Ormond Beach, California

Western Snowy Plover and California Least Tern Breeding Survey

2015 Season

Submitted to:
Chris Kofron
Recovery Permit Coordinator
U.S. Fish and Wildlife Service 2493 Portola Rd, Suite B Ventura, CA 93003

Cynthia Hartley
Ventura Audubon Society
Permit# TE-181713-1

Table of Contents

Introduction

The abundance and productivity of the threatened western snowy plover (WSP) (*Charadrius alexandrinus nivosus*) and the endangered California least tern (CLT) (*Sternula antillarum browni*) was monitored at Ormond Beach in Oxnard, Ventura County, California from March 15, 2015 to September 15, 2010. Loss of habitat, predation pressures, and breeding bird disturbance have caused the decline of the coastal population of WSP and led to the federal listing of the Pacific Coast Population of WSP as threatened under the ESA on March 5, 1993 (Federal Register 1993). The CLT subspecies was federally listed as an endangered species in 1970 and as endangered under the state in 1980 (USFWS 1985).

Executive Summary

Western Snowy Plover

Population abundance varied from approximately 70 individuals at both the beginning and end of the season, to a low of 6 individual birds at mid-season (June 30). A total of 24 WSP nests were identified, of which 79% successfully hatched (19 nests) and 21% failed (5 nests). Of the failed nests, 4 were abandoned and 1 was lost to high tide. The number of breeding WSP observed was 20 (9 females and 11 males) occurring on the May 7, 2015 survey. Forty nine eggs hatched out of 65 eggs laid and 5 chicks were confirmed to have fledged (8%).

First Nest Initiation Date	March 19, 2015
First Hatch Date	April 16, 2015
First Fledge Date	May 20, 2015
Period of Peak Nesting	April 13-April 21 & May 4-May 7*
Last Nest Initiation Date	July 10, 2015
Last Hatch Date	August 7, 2015
Last Fledge Date	July 27, 2015

*peak of observed breeding adults

Threats to Nesting Success: Ravens harassed nests inside of predator exclosures, 4 of which abandoned. All of the abandoned nests had mature embryos. One of the abandoned nests is suspected to have been lost due to direct predation of the adult. Human impacts to nesting success included off leash dogs, truck traffic and heavy recreational beach use between the tideline and the foredunes.

California Least Tern

The first CLT was observed flying over Ormond Beach on May 12, 2015. Breeding activity was observed during the week of May 28-June 1. Two adults were observed making scrapes on the beach together and exchanging fish on the north end, seaward of Ormond Lagoon. No CLT were observed to land on any other areas of Ormond Beach. Despite breeding behavior during this time no nests were established. Thereafter through mid-July CLT were only observed foraging in Ormond Lagoon or in nearshore waters or flying high above the beach. Contrary to past years, CLT did not attempt nesting in the dunes of the north nesting habitat.

Threats to Nesting Success**:** The area where CLT were observed displaying nesting behavior is also an area with many homeless encampments and off leash dogs. Disturbances to CLT because of these activities were constant during all observations this season. The north habitat fence where CLT have favored for nesting in the past is also a site of regular trespassing inside the restricted area. There were also ravens and a kestrel present in the north habitat when CLT arrived. All of these issues may have contributed to site abandonment before nests were established.

Site Description

Beach Ownership

Ormond Beach is owned by a patchwork of landowners. Nesting occurs on land owned by both the City of Oxnard and the State of California Coastal Conservancy (SCC). Beach access entails crossing boundaries of different land owners depending on point of entry. Legal jurisdiction also varies depending on location. 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. The northern portion of Ormond Beach is owned by the City of Oxnard. The center and southern portion of the dunes and an inland salt pan are owned by the SCC. Inland on the north end is the Halico property, a former scrap metal recycling operation designated an EPA superfund site in 2007. Adjacent to Halico and inland of the northern nesting area is property owned by The Nature Conservancy (TNC). Southeast of TNC property is a power plant owned and operated by NRG. This parcel is encircled by SCC land and fronts 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 property, which processes yard waste and food scraps into compost (Figure 1, right).

Figure 1. Ormond Beach Property Owners

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 historically 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 and has been extending over the past several years (Figure 2).

Figure 2. Survey Area

Facilities and Beach Access

There are two public entrances to Ormond Beach and one non-public access used illegally by trespassers on TNC property. One of the public access points is via Arnold Road on the south end. The road terminates in a parking lot near the beach and is the most popular access to Ormond Beach. A full time docent, Walter Fuller, lives in a trailer in the parking lot provided by the City of Oxnard. Mr. Fuller is present most of the time and greets the public, collects metrics on visitors and hands out literature and educational material. He contacts local authorities in emergencies. The parking lot has portable toilets and trash cans maintained by the Oxnard Parks and Recreation Department. The parking lot has a gate that is closed by Mr. Fuller between dusk and dawn. A locked storage container on site holds fencing materials, predator exclosures, signs and docent materials. The other main public access to Ormond Beach is via Hueneme Beach on the north end. Hueneme Beach is a popular recreational beach with several pay parking lots. Beach goers access Ormond Beach by walking south from Hueneme. The beach is also accessed illegally by trespassers who walk through The Nature Conservancy property and then cross nesting habitat to access the beach. Trespassing activities continue despite no trespassing signs and a chain-link fence and gate at the back of the nesting area. Black mesh fencing extends from the chain-link fence and encircles most of the nesting grounds. There are homeless encampments on the north end of the beach near the Ormond lagoon on City of Oxnard and City of Port Hueneme properties and also on the Halico property. NRG has made available the use of a private parking lot adjacent to their property for use by Ventura Audubon to access the north nesting area. There is also a locked container in this parking lot that holds fencing materials, supplies and predator exclosures for use by Ventura Audubon for nest monitoring activities on the north end of Ormond Beach.

Recovery Program

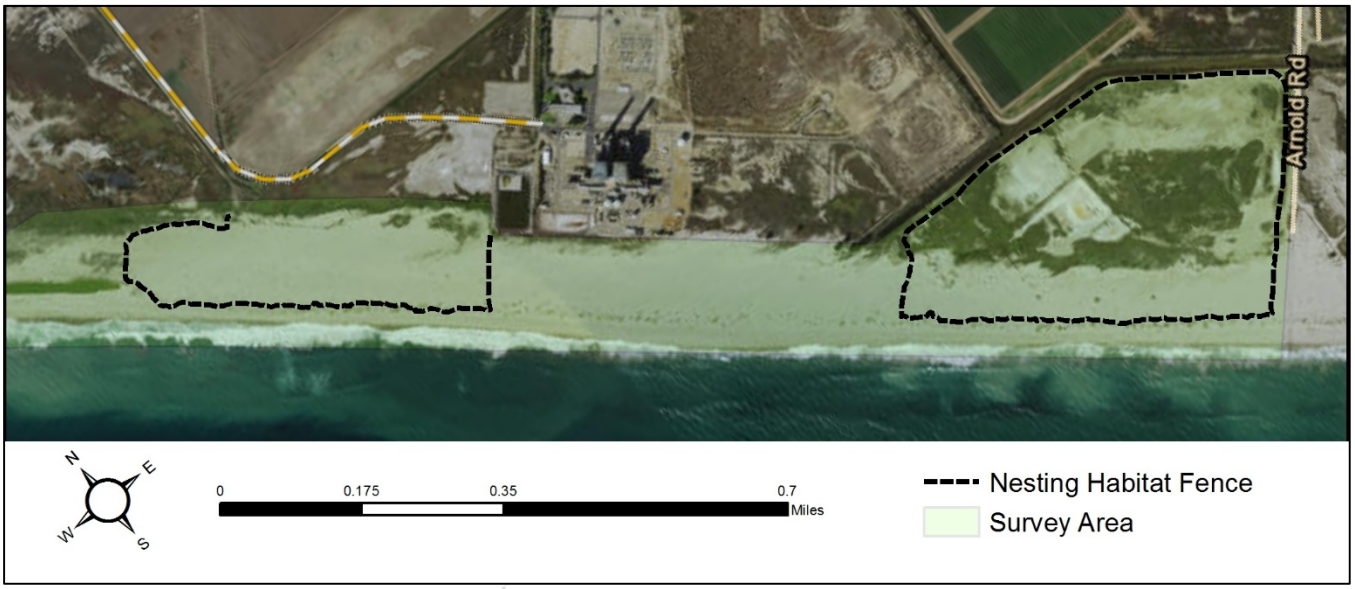
In addition to nest monitoring, Ventura Audubon leads a recovery program that addresses the causes called out by the USFWS that have contributed to the decline and listing of the WSP and CLT. Specifically the program addresses disturbance to nesting habitat by providing protection to nesting areas with fences, conducting public outreach and a docent program.

Nesting Habitat Fencing

Two areas of nesting habitat are protected with semi-permanent fencing (figure 3, next page). Fences have been used by Ventura Audubon since 2006 and the fence locations correspond to the areas of highest density nesting of WSP and CLT. Nevertheless, each year fence locations need to be re-assessed based on variations in annual habitat usage. Nesting areas are enclosed with either 4' or 5' wide black mesh cintoflex-C fencing attached to metal T-posts (Figure C- 1). On the south end 7,300 linear feet encloses 70 acres on all sides and on the north end 4,000 linear feet enclose 30 acres on 3 sides (Figure 3, next page). The north and south nesting habitat fence locations were chosen based on nesting clusters documented starting in 2002. The mesh openings are 1.75" square through which birds and small animals easily move in and out. The T-posts are planted every 10-20'. The fence is intended

as a visual demarcation of the nesting area, rather than a predator exclusion fence. It provides a physical barrier that is challenging, although not impossible, for humans to cross. 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, cross under the fence. The material is UV resistant, so it weathers well in the beach environment. The fence is semi-permanent, but is left in place year round because the beach area is remote and vagrants are a year round problem. Our experience has shown that the nesting habitat boundary is easier to enforce when enclosed by a year-round fence. In past years vagrants have readily inhabited the nesting area if it is easily accessible and we have found that they are unlikely to comply with closures to areas they are accustomed to accessing (Figure C- 2). Vandalism to the fence is an ongoing problem.

Figure 3. Nesting Habitat Fence Boundary in 2015



Symbolic fencing

Symbolic fencing was used for the nests established outside of the black mesh fences. Symbolic fencing consisted of wood stakes hammered into the sand in a circle around the nest and strung with pink kite string (Figure C- 3). Ideally the radius of the circle was equal to or greater than the flushing distance of the brooding adult, however some birds flushed at a distance of 200'. This was impractical for symbolic fencing so the circles were made as large as possible. Seasonal closure signs in both English and Spanish were affixed to posts, as well as Audubon "Share the Shore" signs created by school children (Figure D- 1). Sometimes birds established nests inside the black mesh fence, but so close to the edge that beach goers flushed the brooding adult. In these cases a semi-circle of symbolic fencing was used to keep the public far enough away from the fence to prevent disturbance to the brooding adult.

