

ANNUAL REPORT  
FOR THE WESTERN SNOWY PLOVER  
AT SAN LUIS OBISPO COAST DISTRICT IN 2015

Submitted by

California State Parks  
San Luis Obispo Coast District  
750 Hearst Castle Road  
San Simeon, CA 93452

Recovery Permit #TE-082237-6.3

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## INTRODUCTION

This report summarizes the nesting activity during the 2015 breeding season of the Western snowy plover (WSP) (*Charadrius nivosus nivosus*) in California State Parks (CSP) San Luis Obispo Coast District (District) at Hearst San Simeon State Park (HSSSP), Villa Creek Beach within Estero Bluffs State Park (EBSP), Morro Strand State Beach (Morro Strand), and the Sandspit within Montana de Oro State Park (MDO) (Appendix 1). At each beach, nesting activity was monitored from March 3<sup>rd</sup> through September 24<sup>th</sup>. The current management within the District for the WSP consists of monitoring breeding and wintering activities, habitat protection through symbolic fencing and signage, predator management, public outreach and education, enforcing CSP regulations, and habitat enhancement through exotic plant eradication.

The District's goals and objectives for WSP management follow those of the System-wide Management Guidelines developed by CSP Natural Resources Division. During the 2015 breeding season, the District also continued to implement "Western Snowy Plover Conservation Guidelines" which were developed by the District. The main goal is to achieve an increase in breeding adult WSP and provide long-term protection of breeding and wintering WSP and their habitat.

Nest numbers, nest distribution, nest fates, and current management measures are discussed within this report. Additionally, this report includes future management recommendations to enhance WSP survival and reproductive success. These activities were conducted under permits from the United States Fish and Wildlife Service (USFWS), as well as, from the California Department of Fish and Wildlife (CDFW). USFWS Recovery Permit Number TE-082237-6.3 was issued to CSP with Nicholas Franco, District Superintendent, as the principle officer. Authorized individuals listed on the permit are Lisa Andreano, Charlotte Bailey, Brian Barandon, Virginia Brown, Sarah Bull, Vincent Cicero, Jeff Ebner, Woodrow Eggers, Matthew Fresquez, Danielle Guest, Margaret Harrington, Jodi Isaacs, Raven Lukehart, Regena Orr, Bonnie Phillips, Allen Potthoff, John Sayers, Taryn Schingler-Kinney, Lauren Seguy, Gregory Smith, and Michael Walgren. CDFW Scientific Collecting Permit Number SC-13063 was issued to the District with Nicholas Franco, District Superintendent, as the Principle Scientific Investigator. WSP responsibilities including training, oversight, adequate supervision, and reporting were delegated to Regena Orr for the CDFW permit. Individuals working under the Principle Scientific Investigator on the permit are Lisa Andreano, Charlotte Bailey, Brian Barandon, Vincent Cicero, Jeff Ebner, Matthew Fresquez, Jodi Isaacs, Raven Lukehart, Regena Orr, Allen Potthoff, John Sayers, Lauren Seguy, Taryn Schingler-Kinney, and Michael Walgren.

## METHODS

### Survey Area

The beaches monitored by the District during the 2015 WSP breeding season are located along 45 miles of coastline in San Luis Obispo County, California. All of the beaches are within the USFWS Recovery Unit Five for the WSP.

#### Hearst San Simeon State Park (CA-69 through CA-77)

The beaches within HSSSP stretch 18 miles from the San Luis Obispo County line south to Cambria (Appendix 1). The beaches north of San Simeon Creek Beach were acquired by CSP in 2005. Some of these beaches have little visitation compared to the other beaches within the District. HSSSP encompasses the first eight beaches listed below.

#### San Carpoforo Creek Beach (CA-69)

The northernmost beach in the District, San Carpoforo Creek Beach, falls under joint jurisdiction of the United States Forest Service and CSP. WSP utilize approximately a one eighth mile stretch of a wide, fairly level area which is a mixture of sand and cobblestone substrate. The general nesting area is bordered to the north and east by San Carpoforo Creek, creating a small sandspit. East of the creek is a sandy area with sparse vegetation. Beyond the creek on the north end of the beach is a large sandy area littered heavily with driftwood and low growing vegetation which adjoins a steep, densely vegetated hill that slopes up to Highway One. The west side is bordered by ocean. The San Carpoforo Creek beach area is highly dynamic depending upon tides and creek level.

