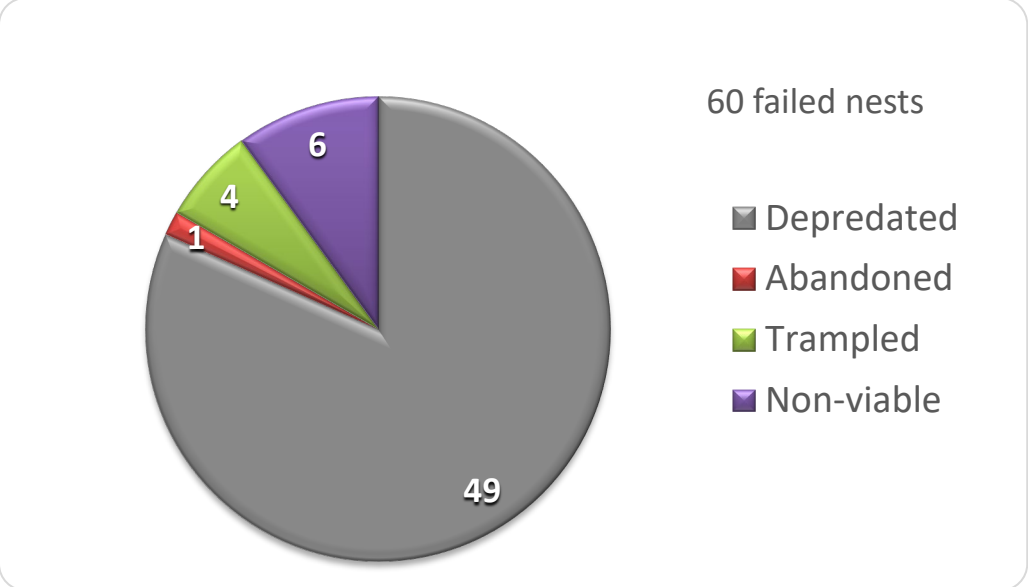


Figure 10:  Predators of CLT Nests

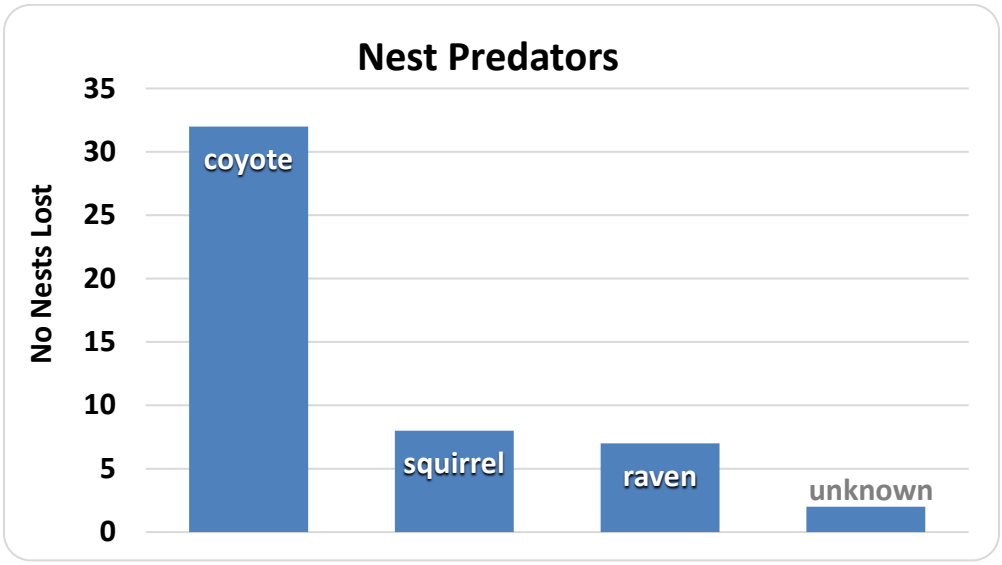



Figure 11: A total of 18 CLT Fledglings

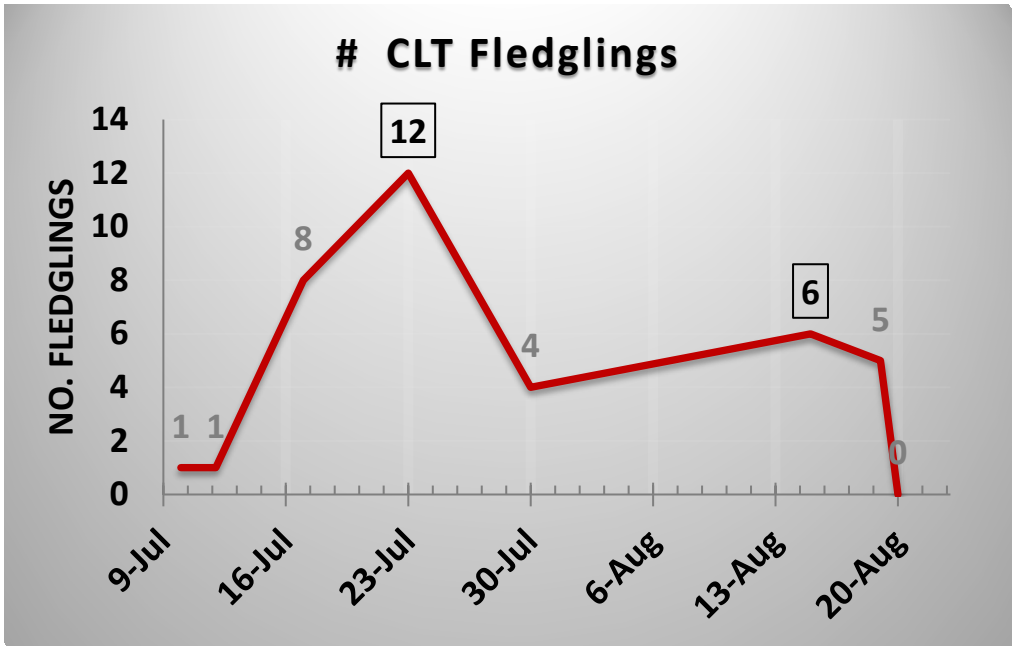
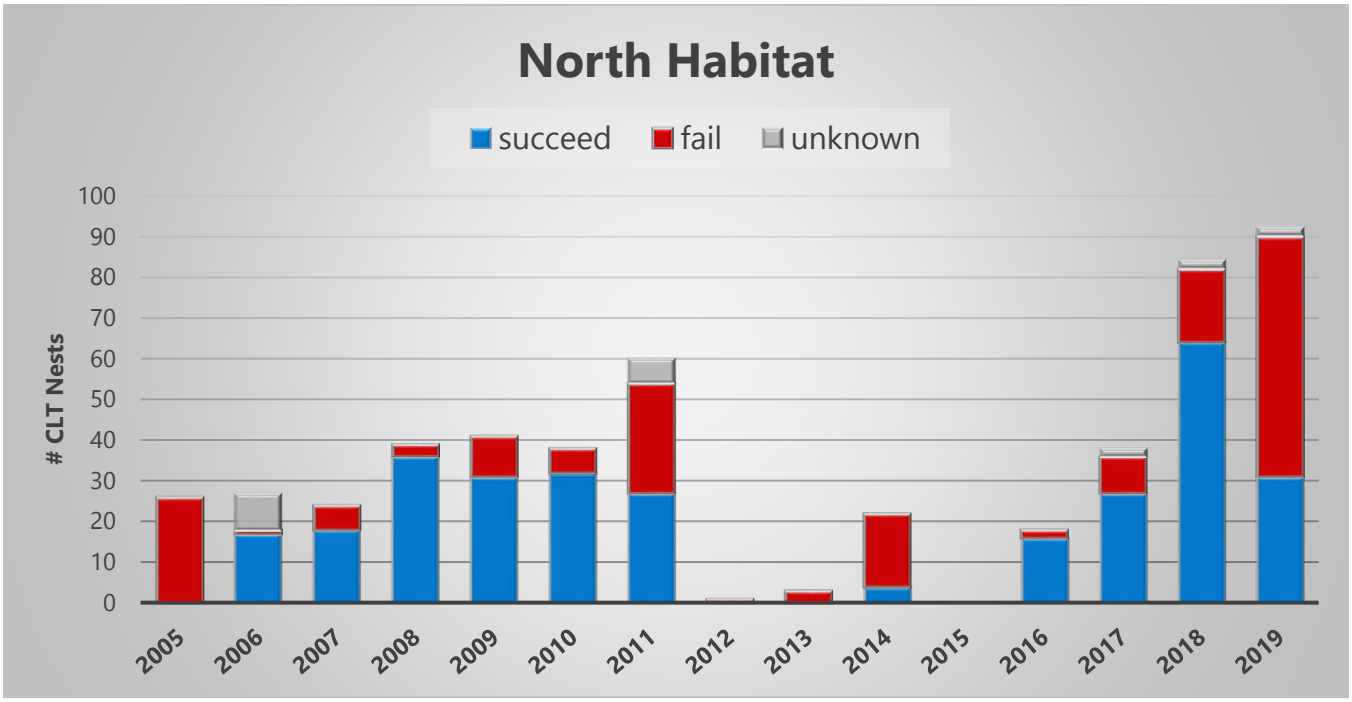


Figure 12: CLT Outcomes for the past 15 Years, 2005-2019



# Appendix D: Photographs

Photo 1:  Habitat Fence

Photo 2: Symbolic Fence and Cable Fence

Photo 3: Temporary Symbolic Post and String Fence


# References

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