Predator Exclosures

Both a 3'X3' and 2'X2' square wire mesh cage design was used, the smaller version was adopted in late May 2015 (Figure C- 4). Exclosures were made of galvanized wire with 2"X3" openings. Upon discovery of a WSP nest, an exclosure was placed over the nest. The exclosures were anchored to the ground with 6' landscape staples. Adults were observed to ensure that they returned to brooding, which happened in all cases. Symbolic fencing was used in combination with predator exclosures on nests outside of habitat fences. After May the use of predator exclosures was discontinued on nests behind the black mesh habitat fences because predators appeared to be cuing in on them. However exclosure use on nests established outside of the fences on the foredune toe was continued. It was necessary because nests in these locations had a greater risk of being run over by service trucks that regularly drove the beach above the high tide line, as well as beach walkers and joggers who favored that part of the beach and unleashed dogs. To reduce visibility to predators the smaller 2' cube was adopted. Two to four wood stakes with no string were used instead of a circle of symbolic fencing and signs were downsized and printed on tan or green colored paper (Figure D- 2) instead of white. Throughout the season 3-5 decoy exclosures (not on a nest) were left in both fenced areas to attempt to confuse predators.

Docent Program

Ventura Audubon and California State Parks are partners in the Ventura County Public Beaches WSP and CLT Docent Program. Ventura Audubon provided docent manuals that were given to docents during training, fliers for handing out to the public, leashes to give to dog owners who did not bring leashes to the beach and dog treats for compliant dogs. A State Parks Volunteer Coordinator led a three hour training class at San Buenaventura State Beach (SBV) where docents learned the life history of CLT and WSP, how to engage the public, safety information and best practices for contacting dog owners with off-leash pets. Docent trainees were taken to the beach and given the opportunity to view WSP that inhabit SBV and if a nesting WSP was present they had the opportunity to observe a brooding bird. Each Ventura County public beach where WSP and CLT nest was described in detail and volunteers were given the option of selecting the beach on which they wanted to serve. Docents had access to a shared calendar to log their hours and were asked to serve 2 hours per week, however attendance was voluntary, unsupervised and up to the volunteer to schedule. In 2015 training sessions where held on April 11, May 2 and June 7. A total of 20 volunteers attended training and out of this group 9 docents served at Ormond Beach from May until September for a total of 102 hours (Table 1). This is the third year of the program and 2015 was the first year docents were deployed on Ormond Beach.

Table 1. Docent hours served on Ormond Beach

	May	June	July	August	September	total
Docent Hours	20	50.25	12.75	13	6	**102**

Western Snowy Plover

Methods

Population Abundance

A dune ridge has formed over the past 10 years and the beach in front has extended so that in many places there is about 100' of relatively flat sand seaward of the dune ridge. In order to thoroughly census the entire beach it was divided into 3 areas that were surveyed once weekly on different days. The tide line in front of the dune ridge from the Mugu boundary line to Hueneme Beach was one segment, the south nesting habitat fence and dunes in front of the power plant was another and the north nesting habitat fence and dunes next to the north side of Ormond lagoon was the 3rd area. Areas were covered in sequential days when possible and count totals for the week were summed from the 3 areas. Because of the presence of many homeless encampments near the Ormond Lagoon, including a loose aggressive pit bull that belonged to one camp, that area could not be thoroughly searched.

Nest Surveys were conducted for 25 weeks from March 15 through the first week of September. Monitoring was conducted by walking wandering transects. The entire beach was covered a minimum of once per week and nests were rechecked between 1-3 times per week. All plovers observed were recorded by age and gender. Banded WSP observed during the survey period were recorded and the data was sent to Frances Bidstrup at Point Blue.

Breeding Activity

Nest Fate

When a nest was found, it was approached to collect GPS coordinates. The date found, number of eggs and sex of brooding adult was recorded. Because of the presence of ravens, if an adult WSP was observed from a distance brooding a nest previously marked it was not approached again. Nests that did not have exclosures were not marked in any way. An observation point 150-200' away from the nest was identified and that location was marked with a waypoint. Detailed notes were taken on nearby nest landmarks for re-sighting. If no adult was observed brooding from 100-150' away, the nest was approached to check eggs. Each nest was followed until hatching, or until 28 days after discovery even if no bird was observed brooding. 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. Next, the nest scrape was carefully examined for footprints 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 and locating chicks when possible (Mabee 1997). If eggs remained in the nest for more than 28 days after discovery and no adult was observed nearby it was tested for failure. Failed nests were determined based on placing an egg on end and rechecking within 3-7 days to see if an adult was in attendance. If the egg remained in the same position, the eggs were collected and submitted to the Western Foundation of Vertebrate Zoology (WFVZ) for analysis of incubation stage and to be archived. Unhatched eggs left over from successful nests were also collected and submitted to the WFVZ.

Nest Initiation

Nest initiation was calculated for nests confirmed to have hatched by subtracting 28 days from the first observed survey date in which no eggs remained in the nest. Known nests were re-checked from a distance between 1 and 3 times per week and docents on the beach reported observations of newly hatched chicks on several occasions. This enabled more accurate estimation of nest fate dates than has occurred in past years when the beach was walked just once per week. For nests determined to have failed, nest initiation was estimated to be the first date the nest was observed. For abandoned nests, the date of abandonment was taken as the first survey date that the adult was not seen brooding the nest or associated with it in any way.

Breeding Adults

The number of breeding adults was estimated by adding the number of nests and the number of active broods. One breeding male and female were attributed to each active nest and one breeding male was attributed to each active brood. The survey with the highest number of breeding adults was taken to be representative of the season. This is a conservative estimate as it reports only observed breeding adults and assumes a high rate of re-nesting of the same birds. There is no banding conducted on Ormond Beach so it is not possible to identify individual birds.

Chick Observations

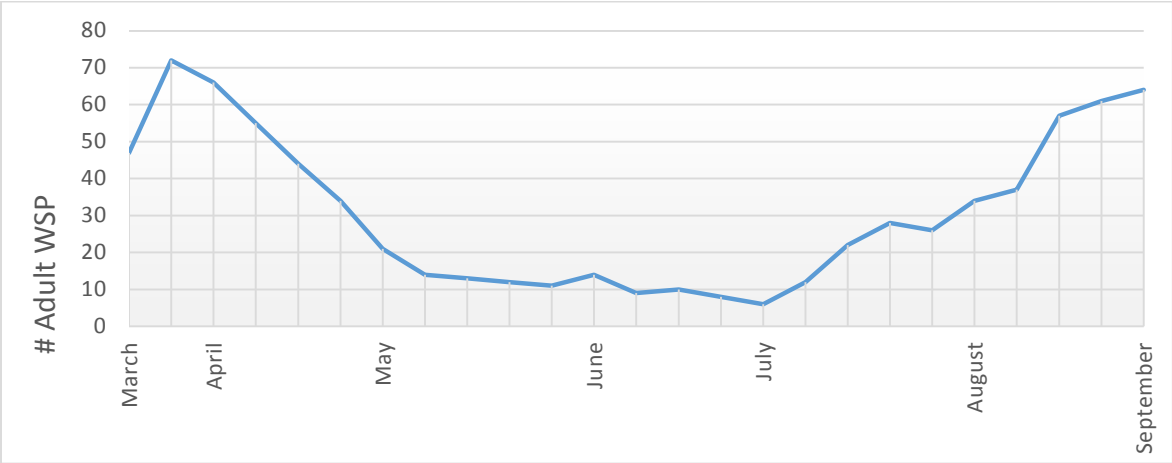
All chick sightings were recorded with a GPS waypoint collected as close as possible to locations were chicks were either directly observed or reported by docents. Once a nest hatched chicks were looked for each week and where possible tracked until fledging. Fledglings were determined to be from Ormond Beach if they had been spotted for several weeks in the same area prior to reaching fledge age and if they were accompanied by a guarding adult. Hatch year chicks that did not meet these criteria were assumed to be from other beaches.

Results

Population Abundance

Population abundance was highest the first and last three weeks of the survey period, corresponding to migration times. The last week of March had the largest number of birds with 72 individuals. After the first week of April the population numbers dropped weekly reaching the lowest numbers between mid-May to early July with 6-14 individuals. The breeding window survey was conducted on May 22 which was week 10 of the season. On the window count Ormond Beach had a total of 11 males, 0 females, 7 chicks and 1 fledgling. The lowest survey number occurred the first week of July with 6 individuals. Thereafter each week the population increased reaching a late season high of 64 individuals in September (Figure 4, next page). For detailed population counts and dates, see Figure B- 1.

Figure 4. Weekly Population Counts



Banded WSP

An adult male with the combination ya:ya was observed two times in March, then again on two occasions in August. During the March sightings the bird was seen on the south end of Ormond and in August it was on the north end near Hueneme Beach. This bird fledged from Moss Landing Salt Ponds in 2014. Another male with the combination ro:ar was observed for three consecutive weeks in the last half of March and the first week of April. The last sighting was on April 1st. The same bird was reported two days later on April 3rd at Guadalupe dunes. It fledged in 2014 between Marina and Salinas NWR (Figure B- 2).

Breeding Activity

Breeding Adults

The estimated number of breeding adults was 20 individuals, derived from 9 nesting pairs and 2 males with clutches that occurred on May 7, 2015. A total of 24 nests were dispersed over almost the entire 2 mile length of Ormond Beach. Nests were clustered into 5 main areas (Table 2), which is consistent with spatial dispersal of nests in past years.

Table 2. Nest numbers in each nesting area

Area	Ormond Lagoon	North	Power Plant	Salt Pan	South	Total
# Nests	2	5	6	3	8	**24**

Nest Initiation

The first nest was initiated on March 19, 2015 and the final nest hatched on approximately August 7, 2015. Throughout the first 4 months of the season, nest establishment occurred at a steady pace, with 6 new nests each month, except May which had 5. Then nest initiation dropped off in July to only one new nest, which was the last nest of the season (Figure 5). Although most nests were located inside one of the habitat fences (15 total), there were several nests (9) outside of the fences (Figure 6, below).