#### Point Sierra Nevada (CA-71)

The beach at Point Sierra Nevada is approximately one half mile long and fairly narrow with marginal habitat. The beach is bordered by rocky bluffs to the north and south, a wide dune area to the east, and the ocean to the west.

#### Arroyo de la Cruz (CA-72)

Arroyo de la Cruz is a fairly wide, approximately one quarter mile long mostly sand beach with cobblestone areas. It is bordered by Arroyo de la Cruz Creek to the north early in the season and bluffs later in the season, when the creek no longer flows out to the ocean. To the south is a heavily vegetated area along steeply sloping bluffs.

#### Sidney's Lagoon (also known as Arroyo de la Corral) (CA-73)

The main beach is a fairly level area less than one eighth mile long. It is bordered on the north by a small pocket beach and a grassy hill. The south end is bordered by rocky outcroppings. The beach slopes down to a seasonal drainage which borders the east side. The drainage runs along Highway One.

#### Piedras Blancas (CA-74)

This narrow sandy beach is approximately half a mile in length, bordered to the north by bluff and rocks and to the east by coastal scrub. The beach narrows at a small drainage to

become dune backed. The south end of this beach is bordered by rocky outcroppings and to the west by ocean.

Arroyo Laguna (CA-75)

This approximately one mile long beach was divided into two sections for convenience. The northern section (Arroyo Laguna North) is bordered to the north by Arroyo Laguna Creek, rocky outcroppings and bluffs. To the east of this section of beach is grassland. The southern section (Arroyo Laguna South) is a wide sandy beach backed by dunes. Near the south end of this section Oak Knoll Creek flows to the ocean during the rainy season.

San Simeon Creek Beach (CA-77)

This approximately one quarter mile long beach is bounded by coastal bluffs to the south, ocean to the west, San Simeon Creek to the north, and a small unnamed tributary to the east. Highway One runs above the eastern edge of the site.

Santa Rosa Creek Beach

Santa Rosa Creek Beach is approximately a half mile in length. This beach is bounded by coastal bluffs to the north and south and by the Santa Rosa Creek lagoon on the eastern side.

Villa Creek Beach (CA-78)

Villa Creek Beach is located north of the town of Cayucos along Highway One (Appendix 1). It is situated at the northern boundary of EBSP and is one third of a mile in length. Villa Creek runs through the northwestern portion of the property. A large rocky outcropping sits to the west of the creek mouth with a small sandy beach area that develops later in the breeding season as the creek flow diminishes. This area is referred to as “West of Villa Creek” and has occasionally been used for nesting. Near the east bank of the creek are mudflats and annual grassland. This area is referred to as the “back area” and has been used for nesting in prior years. A sandy beach and a small sandspit border the south side of the creek mouth. The main section of beach used for nesting consists of dark, medium grained sand on a narrow sloping beach, which is widest at the north and south ends. The beach is backed by driftwood, coastal scrub, and some low coastal foredunes. This area is also considered part of the “back area.” During the nesting season, change in beach topography and width were frequently noticed from week to week due to the effects of wind, rain, tide, and surf.

Public access to Villa Creek Beach is from a parking lot adjacent to Highway One with a one-quarter mile connector trail to the Bluff Trail and Villa Creek Beach.

Immediately south of Villa Creek Beach are two pocket beaches backed by bluffs and bordered on the north and south by rocky outcroppings. The northern pocket beach is slightly larger than the southern. Both can be influenced by tide. These pocket beaches have been used in past years as nesting sites by WSP. Although WSP pairs were occasionally spotted on the northern pocket beach, no nests were found in 2015.

In addition to Villa Creek Beach, another portion of EBSP, Cayucos Point, has been used as a nesting site in previous years, although no nests have been found since 2008. Cayucos Point is north of San Geronimo Creek and is located approximately one and a half miles south of Villa Creek Beach. This is a small sandy bluff backed beach with offshore rocks and a rock reef.

#### Morro Strand State Beach (CA-80)

Morro Strand is comprised of two units with the northern unit located three miles north of the City of Morro Bay (City) and the southern unit located within the City (Appendix 1).