Figure 5. WSP nests initiated each month on Ormond Beach

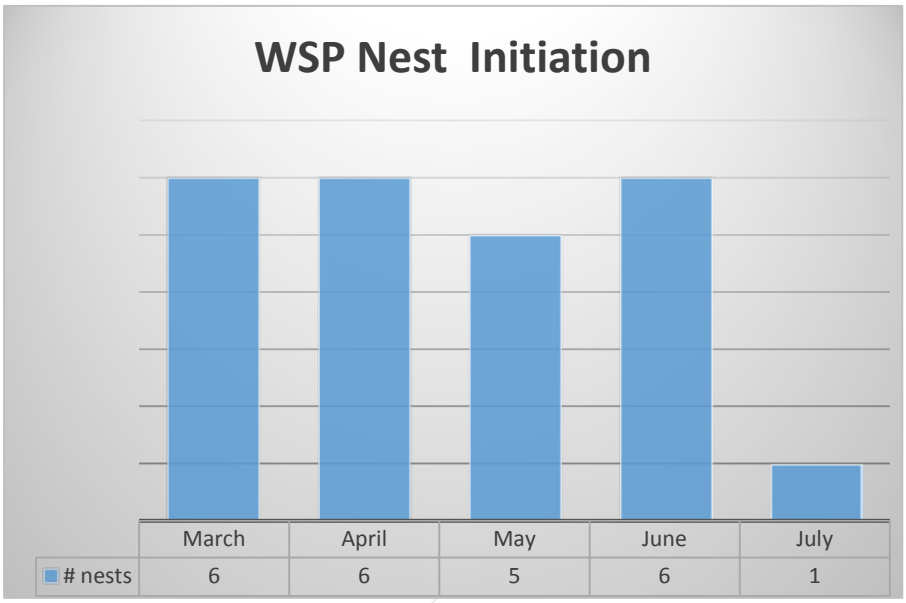
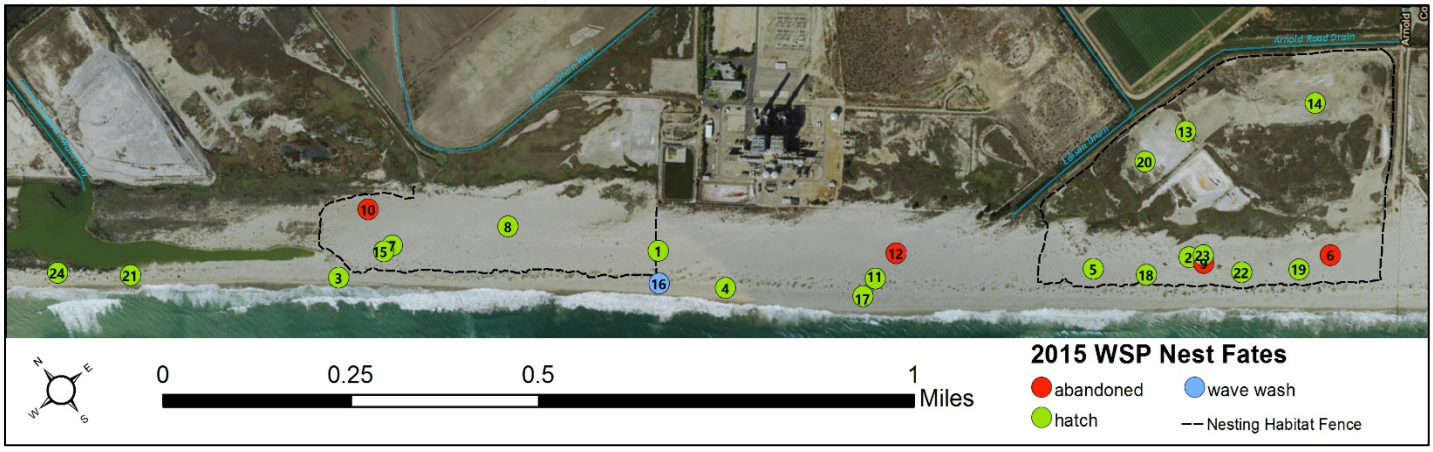


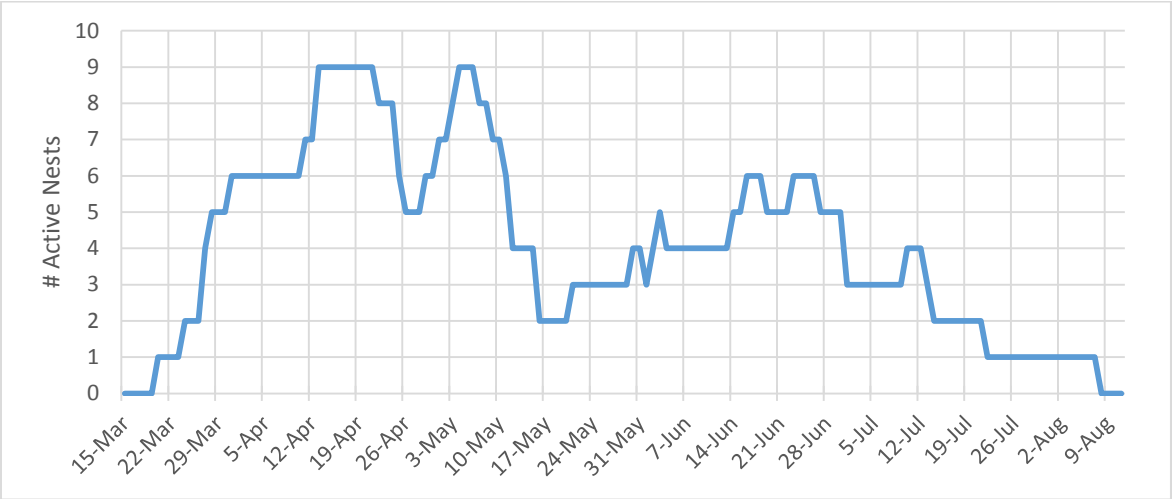
Figure 6. Nest location and outcomes



Seasonal Nest Activity

The greatest nest activity occurred in the months of late April and early May, with two peaks close together of 9 nests. In late May nest activity dropped to just 2 nests and failed to return to previous levels for the rest of the season. The sudden drop in nest activity corresponded to a cluster of nest abandonments in early May. Nest activity increased to a second smaller peak of 6 active nests in late June. Thereafter nest activity gradually decreased (Figure 7). Any of the secondary peaks during the season could represent a wave of re-nesting, however without banded birds it is not possible to determine this with certainty.

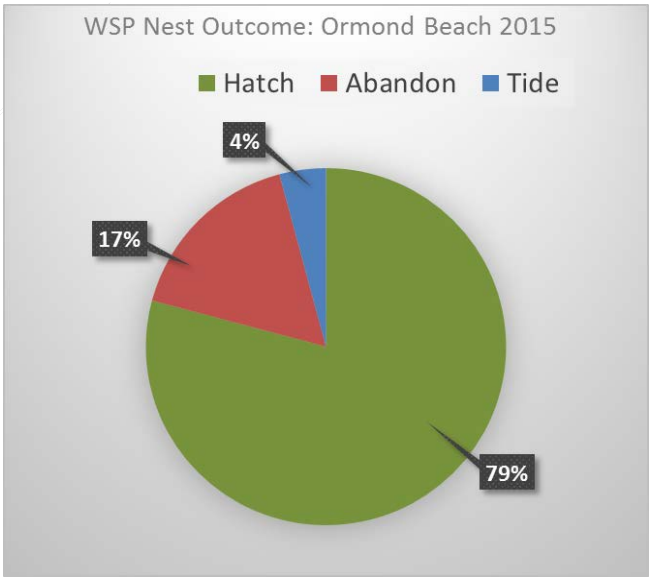
Figure 7. Time Line of Active WSP Nests



WSP Nest Fates

Nineteen out of 24 nests hatched (79%) and 5 nests failed (21%). Out of the nests that failed, 4 were abandoned and 1 nest was lost to high tide (Figure 8). For two nests, 2 out of 3 eggs hatched. The

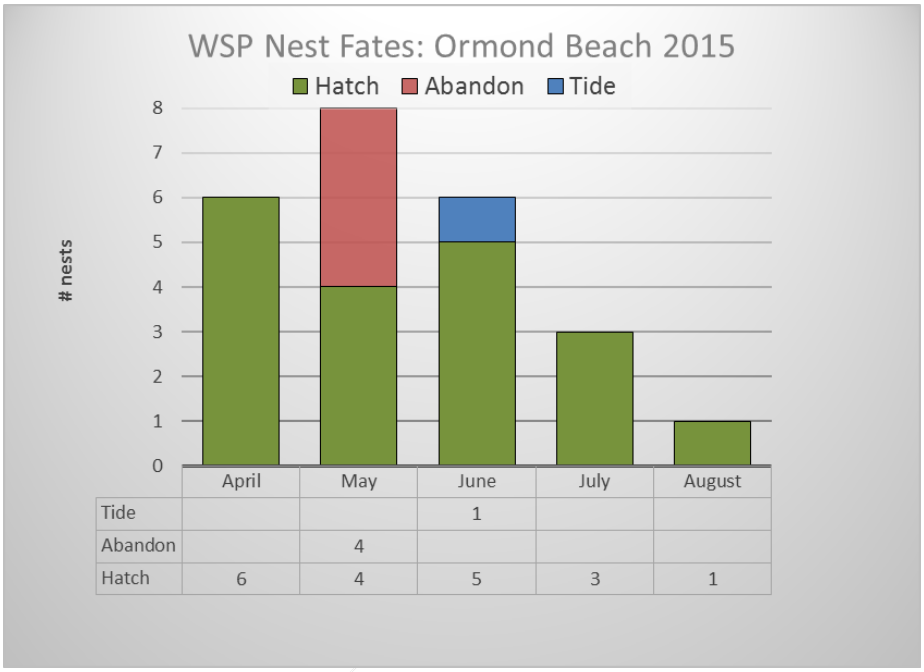
Figure 8. Four nests were abandoned, 1 was lost to tide and



unhatched egg from both nests was submitted to the WFVZ and in both cases the egg was found to be non-viable. For a table of detailed nest outcome and egg incubation status see Figure B- 3.

All 4 nest abandonments occurred within a two week period in early May. The nest lost to high tide occurred in June during a 6′ tide event (Figure 9). All of the eggs from the abandoned nests had embryonic development. The eggs from 3 of the abandoned nests were near full term and the 4th nest had small embryos. The eggs from the nest lost to tide had no embryonic development and were likely lost very soon after nest initiation.

Figure 9. Nest fates by month

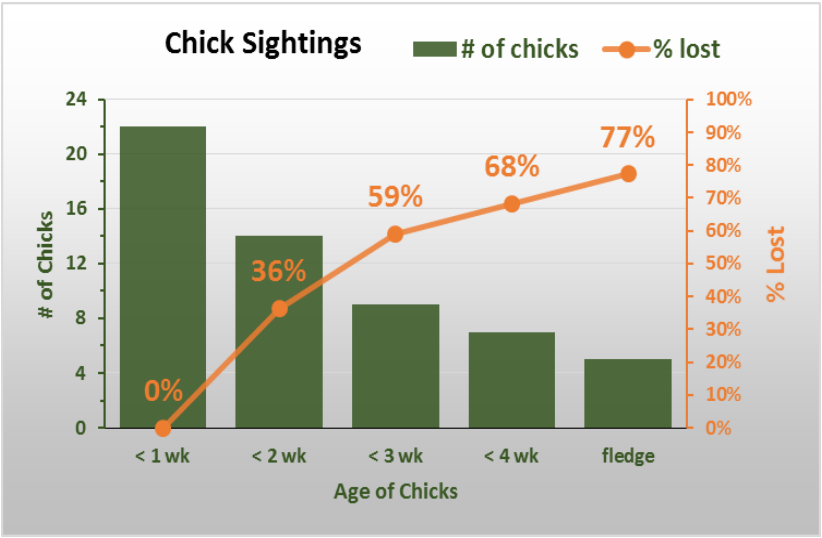


Chicks

Chick Abundance

A total of 22 chicks were sighted within one week of hatching, representing 45% of the eggs that hatched (22/49) and 34% of all eggs laid (22/65). As chicks became older sightings decreased (<week 2 = 36%, <week 3= 59% and <week 4=68% and fledglings=77%) (Figure 10, right).

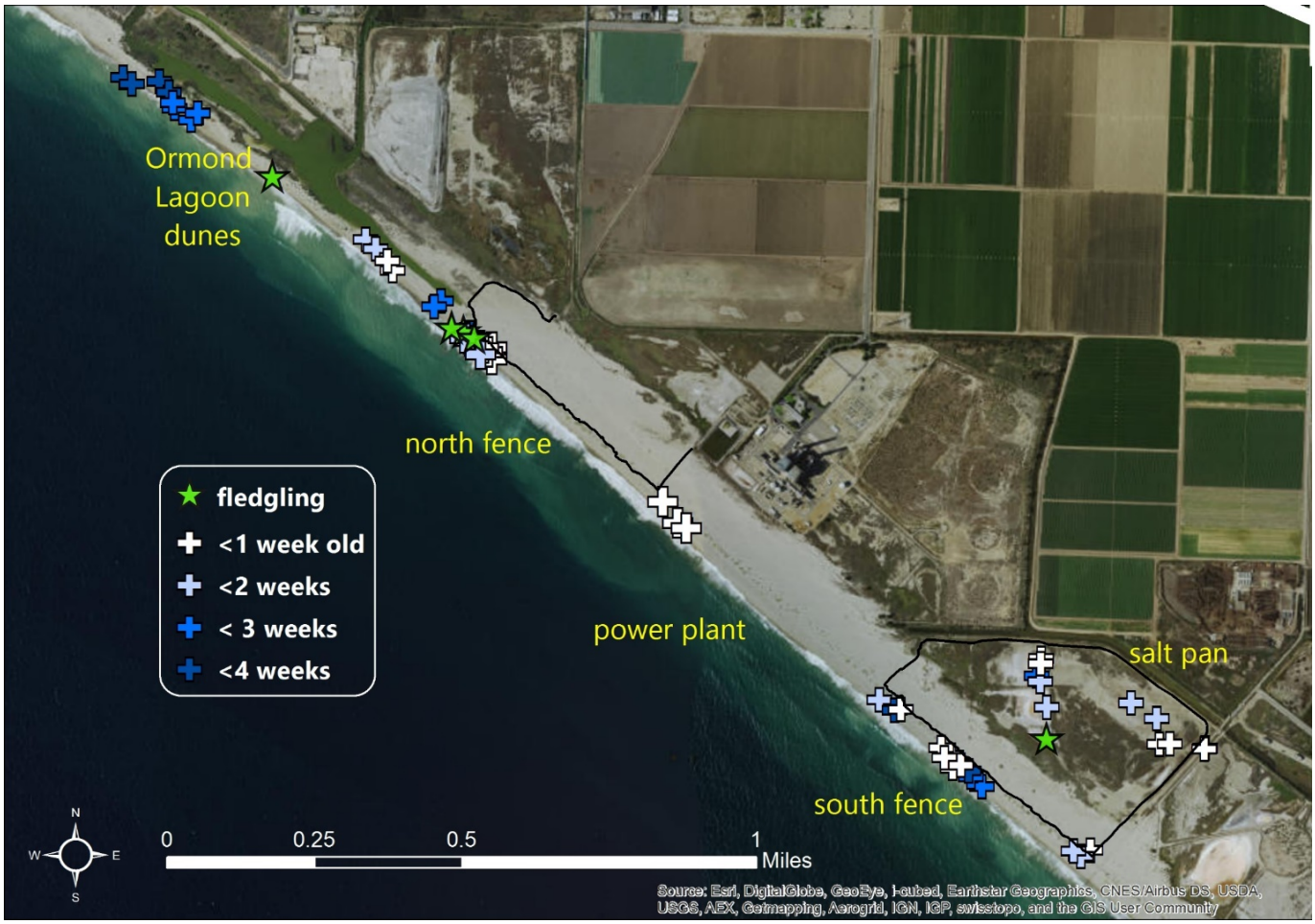
Figure 10. Age of re-sighted chicks and percent attrition



Chick Locations:

Chicks were observed almost exclusively outside of the habitat fencing between the foredunes and the high tide line. The one exception to this were chicks observed in the salt pan. There were 3 nests in the salt pan and if water was present clutches stayed nearby after hatching. The biggest cluster of chicks occurred in the wrack line adjacent to the north habitat fence. One chick fledge from the salt pan, the rest fledged on the north end of Ormond Beach. No chicks are known to have fledge from the dunes on the south end of the beach (Figure 11). With the exception of 3 newly hatched chicks from nests located in the area, no chicks were seen in the dunes in front of the power plant.

Figure 11. Location and ages of chicks



Furthermore there was a marked change in chick dispersal between the first half of the season (before June 25) compared to the second half of the season (after June 25). In the first part of the season chicks were present on the wave slope in front of the south habitat fences, but they were completely absent in the second half of the season, this despite almost the same number of nests that hatched in the south habitat area (5 vs. 4 nests respectively). The only chicks observed in the second half of the season occurred near the Ormond Lagoon (Figure A-2 and Figure A-3).

Fledglings:

Five chicks were confirmed to have fledged out of 49 hatched eggs. One nest fledged 2 chicks and the rest fledged 1 chick, so out of the 24 nest attempts, 4 nests succeeded in fledging chicks. This represents an overall success for nests of 17% (4 nests/24 attempts). The fledge rate for all eggs laid was 8% (5 fledglings/65 eggs) and for eggs that succeeded to hatch it was 10% (5 fledglings/49 eggs). Only one chick fledged in the south, and this was in the salt pan. No chicks were observed to have fledged from the beach in front of the south fence. The majority of observed fledglings (4/5) occurred near Ormond Lagoon.

Table 3. Chick and Fledgling Summary

Outcome	#Nests	#Eggs/chicks
Attempted	24	65
Hatch	19	49
Fledge	4	5

Predators

Many predators of WSP were observed during surveys. Thirteen avian predators were observed. Several non-avian predators were present, primarily evident from tracks. The exception to this were coyotes, which were directly observed in both the north and south nesting habitat within the fences, and ground squirrels in the salt pan area.

American Crow (*Corvus brachyrhynchos*)	Northern Harrier (*Circus cyaneus*)
Common Raven (*Corvus corax*)	Red-tailed Hawk (*Buteo jamaicensis*)
Great Blue Heron (*Ardea herodias*)	White-Tailed Kite (*Elanus leucurus*)
Great egret (*Ardea alba*)	Loggerhead Shrike (*Lanius ludovicianus*)
Snowy Egrets (*Egretta thula*)	Turkey Vulture (*Cathartes aura*)
American Kestrel (*Falco sparverius*)	Western Gull (*Larus occidentalis*)
Peregrine Falcon (*Falco peregrinus*)	
Coyote (*Canis latrans*)	Opossum (*Didelphis virginiana*)
Raccoon (*Procyon lotor*)	Snake, unknown species
California Ground Squirrel (*Otospermophilus beecheyi*)	

Although nests were not directly predated, ravens were observed landing on and walking around exclosures of several nests in April and May. Three abandoned within a 2 week period of each other, two of which were in the south fence and the 3rd was in the dunes fronting the power plant. The 4th nest was in the north fence and was likely lost to predation of the adult. Feathers were found in the exclosure and in a trail going north east to the TNC property behind the area. The feathers were collected and submitted along with the abandoned eggs to the WFVZ. At the WFVZ the feathers were compared to a WSP skin and determined to likely be WSP feathers (Figure C- 5). A week before this nest abandoned an American kestrel was observed landing on the predator exclosure of a nearby nest that had recently hatched. This kestrel was frequently observed landing on dunes in the north fenced area from May through August. A group of 4 ravens were also observed landing on the exclosure after it abandoned and before the eggs had been removed.

After these incidences of nest abandonment, the use of predator exclosures was discontinued on nests found inside the habitat fences. Predator exclosures were only used on nests located outside of the nesting fences between the foredunes and high tide line were vehicle traffic and beach activity threatened nests, along with small size signs (5"X7") and reduced symbolic fencing (2-4 posts, no string). All of these measures were done to reduce visibility of nests to predators, but at the same time protect the nests from human activity. Thereafter no additional nests were abandoned or predated.

Human Activities

Off leash dogs: Dogs have been a problem noted on all breeding year reports since the first report in 2003. This year a total of 855 dogs were documented entering Ormond Beach from the Arnold Rd parking lot between March and September (Walter Fuller, Sept 2015, pers. comm.). Additional dogs entering from Hueneme are not included in these metrics. Docents were present for the first time in 2015 and reported greater than 50% non-compliance with the leash law. Docents also reported on multiple occasions that dog owners generally complied when asked to leash their loose dogs, but then took their dogs off leash again when there were away from docents. On the north end of Ormond Beach there is a sign posted that bans all dogs from the beach, however there appears to be no enforcement of this ordinance. Dogs are often seen entering Ormond from this location. On June 30 during a nest survey an off leash dog was observed chasing shorebirds at the lagoon. A young black neck stilt chick had been located near the lagoon during the previous week and the parents were defending during the dog incident. At least two loose pit bulls associated with homeless camps were on the beach this season and were allowed to freely roam the beach (see section below). Beginning in July of 2015 there were no Animal Control officers on duty on Sundays, yet Sunday is the busiest day for beach visitors and dogs.

Beach Encampments and Fence Trespassing: These activities sharply increased in 2015. Encampments were located primarily around the Ormond Lagoon near the terminus of Perkins Rd (Figure C- 6); as the season progressed the number of homeless encampments increased and spread to the south end of the beach. Homeless encampments typically occurred in the cover of bushes or trees, in particular under tamarisk trees in the north end and under a large myoporum tree on the south end (Figure C- 7). Trespassing has been noted to be a problem in the north fence area beginning 6 years ago in Ormond Beach year-end WSP reports (2009, 2011-2014). This year in 2015 fresh foot and bicycle tracks crossing through the north nesting habitat were common. Trespassers entered the beach through the nesting area at the terminus of a foot path coming from The Nature Conservancy property. The habitat fence at entrance and exit locations was regularly cut or pushed down to allow easy fence crossing. Weekly repairs to the fence were re-cut. Trespassers in the north fence area crushed one of the decoy predator exclosures (for a map see Figure A-1). The north nesting habitat is also the location where a loose pit bull, presumably from a homeless encampment, was seen inside the fence on April 4, 2015 (Figure C- 8). Animal Control was called and they responded, but they were unable to locate the dog. Beach goers reported the same dog on several occasions. A second pit pull belonging to a camp near the Ormond Lagoon ran freely on the north end of the beach and was observed on July 21, August 27 and Sept 1 2015. The dog was reported to Oxnard Animal Control on all of these occasions (Figure C- 9).