The northern unit of Morro Strand, referred to as Old Creek, is approximately one and a third miles in length. WSP sporadically have wintered at Old Creek but have not been known to nest there. Most of the beach is a narrow strip backed by steep bluffs topped with houses. The main beach is approximately a quarter mile in length and is backed by two parking lots with coastal salt marsh and a small riparian area between them. To the northwest and southeast of the main beach are houses. Old Creek runs through the middle of the beach.

The southern unit is approximately two miles long, extending from the area adjacent to the Morro Strand Campground south to the CSP boundary west of Highway 41. This area was monitored during the 2015 breeding season. WSP habitat on Morro Strand is broken up into four sections separated by ten beach access corridors spread throughout the length of the beach. The Campground section has corridors located at the campground kiosk, the north bathroom, the south bathroom, and the southern end of the campground. The Beach Tract segment has a row of houses backing the foredunes and access corridors located at Hatteras Street, Easter Street, Sienna Street, and Azure Street. The Cloisters section entails the area from the Azure Street access, which is adjacent to the Cloisters housing development, south to the boardwalk beach access. This section is broken up into approximately equal halves by a seasonal drainage referred to as North Playa. The High School section extends from the Boardwalk Corridor to the CSP boundary west of Highway 41.

The Campground and Beach Tract sections consist of flat sandy beach backed by low foredunes vegetated by non-native ice plant (*Carpobrotus spp.*) and sea rocket (*Cakile maritima*) and native sand verbena (*Abronia spp.*) and beach bur (*Ambrosia chamissonis*). The Cloisters and High School sections consist mostly of flat sandy beach with areas of small to medium size cobbles. The dunes along this stretch of beach are vegetated mostly with a mixture of native plants. Efforts continue to eradicate non-native species. See the Habitat Enhancement section within Current Management for information on the non-native species eradication efforts at Morro Strand.

#### Sandspit (CA-81)

The Sandspit is a barrier dune system located between the Pacific Ocean and the Morro Bay Estuary within the communities of Morro Bay and Baywood/Los Osos. The Sandspit falls under joint jurisdiction of the City and CSP, with a small portion being privately owned. With exception to the small privately owned segment, the northernmost

mile of beach is City property, while the remaining southern area is within MDO (Appendix 1). Although the CSP boundary has not always been demarcated clearly, CSP still manages the habitat in this area by installing symbolic fencing and signage. Therefore, the nests found on the private property are included with the CSP nest numbers.

The length of the contiguous beach from the northern tip of the Sandspit to the southern end at Hazard Canyon is approximately five and a half miles. The northernmost half mile of the Sandspit contains two jetties, which protect the Morro Bay Harbor entrance. This section of beach, called Jetty Beach, is backed by a sparsely vegetated plateau consisting of large areas of dredge spoils containing coarse rocks, stones, pebbles, shells, and sand. South of Jetty Beach the majority of the Sandspit consists of a sandy beach with low, sparsely vegetated foredunes that are backed by higher, more stabilized, densely vegetated dunes. Large barren sand sheets are scattered throughout the dune system. In contrast, the southernmost mile of beach is backed by steep sandy bluffs reaching approximately 75-100 feet above sea level. On the eastern edge (bayside), the Sandspit landscape is made up of large, barren sand sheets and provides little suitable habitat for WSP. Thus, the bayside of the Sandspit was not monitored this season.

The Sandspit has seven rescue markers at roughly half mile intervals starting at Rescue Marker One, located near Army Road in the south and ending at Rescue Marker Seven, located just before the South Jetty in the north. When monitoring, these markers are used to divide the beach into smaller areas in order to better analyze the data collected.

Southern access to the Sandspit consisted of five symbolically fenced access trails within MDO. Northern access to the Sandspit consists of three access corridors (one on CSP property and two on City property) linking the east (bay) side to the west (beach) side. These three corridors, as well as the northern tip of the Sandspit, are often accessed by boat, canoe, kayak, and surfboard.

## **Monitoring**

The beaches within HSSSP were monitored approximately once per week from the beginning of March until the end of July.

Beginning March 3<sup>rd</sup>, monitoring was conducted five to seven days a week at Villa Creek Beach, Morro Strand, and the Sandspit. Nest searches were conducted three times a week inside the symbolic fencing and two to four times a week outside of the fencing. This was the fourth year monitoring was conducted on the weekends. Monitoring occurred 28 times on the weekends between April 25<sup>th</sup> and August 16<sup>th</sup>. Weekend monitoring was conducted outside the symbolic fencing primarily to have a greater CSP presence on the beaches during the busier summer months. Beginning September 1<sup>st</sup>, monitoring was reduced to two days per week, since there were no more active nests.