After the conclusion of the nesting season there was a stabbing on Ormond Beach associated with one of the encampments (Walter Fuller, 10/16/15, pers. comm.). The concentration of homeless activities near Ormond Lagoon make it difficult and unsafe to conduct nest monitoring. Yet because of the lagoon nesting birds are attracted to this area. WSP chicks from undiscovered nests were found near the lagoon this year as well as in past years. Chicks gravitate to this part of the beach. WSP are not the only species that favor this area. CLT have nested here in past years and attempted to this year. Other shorebirds that favor nesting near Ormond Lagoon include black necked stilt, American avocet and killdeer.

Truck Traffic: Trucks routinely drive on Ormond Beach on the wave slope and above the high tide line as evidenced by frequent tracks seen on the beach. Because nest surveys are infrequently conducted, trucks are rarely seen. An illustration of the problem is nest #17 that was located just above the high tide line and had an exclosure on it because it was outside of the nesting fences. This nest was nearly run over by a truck. Truck tracks in the sand could be seen passing the warning signs to avoid the nest, and executing a U-turn just before the nest (Figure C- 10 and Figure C- 11). Groups known to have trucks on the beach include Ventura County Flood Control, Ventura County Fire Department, Marine Mammal Rescue, Oxnard Public Works and Hueneme Beach lifeguards.

Group Visits: Ormond Beach is a popular beach for many groups that conduct environmental and science education. Its popularity as an educational destination has increased over the years. Activities include nature walks, school field trips, beach cleanups and research projects. Arnold Road provides easy access and relatively safe access to Ormond Beach and most groups organize from this location. However there is no method in place for coordinating these groups, nor any guidelines or limitations to the number of visitors that come at a time. Occasionally groups come on the same day without foreknowledge of each other. Some groups voluntarily notify the unpaid docent Walter Fuller in advance, but many do not. Other than guidance to visitors by Mr. Fuller, there is no instruction to visiting groups on how to minimize impact to the environment. For example during the week of June 1, which is near the peak of nesting and chick season, 5 school groups brought 275 students to the Arnold Rd beach access. That was also the week of the oil spill cleanup that brought 70 workers to the beach.

Discussion

Nesting Outcome and Trends

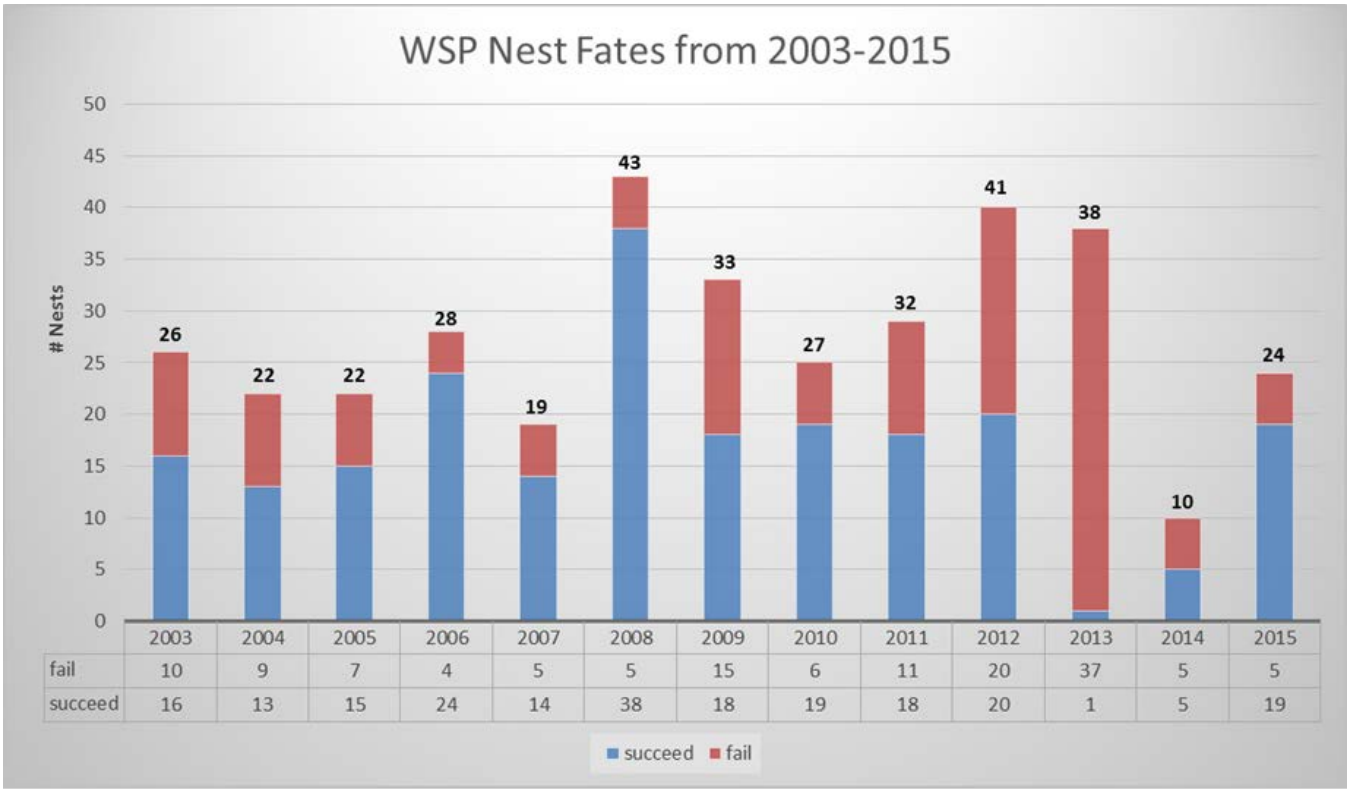
The number of successful WSP nests in 2015 represents an improvement over the previous 2 years. The year 2013 had the lowest nest survival of all years recorded, and 2014 the lowest number of nesting attempts of all years recorded (Table 4).

Table 4. Comparison of nest outcome 2013-2015

	2013	2014	2015
Nest attempts	38	10	24
Hatched nests	1	5	19
% Hatch	3%	50%	79%

It is possible that due to the lack of successful nests and resulting fledglings in 2013 that 2014 represents a year refractory to nesting attempts and 2015 was the recovery year. Overall, the nesting outcome for 2015 is more consistent with nest outcomes in pre-2013 years (Figure 12).

Figure 12. Nest fates from 2003-2015



Predation was identified to be the leading cause of nest failures in 2013. Because Ormond Beach has no predator control program, predator exclosures were used on nests in 2014. The same approach was used in 2015; however, it was evident by May that predators, in particular ravens, where cuing in on nests and likely causing abandonment. Choosing to forego predator exclosures and allowing WSP to use their natural defenses may have been a successful strategy. However, it is probably more likely that the largest benefit came from the predator management program on the neighboring beach at Naval Base Ventura County Point Mugu. Ravens were not observed anywhere on Ormond Beach beginning in June nor at any time the rest of the nesting season, so it is probably more likely that either the predator management plan at Pt. Mugu successfully removed them or the ravens moved on to other areas on their own. Moving forward, the use of predator exclosures should continue for nests outside of the habitat fences, especially for nests between the foredunes and tide line. In contrast, nests inside the habitat fence should be carefully considered for exclosures depending on the number and types of predators present. It is possible that under current circumstances an ongoing predator management program will be required in order to maintain the type of nesting success achieved in 2015 and in years previous to 2013. Unfortunately there is no funding for such a program on Ormond Beach and we are fortunate that the Pt Mugu predator management program is in close proximity. If predator pressure were to return to levels seen in 2013, then predator exclosures on all nests may be the only option despite the drawbacks.

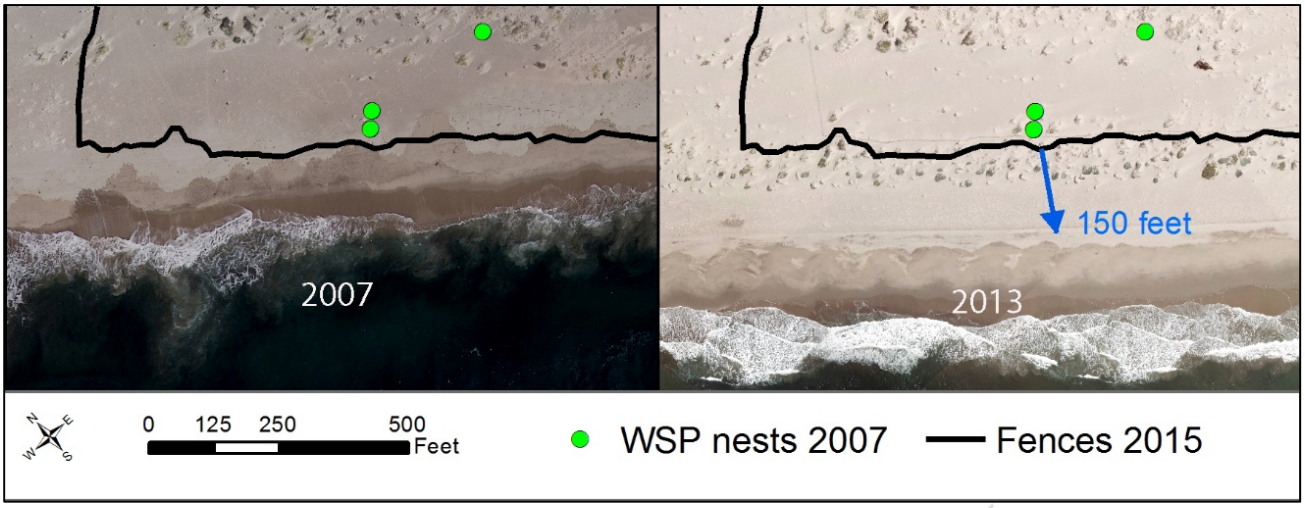
Human Impacts to Nesting Success

No nests were directly vandalized or lost to humans this year, however there were several types of human activities that occur between the habitat fences and the high tide line where nests, foraging WSP and chicks locate. These activities pose threats to breeding birds and may be responsible for chick attrition. In past years these activities have been responsible for nest losses. These include off leash dogs, truck traffic, horses on the beach, remote controlled toy cars, go-carts, kite boards, kites and aerial drones. These activities also impact winter flocks that rest and forage on Ormond Beach.

The problem has been exacerbated by natural changes to beach topography. Beginning in 2006 the first habitat fences were installed to give protection to the north and south nesting areas. Fences were placed just above the tide line. Since then the dune ridge has been growing in height and the beach has been extending seaward of the dune ridge. This has resulted in a retreat of the beach away from habitat fences, in some places by as much as 150 feet.

To illustrate, Figure 13 (next page) shows nests from 2007 plotted on an aerial image from both 2007 and from 2013 to show the change in beach size. The 2015 habitat fence is displayed on both aerials as a benchmark. Nests in 2015 that are the same distance from the tide line as nests in 2007 are located outside of the habitat fence (not shown).

Figure 13. Comparison of the changes to beach topography on Ormond Beach: 2007 vs. 2013 Fence line from 2015 used as a benchmark of beach extension.



The beach extension provides an area that is attractive for WSP to place nests, and indeed there has been an increase in nests in this area where no nests were seen previous to 2010. Because the height of the dune ridge is growing it provides privacy to beach goers. As a result, in addition to typical beach activities, this area provided cover for nude sun bathers and lewd activities (Walter Fuller and various Ormond Docents, pers. comm.). It is also a draw for beach campers (Figure C- 12), night time bon fires (Figure C- 13) and homeless. Because of the current beach topography WSP clutches in the tide line have a much longer distance to travel to seek the shelter of the fences and must navigate all of the human activity above the high tide line and in the dune ridge. Recreational beach activities increase in the summer, with a noticeable visitor increase beginning on Father's Day weekend. Summer weekends, especially on Sundays, are very busy (Walter Fuller, pers. comm.). This may explain the loss of chicks in front of the south habitat fence in the second half of the season.

Homeless activities are a special concern as they represents a degradation of habitat and a risk to the safety of nest monitors, docents and beach goers. In particular if the Ormond Lagoon area could be better protected where encampments were greatest in 2015, it would potentially be a very successful wildlife area. The other concern is off leash dogs. Port Hueneme bans dogs from the beach, yet dogs are often seen off leash entering Ormond from Hueneme Beach. Dog visits to Ormond Beach via Arnold Road have been steadily increasing over the years (Walter Fuller, pers. comm.), yet leash law enforcement is infrequent and voluntary compliance is low. This is compounded by the presence of loose dogs associated with homeless encampments. With the reduction in force from 3 to 2 animal control officers in 2015 it has become increasingly difficult to get a response from animal control. Often the line is not even answered. Sundays are the time of greatest beach use and it is also the day when there is no animal control officer on duty. Finding a way to reduce the number of loose dogs would decrease dangers to WSP clutches that must forage in the

California Least Tern

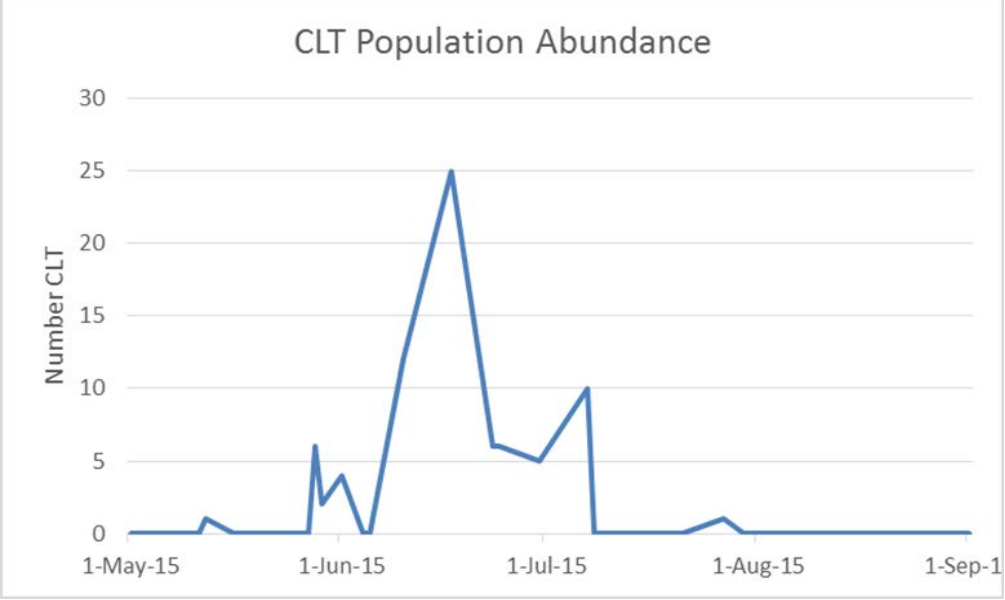
Methods

The 200 acre survey area (Figure 2) was walked as wandering transects in its entirety once per week by dividing the area in to 3 subsets (Methods, page 8). The tide line in front of the dune ridge from the Mugu boundary line to Hueneme Beach was one segment, the north nesting habitat fence and open area in front of the power plant was another and the south nesting habitat fence and dunes around the north end Ormond lagoon was the 3rd area. Surveys were conducted during WSP season from March 15 until early September. During surveys presence and behavior of CLT were noted and recorded.

Results

CLT were observed at Ormond Beach from May 1, 2015 until July 27, 2015. No nests were established in 2015. On May 28, six CLT adults were observed foraging in the Ormond Lagoon and 2 adult CLT were seen making scrapes on the sand bar between the Ormond lagoon and the high tide line On May 29 two adult CLT were observed exchanging a fish in a nearby location. On one other occasion they were observed roosting on the beach by the lagoon. A flock of 20 were observed on the outer beach on June 17, 2015, with one juvenile in the group. Thereafter CLT were only observed to be foraging in the Ormond lagoon and in near shore waters or flying high above Ormond Beach (Figure 14).

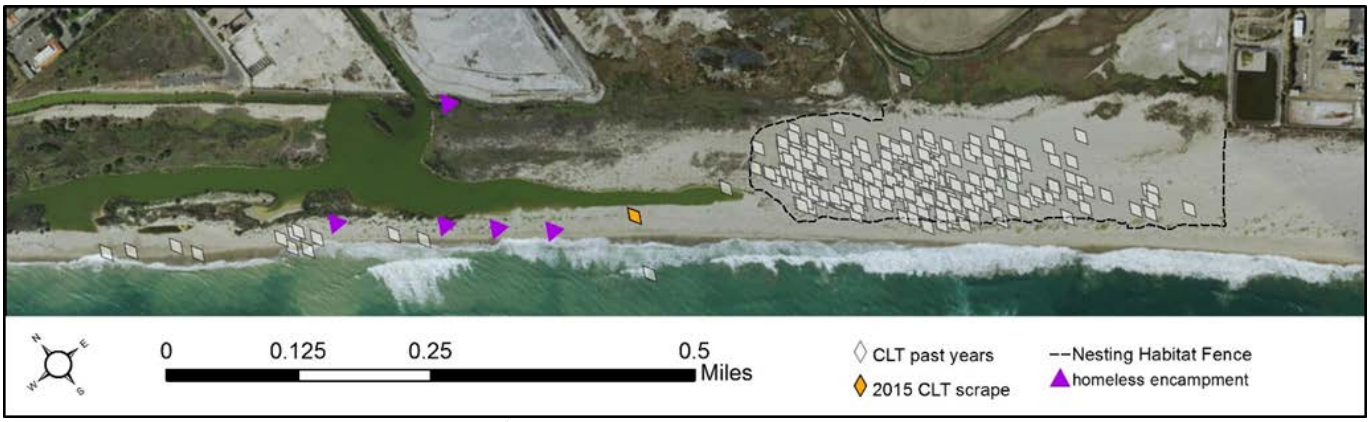
Figure 14. CLT Population Abundance



Discussion

This year represents the first year that CLT have not established any nests on Ormond Beach. The only evidence of attempted nesting was the observation of a single pair making a scrape together. It was in a location outside of the nesting fences near the Ormond lagoon (Figure 15). It is also in an area where nests have been established in past years, although in small numbers. This year the number of homeless encampments was greater than has occurred in the past. The encampments are in the same locations favored for nesting by the CLT. Furthermore, no nesting attempts were made in the north habitat fence, also a first for a nesting year. Several predators where present in that location including a kestrel, coyote and a peregrine falcon, in addition to human trespassers crossing through the fenced area and 2 loose pit bulls. By the time CLTs had arrived and started looking for nesting areas the WSP had already abandoned the north fence area for the season.

Figure 15. The single observed incidence of CLT breeding behavior in 2015, and CLT nests in past years relative to current homeless encampments



Special Topics in 2015

Refugio Oil Spill

The Refugio oil spill occurred on May 19, 2015 at Refugio State Beach approximately 60 miles north of Ormond Beach. Beginning on May 28, 2015 tar balls washed up on Ormond Beach. The amount and size of the tar balls were greater than the normal tar deposition and the entire 2 miles of Ormond Beach was impacted. Tar deposition was the greatest during the first week, however it continued to wash up throughout the summer. Initially the tar balls ranged in size from very small up to about 5 cm. Later in the summer some tar balls as large as 10" washed on to the beach. During the first week after the tar came onshore there was also a fresh deposit of wrack. Due to mid-day heating from the sun tar balls became tacky which caused clumping of the tar to the wrack.

Figure 16. Progression of tar deposits on Ormond Beach

On June 4th cleaning crews arrived at Ormond Beach to pick up the tar. The crew staged at Arnold Rd and was comprised of approximately 65 workers, a biologist, cultural resource consultants and a security detail. The cleanup occurred near the height of nesting season. Because of the presence of several pre-fledge age chicks on the beach no vehicles entered the beach and cleaning activities were restricted to the part of the beach without chicks. Workers accessed the beach on foot via a foot path that by-passed most of the beach. The cleaning area included the tide line in front of the power plant and about half of the area in front of the south fence line. Approximately 0.7 mile of beach (8 acres) was cleaned. During the cleanup operation eggs from a nest that had recently been washed out by the tide were found as well as a newly established nest just above the tide line. Workers by-passed the nest and the adult returned to brooding. This nest hatched on approximately June 26.

Oil Cleanup Impacts

The length of Ormond Beach that fronts nesting habitat is 2 miles long. The area that was cleaned was 0.7 miles. No birds were observed to have been oiled. However, the entire 2 mile length of Ormond Beach was impacted by the tar. Especially concerning is the impact to the wrack, which is the foundation of the food web. The quality of the wrack was degraded after it mixed with melted tar. Cleaning crews worked to save as much of the wrack as possible, but because the tar was glued to the

wrack it was difficult to separate. Much of the wrack from the 0.7 miles that was cleaned was removed during the effort. The cleaning effort did not document the amount of wrack that was removed. Using the publication "A Potential Restoration Approach for Sandy Beaches Impacted by Oil Spill and Cleanup Activities" (Dugan, 2009) as a reference for estimating a healthy amount of beach wrack, the amount of wrack lost in 0.7 miles at Ormond is 680 kgs. Extrapolating to the entire 2 mile length of tarred wrack on Ormond Beach this represents 2,580 kgs of wrack. Because the tar impacted all neighboring and even remote beaches it was not feasible to do wrack replacement. Other impacts include the introduction of approximately 70 beach cleaners to the nesting habitat of a federally threatened bird that was actively nesting and rearing chicks.

Figure 17. Drawing submitted by a student after an Ormond field trip on June 5, 2015

Agromin

Agromin processes yard waste and food scraps into compost. Gulls and other scavengers are attracted to the operation and gather around the facility. The types of scavengers that are attracted by human trash are also known predators of WSP. These include but are not limited to gulls, ravens, crows, coyote, raccoon, rodents and opossum. Currently Agromin uses bottle rocket noisemakers and reflective banners to haze gulls and other avian scavengers attracted to its composting operation. This activity causes them to retreat, resulting in a large number of gulls roosting in and near the salt pan that is nearest the Agromin in property. Currently Agromin is seeking to expand operations.