All WSP monitors were trained by USFWS authorized individuals. Monitoring was conducted in the morning or early afternoon from approximately 8:00 am to 2:00 pm. Portions of EBSP were walked once a week to check pocket beaches for WSP nests and breeding activity. The Sandspit was monitored by two people to allow for adequate coverage. To accomplish this, the Sandspit was divided into north and south sections, which enabled each monitor to be responsible for only one portion. This division occurred between Rescue Marker Three and Four at a location referred to as “Rocky Mounds”. The back dune area on the westernmost side of the Sandspit was checked weekly for WSP nests and breeding activity. The back dune monitoring was conducted on one of the days when the regular monitoring was performed from outside the symbolic fence. Monitoring was done on foot with the use of binoculars.

Monitoring activity included observing adult WSP behavior, locating scrapes and nests, mapping nest locations utilizing Global Positioning System (GPS) technology, tracking nests to determine their fate, floating nests found at completed clutches, recording nesting habitat substrate, recording evidence and observations of predator and human activity, recording evidence and observations of chicks and fledglings, and repairing/maintaining signs and symbolic fencing. All data (including photographs of the nest and nest location maps) were recorded on a nest card for each nest found (Appendix 2) and entered into computer databases. Monthly population censuses were conducted to determine numbers of WSP on District beaches throughout the year. See Appendix 3 for population census data from October 2014 through September 2015. Color leg band combinations were recorded and sent to Frances Bidstrup of Point Blue Conservation Science (Point Blue was originally founded as the Point Reyes Bird Observatory Conservation Science). See Appendices 4 and 5 for a list of the band combinations observed and their histories. “Procedures for handling injured, sick, or dead WSP (including chicks and eggs)” for the District were followed again this year.

#### *Nesting Habitat Substrate*

Beginning in 2013, WSP monitors documented descriptive substrate variables of habitat used by WSP for nests located within the District.

When a nest was found, the substrates were recorded according to a standardized in-field substrate data survey. First, percentage estimates of the three most prevalent substrates surrounding the nest bowl within a one meter radius were entered. Then, if vegetation was present, individual species and height range were specified. Next, the location of the nest on the beach – lower, middle, upper, or back dunes – was documented. Annotation of the topographic relief of the area within 0.76 meters (30 inches) surrounding the nest followed. Topographic relief was described in the following terms: flat (surface is overall flat), concave (surface is an overall bowl formation), convex (surface is an overall hill formation), or hummocks (surface consists of a series of small mounds). Proceeding further, the distance to the nearest active nest in feet was calculated when other nests in the area were known to be active. The distance between the newly discovered nest and the closest active nest was determined by measuring between the GPS coordinates of the two nesting sites, using the map containing the GPS points and the distance/bearing tool, both located in the Garmin Map Source software program. Finally, any other distinctive

features or significant information about the nest bowl habitat was reported. The data was collected quickly in order to limit disturbance to nesting WSP.

In addition, WSP monitors surveying on the north Sandspit and the south Sandspit intermittently performed descriptive evaluations of substrate variables at random locations within the WSP habitat. Another WSP monitor performed the same assessment at a random location on either Villa Creek Beach or Morro Strand. WSP monitors actively surveying in-habitat were notified at a random time. At the physical location of each individual WSP monitor at the time of random notification, the same substrate recording procedures cited above were followed. Precautions were taken when gathering data so that minimal disturbance to WSP was a higher priority. Therefore, monitors had the discretion to abort random point data collection in order to minimize reactive behavior from WSP.