Figure 18. Gulls roosting near salt pan on berm

Figure 19. Gulls roosting in the salt pan where WSP chicks and nests where located this year

Agromin Impacts

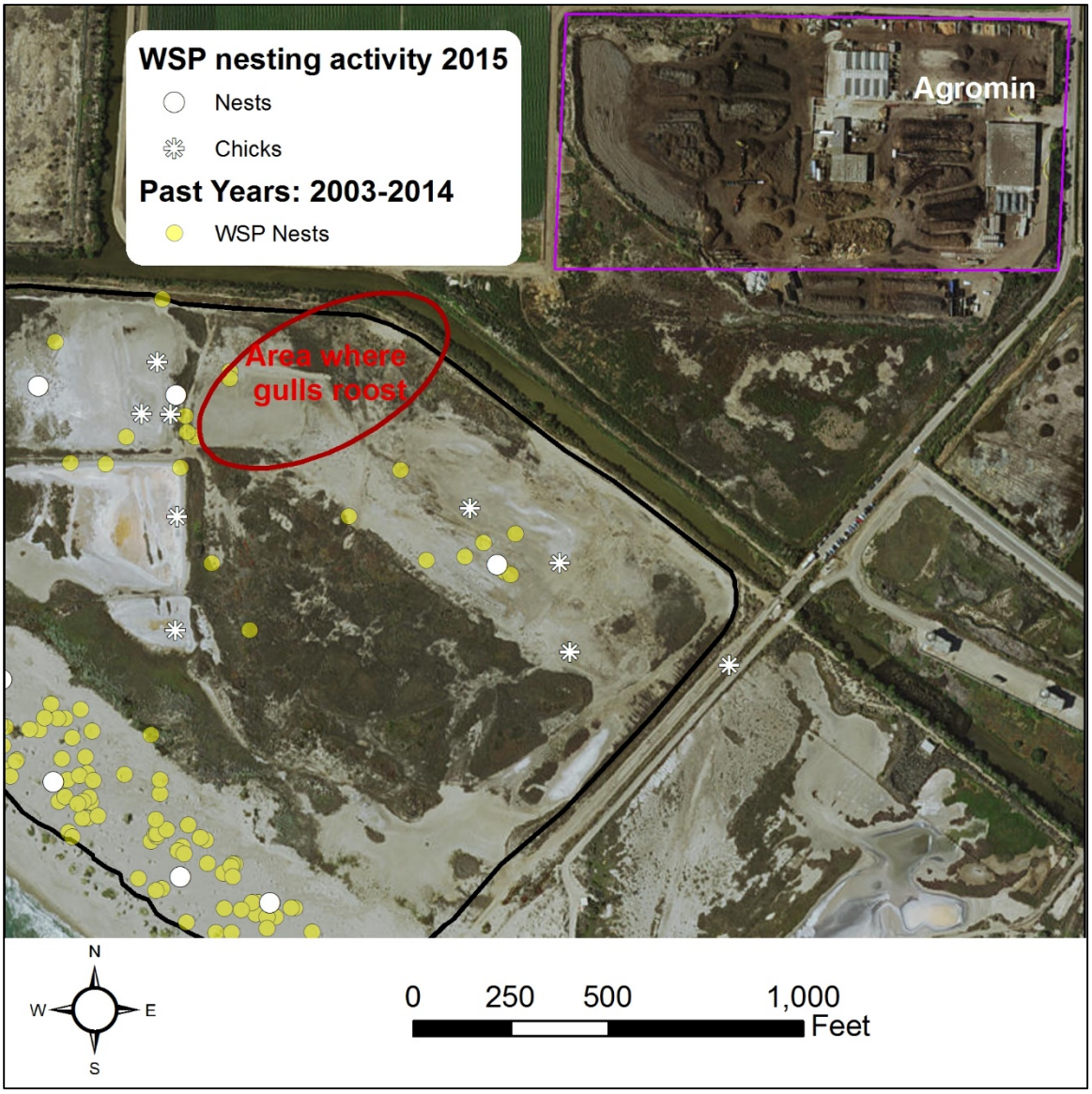
It is difficult to quantify the direct impacts of Agromin activities. There have not been any methodical studies conducted to quantify numbers of gulls or other natural predators before and after Agromin started operations. Any information we have regarding the presence of predator species is anecdotal. The only detailed data we have is nesting outcome for WSP beginning in 2003 (13 years). Therefore the only metric we have to determine if nesting is impacted will be changes to WSP nesting outcomes.

Of concern is that Agromin takes action to discourage scavengers, in particular gulls, only from their own property. This causes potential predators to retreat to nearby properties. The border of the Agromin property is within 400 feet of the salt pan nesting area at its nearest location. (Figure 20, next page). This is a nesting area not only for federally threatened WSP, but also many other shorebird species that nest and seek refuge in the south end salt pan.

The salt pan is completely protected by habitat fences to access from humans and loose domestic dogs. WSP nesting has been documented periodically in the salt pan for the past 13 years, coincident with water present in the salt pan ponds as a result of either heavy winter/spring rains or late season showers. These conditions provide sufficient forage for precocial WSP chicks to remain in the area until they reach fledging age with the benefit of being completely behind habitat fencing. The alternative location for chicks is the outer beach where they are vulnerable to human activity because they must leave the protection of habitat fencing to forage. Chicks that are beach-reared have been documented to have 50% lower survival rates than clutches that find safe forage away from the beach (Colwell, 2007). This year in 2015 chick sightings dropped to zero on the outer beach in this area during the peak of summer recreational activities. During the same time period the only chicks observed on the south end occurred in the salt pan (Figure A-3), despite the successful hatching of four nests nearer to

the outer beach. It is possible that surviving clutches gravitate to the salt pan if there is sufficient forage rather than the outer beach. The introduction of avian and other predators has the potential to interfere with brooding and foraging behaviors and makes chicks vulnerable to predation (Colwell, 2007; Webber, 2013; Ellis, 2015). It may also cause clutches to attempt to leave the area to seek safer locations, which in turn impacts chick survival (Webber, 2013).

Figure 20. Proximity of Agromin to nesting area



Recommendations

Recovery Plan Enhancements

1. Provide better protection for foraging chicks and nests seaward of the dune ridge: Move the cintoflex fences or install seasonal symbolic fencing to enclose the foredunes and part of the dune toe.
2. Work with enforcement agencies to find a solution for leash law non-compliance.
3. Consider using the same post and cable symbolic fencing used by Ca State Parks. This will have lower visibility to predators, is more durable than wooden stakes and string, harder to vandalize and easier to move around. It could also be used to protect winter flocks.
4. Erect symbolic fencing in front of the Ormond lagoon with signage. Consider the same in front of the power plant dunes during nesting season.
5. Use predator exclosures case by case, based on the nature of predators and nest locations.
6. Expand the docent program to increase docent hours on the beach, explore a collaboration with CSUCI. Escalate efforts by docents to achieve better leash law compliance.
7. Conduct pre-season training to groups that drive trucks on the beach, advocate for them to find ways to minimize beach driving.
8. Work with NRG to investigate the cause of the nest shadow in front of the power plant.
9. Incorporate removal of tamarisk and myoporum trees that provide shelter to homeless encampments to the Coastal Development Permit application

Land Management and Enforcement

1. Conduct a pre-season meeting with Land Managers, Oxnard Police Department and other enforcement agencies, CDFW and USFWS:
    a. Problem solve a way to increase Animal Control presence to put pressure on leash law offenders
    b. Address solutions to homeless encampments
    c. Increase police presence in public access parking lots
    d. Address a way to reduce trespassing in the north habitat fence
    e. Work out guidelines for when to contact authorities, and which authorities for docent volunteers
2. Complete the Memorandum of Understanding under way between the land managers of Ormond Beach (Ca Coastal Conservancy, The Nature Conservancy and the City of Oxnard). The MOU will unify and streamline management of Ormond Beach.

3. Work with Oxnard City Council on an ordinance to control the various human activities that impact nest and chick survival, in particular: leash law compliance, beach camping, horses on the beach, drones (UAVs), remote controlled cars, kite boards, kites, powered cars (go-carts), and falconry.
4. Continue working on a way to coordinate group visits and a way to provide provided to reduce impact to nesting birds.

Acknowledgements

I would like to thank Walter Fuller, my field assistants Dorothy Horn and Vince Kinsch, the Audubon team including Bruce Schoppe, Debra Barringer and Alexis Frangis, our Ormond Docents and CA State Parks for the docent program. Thanks to the City of Oxnard for your support and Oxnard City Corps for your hard work, without you we would not have had habitat fences in 2015. Thanks also to the Western Foundation of Vertebrate Zoology for your support throughout the year and for your analysis of our egg data.

Funding for nest monitoring was provided by NRG. NRG has kindly made available access to their private contractor's parking lot which provides us safe and secure access to the north end nesting area, as well as a storage container in the same parking lot for our north end supplies. NRG also provided access to the remote north end of Ormond Beach through their property multiple times for our work crews to do fence repairs and police to help us with homeless issues and the loose pit bull in the nesting area.

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

In memory of Reed Smith, my mentor and friend.