#### Floating Nests

In order to determine the estimated hatch date (EHD) for a nest discovered with a completed clutch, the process of egg “floating” was employed. This process can be described as follows: First, eggs were checked for signs of cracks that appear before hatching. If cracks were found, or the chick inside an egg was heard tapping on the shell or peeping, the floating process was discontinued, as such an egg would be in a late development stage very near hatching. Otherwise, an egg was carefully placed in a small, clear container of clean, tepid water. If an egg was completely submerged, a measurement was taken of the angle of the longitudinal axis of the egg to a horizontal line. If the egg was floating with any part of it exposed above water, a measurement was taken of the diameter of the exposed portion. Back at the office, these measurements were compared to a chart of float measurements corresponding to stages of embryo growth developed for the WSP to determine an EHD. The process was carried out directly or closely supervised by a person permitted to float eggs. As an essential part of the process every effort was made to collect data in minimal time, while exercising the necessary care to ensure that eggs were not damaged.

#### Determining Nest Fate

During the 2015 breeding season, the District followed USFWS Recovery Unit Five draft protocols for determining nest hatch success. In order to decrease the proportion of nests assigned an “unknown fate”, it is extremely important to determine the clutch completion date. The clutch completion date is the day the third egg is laid. After clutch completion the parents begin incubating the eggs, and most clutches hatch 28 afterwards. The modal clutch size is three eggs, with a range of two to four. A scrape was considered a nest if it contained at least one egg. A nest containing two or more eggs and with an indication of incubating activity (WSP tracks, nest lining, adult nearby) was considered active.

There are three possible nest fates as determined by Recovery Unit Five.

- a) Hatch- Pips/chicks in the nest or indirect evidence suggesting hatch.
- b) Fail- Direct evidence of loss, predation, or eggs gone before expected hatch date.
- c) Unknown- Eggs gone and no physical sign of fate.

A “Hatch” designation was the most definitive, especially if evidence of a hatch was observed. This included chicks in the nest or its immediate vicinity, or pips found in an empty nest bowl. A nest with at least one hatched egg was considered a successful hatch. If pips or chicks were not present, other indications were used in their absence, including flattened scrapes, distracting adults, eggshell halves nearby, or “brooding tracks”. However, several of these indications had to be present to constitute solid evidence for a hatch. In such cases, the monitor evaluated all of the evidence to reach a reasonable conclusion of hatch or fail.

The “Fail” designation was more complicated, but if the expected hatch date was known, any interval less than 26 days was considered “Fail” unless there was physical evidence to the contrary. Nests could “Fail” through wildlife predation, abandonment, tide, wind or from an unknown cause. Nests were confirmed to “Fail” by wildlife predation when avian or mammalian tracks were found at the nest bowl and all the eggs in the nest were gone, or if eggshell pieces or fluid was found in the nest bowl. Nests were considered abandoned if the eggs were still visible, but no WSP tracks or adults were noted near the nest for two weeks. Single or “dropped” eggs that were not found in a recognizable scrape were not considered to be a potential nest. Tide losses were determined when nests went missing below the high tide line and eggs were found scattered in the wrack. A nest was considered lost due to wind when the eggs became significantly buried by sand in one day and there was no evidence of further incubation. Nests could also “Fail” through an unknown cause where there is no direct evidence of any source that led the eggs to be missing.

Additionally, an “Unknown Fate” could be assigned to the nest if there was not unambiguous support for either “Hatch” or “Fail”. Nests were considered as “Unknown Fate” if the predicted hatch date was unknown and there was no physical evidence of its fate or if at least one egg disappeared after 26 days of incubation. Also, an “Unknown Fate” could be selected if a nest showed evidence suggestive of both “Hatch” and “Fail” but neither one could be conclusively chosen.

While it was tempting to minimize the number of “Unknown Fate” nests by using the terms “Probable Hatch” and “Probable Fail,” these designations were too subjective and could not be assigned objectively. As a result, fate designations were only categorized as “Hatch” or “Fail”, or “Unknown Fate”.

## **Current Management**

### ***Habitat Protection***

By the first week of March, the main District beaches with WSP nesting habitat were symbolically fenced above the high tide line to demarcate the area reserved for nesting. Fencing was installed at San Simeon Creek Beach and San Carpoforo Creek Beach on April 2<sup>nd</sup> and April 23<sup>rd</sup> respectively. These two beaches were the only beaches in HSSSP to be symbolically fenced. The fences consisted of metal eye-posts strung with polypropylene rope and/or jute rope. Signs were placed at regular intervals along the length of the fencing informing the public of the closed WSP nesting habitat. Beige signs