Appendix A: Supplemental Maps

Figure A-1. Trespassing and vandalism in the north nesting habitat

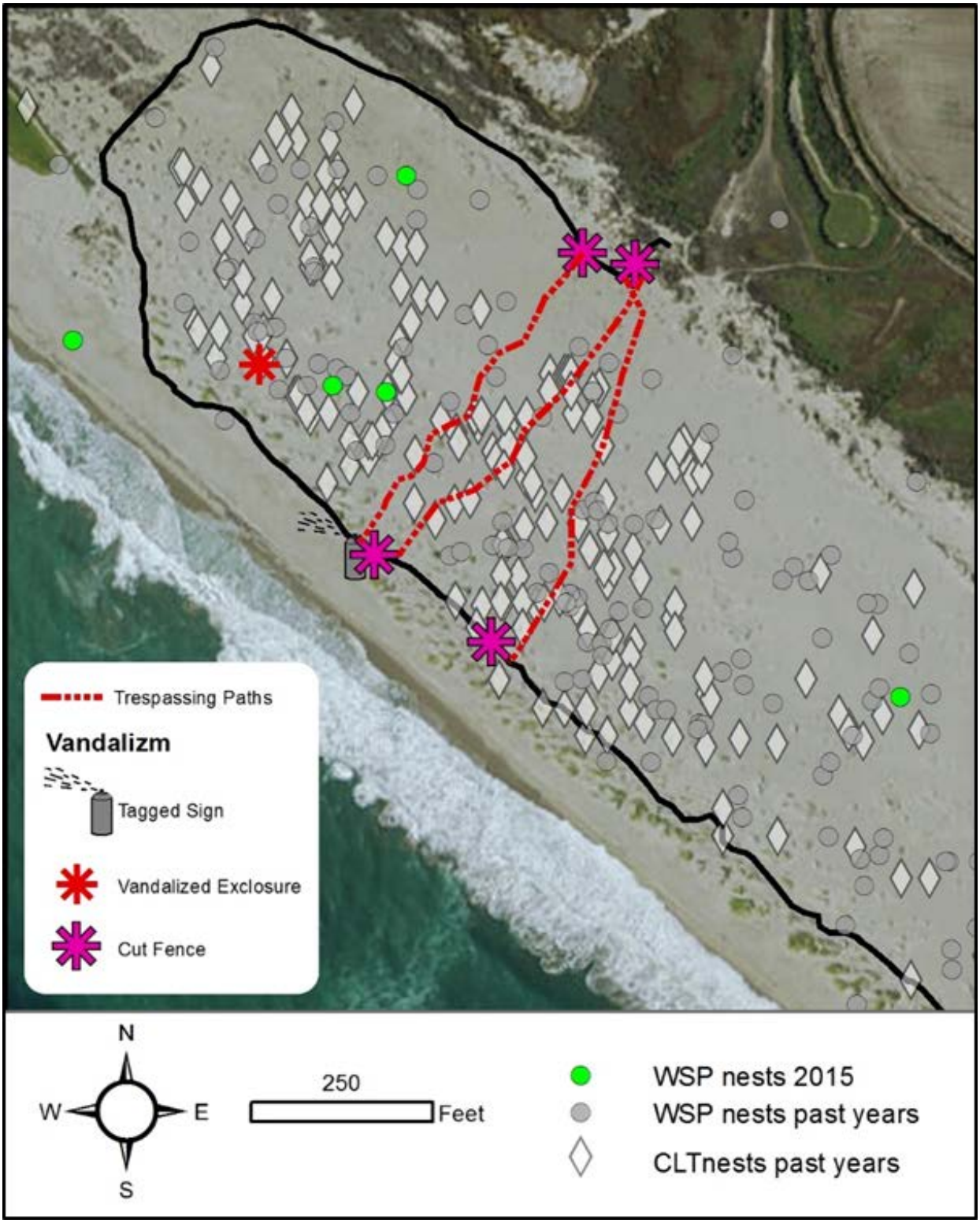
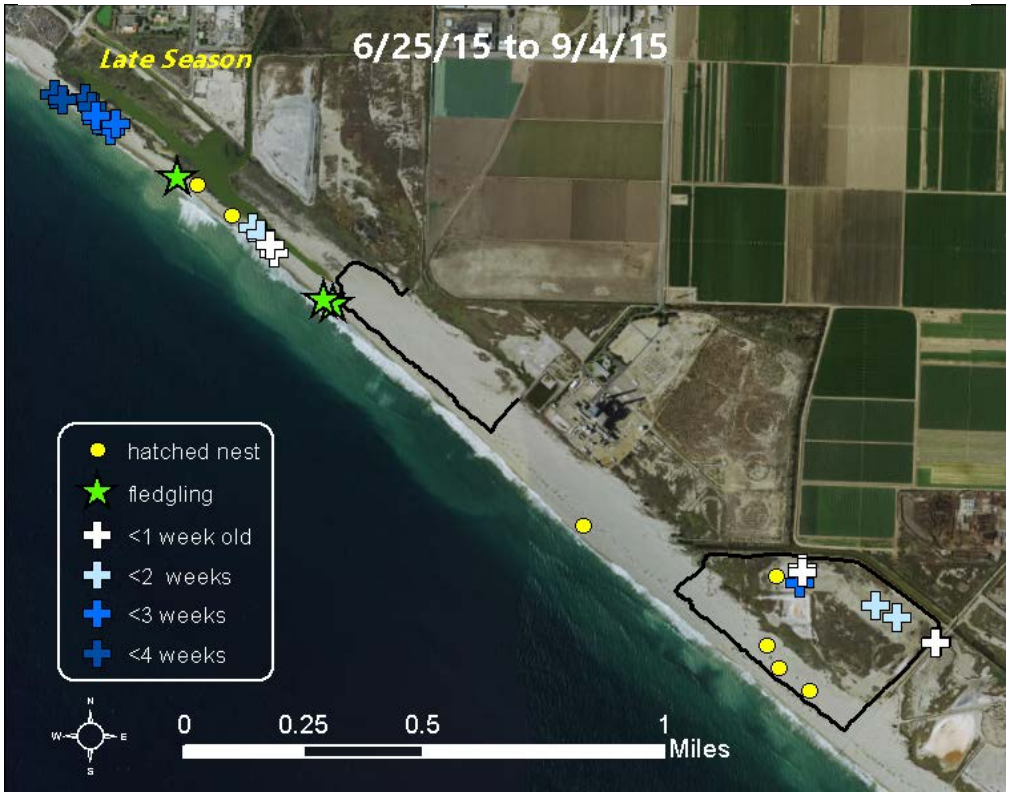


Figure A-2. Early season chick dispersal

Figure A-3. Late season chick dispersal



Appendix B: Tables

Figure B- 1. Population data and survey dates (below)

	week#	Total: adults	Total: all ages	Females	Males	Unknown	Chicks	Juveniles	Calc Nests	# clutches with chicks
March	1	47	47	8	38	1	0	0	1	0
	2	72	72	9	63	0	0	0	5	0
April	3	66	66	13	53	0	0	0	6	0
	4	55	55	13	39	3	0	0	7	0
	5	44	44	16	28	0	0	0	9	0
	6	34	40	14	20	0	5		6	2
May	7	21	30	8	13	0	9	0	7	5
	8	14	17	7	5	2	3	0	7	2
	9	13	20	6	7	0	7	0	4	4
	10	12	19	0	11	0	7	1	3	7
	11	11	14	6	7	0	7	0	4	4
June	12	14	22	4	10	0	6	2	4	6
	13	9	14	4	5	0	3	2	4	2
	14	10	11	6	6	0	3	1	5	2
	15	8	11	4	4	0	2	1	4	1
July	16	6	12	3	3	0	6	0	3	3
	17	12	14	5	8	0	2	2	3	2
	18	22	29	7	15	0	4	3	1	2
	19	28	31	3	25	0	3	0	1	2
	20	26	31	10	16	0	1	4	1	1
August	21	34	37	15	14	5	1	2	1	1
	22	37	38	0	1	36	1	0	1	1
	23	57	59			57	0	2	0	0
	24	61	68			61	2	5	0	1
Sept	25	64	66		1	63	2		0	1
		Peak of observed breeding adults								

Survey Dates

Week#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Date	3/18	3/23	4/1	4/6	4/13	4/20	4/29	5/7	5/11	5/16	5/27	6/1	6/10	6/16	6/23	6/30	7/7	7/14	7/21	7/27	8/3	8/11	8/20	8/27	9/1
	3/20	3/25	4/2	4/9	4/16	4/23	5/1		5/12	5/22	5/28	6/4	6/12	6/17	6/24	7/2	7/8	7/15	7/23	7/29	8/4	8/13			
		3/27	4/3		4/17	4/24						6/5		6/18	6/25		7/10	7/16	7/24	7/30	8/6	8/14			

Figure B- 2. Banded Bird Data

Date	Band Combo	Sex	Year Banded	Fledging Beach	Behavior	Additional Info
3/18/2015	ya:ya	male	2014	Moss Landing Salt Ponds	foraging	above high tide line in front of south fence
3/20/2015	ro:ar	male	2014	male fledge 2014, between Marina and Salinas NWR	foraging	above high tide line in front of south fence
3/23/2015	ya:ya	male	2014	Moss Landing Salt Ponds	roosting	above high tide line in front of south fence
3/25/2015	ro:ar	male	2014	male fledge 2014, between Marina and Salinas NWR "between the signs"	foraging	above high tide line in front of south fence
4/1/2015	ro:ar	male	2014	male fledge 2014, between Marina and Salinas NWR "between the signs"	foraging	above high tide line in front of south fence
8/3/2015	ya:ya	male	2014	Moss Landing Salt Ponds	roosting	Hueneme Beach with 2 other male WSP: 34.136972, -119.185921

Figure B- 3. Detailed nest outcome data

Nest #	Area	est. intitiation	Fate Date	#Eggs Laid	#Eggs Hatched	Outcome	Reason for failure	Comments
3	north	3/19	4/16	3	3	succeed	n/a	
4	power plant	3/24	4/21	3	3	succeed	n/a	
2	south	3/27	4/24	3	3	succeed	n/a	
13	salt pan	3/27	4/24	2	2	succeed	n/a	Undiscovered nest- found as day old chicks
1	power plant	3/28	4/25	3	3	succeed	n/a	
5	south	3/31	4/28	3	3	succeed	n/a	
11	power plant	4/11	5/9	3	3	succeed	n/a	
7	south	4/13	5/12	3	3	succeed	n/a	
8	north	4/13	5/12	3	3	succeed	n/a	
6	north	4/17	5/11	3	0	fail	abandoned	3 eggs ready to hatch
9	south	4/29	5/7	3	0	fail	abandoned	3 small embryos
12	power plant	4/29	5/16	3	0	fail	abandoned	3 eggs ready to hatch
10	north	5/1	5/16	3	0	fail	abandoned	3 large embryos
14	salt pan	5/3	5/31	3	3	succeed	n/a	
15	north	5/4	6/1	2	2	succeed	n/a	
18	south	5/21	6/18	3	2	succeed	n/a	one egg did not hatch - muddled
17	power plant	5/30	6/26	3	2	succeed	n/a	one egg did not hatch - muddled
20	salt pan	6/2	6/30	2	2	succeed	n/a	
21	lagoon dunes	6/2	6/30	2	2	succeed	n/a	Undiscovered nest- found as day old chicks
16	power plant	6/3	6/4	2	0	fail	wave wash	yolk still present; no/little sign of incubation
19	south	6/14	7/14	2	2	succeed	n/a	
22	south	6/14	7/14	3	3	succeed	n/a	
23	south	6/23	7/23	3	3	succeed	n/a	
24	lagoon dunes	7/10	8/7	2	2	succeed	n/a	Undiscovered nest- found as 2-week old chicks
			Total	**65**	**49**			
	fate date for abandoned nests calculated as the first day no adult could be seen brooding							

Appendix C: Photographs

Figure C- 1. Nesting habitat fence: cintoflex-C plastic mesh fending mounted to 6′ T-posts

Figure C- 2. This encampment was located within the south nesting area from 2008-2009. It required police intervention to move this individual out of the nesting area.

Figure C- 3. Symbolic Fencing on nest #11

Figure C- 4. A 2'X2' Predator Exclosure on nest #17

Figure C- 5. Nest #10 abandoned eggs and feathers collected from nest. Eggs had embryos near full term.

Figure C- 6. Encampment by Ormond lagoon

Figure C- 7. Encampment in myoporum tree, north end of Ormond Beach

Figure C- 8. Pit bull loose in north fence on April 4, 2015

Figure C- 9. Pit bull that lived in encampment (Figure C-5) and frequently ran loose on the

Figure C- 10. Truck tracks making a U-turn in front of next #17

Figure C- 11. GPS track of truck tracks in front of nest #17

Figure C- 12. Encampment inside dune ridge, in front of north nesting area

Figure C- 13. Bon fire remnants inside dune ridge, in front of south nesting area

Appendix D: Nesting Area Signs

Figure D- 1. "Symbolic Fence Closed" in English and Spanish, and Audubon "Share the Shore" signs (8X10)

Figure D- 2. Reduced impact sign (5X7)

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