were used at Villa Creek Beach to lessen the impact on the scenic view shed. The corridors at Morro Strand and the Sandspit had yellow signs, so these access points could be clearly seen from a distance. Regulatory signs were posted at CSP beach access corridors stating that dogs were prohibited. Additionally, “No kite flying” signs were posted at the access points to San Simeon Creek Beach, Villa Creek Beach, Morro Strand, and the Sandspit, with the detailed posted order at the kiosks. All beaches had corridors at the main access points which allowed for continued public recreation. Fencing for San Simeon Creek Beach and San Carpoforo Creek Beach was removed on August 26<sup>th</sup> and May 7<sup>th</sup> respectively. Symbolic fences were removed between September 28<sup>th</sup> and October 1<sup>st</sup> for Villa Creek Beach, Morro Strand, and the Sandspit with assistance from California Conservation Corps crew members.

Maps displaying current location and nearby beach access corridors were placed on the bayside of the Sandspit at the accessible landing spots. Red flags were also placed on the bayside at corridor entrances so that kayakers coming from the east side of the bay could navigate toward a corridor. Additionally, maps designating the corridor entrances were given to the local kayak concessions.

#### Habitat Enhancement

Symbolically fencing WSP habitat not only protects WSP nests, it also allows native vegetation to expand into areas that would otherwise be trampled. Thus, erosion of sand into areas such as the Morro Bay estuary is minimized, and WSP breeding areas are stabilized.

Restoration efforts to prevent the spread of non-native ice plant and European beach grass (*Ammophila arenaria*) onto the foredunes and beach were continued this year at Morro Strand. The ongoing program has provided and continues to provide more WSP nesting habitat. Of the 90 acres of coastal dune habitat, less than one acre of beach grass and ice plant remain. From October 2014 through September 2015, a contractor combed the site treating isolated non-native plants with herbicide. Volunteers spent over 180 hours cultivating native plants in the greenhouse, planting the greenhouse grown specimens in treated areas, and hand pulling specific non-native plants from the habitat. CSP staff monitored effectiveness of treatment, guided restoration efforts, and collected several pounds of native seed. Native plant recruitment is high where non-native competition has been removed. In previously planted areas, a variety of native species are now dominant where it once was a monoculture of invasive species.

Habitat restoration at Morro Strand is currently funded by a grant from the CDFW Office of Spill Prevention and Response and will continue through June 2016. Further herbicide treatment and native planting will continue for the duration of the grant. Although the acreage of European beach grass and ice plant is low, the sparse and discrete distribution of the remaining populations renders restoration a labor intensive job. Staff will continue to monitor the site, treat scattered populations of invasive species, and seed and plant treated areas with native plants.

In June 2012, an ice plant control project was initiated in the Morro Dunes Natural Preserve within MDO. Approximately 140 acres, found between the Sandspit day use parking lot and Army Road, have been treated with herbicide. This effort is part of a larger exotic plant control project targeting key invasive species throughout the Morro Dunes Natural Preserve. The bulk of the remaining ice plant predominately grows in the foredunes, covering open sandy areas that have potential to be WSP breeding habitat. Following herbicide treatment, the dead ice plant thatch rapidly breaks down, but the treated area is vulnerable to regrowth. Herbicide treatment of the foredunes occurred strictly from October 2014 through February 2015 to avoid the WSP breeding season. During the breeding season, herbicide treatment occurred in the back dunes, well outside the WSP habitat. Herbicide treatment this year was principally follow-up to inhibit regrowth after major treatment in prior years. It is expected that more open sandy area will result from this project and thus, will provide more WSP habitat.

### Predator Management

Monitors determined the presence of potential predators through either direct observation or by tracks. Due to a lack of funding, predator control was not available during most of the WSP breeding season. Once funding was in place, United States Department of Agriculture (USDA) Wildlife Services was contacted, when predator control was deemed necessary. USDA Wildlife Services spent 76 hours on predator removal activities within the District between July 22<sup>nd</sup> and August 28<sup>th</sup>. Species removed this year were two coyotes (*Canis latrans*), one raccoon (*Procyon lotor*), and one striped skunk (*Mephitis mephitis*).

Traditionally, ten foot by ten foot single nest exclosures were used in an attempt to enhance hatch rate success on Morro Strand. Protocol dictates that all exclosures be monitored regularly for effectiveness. By mid-season 2014, it was clear that exclosures were ineffective in promoting hatching success, so their use was discontinued for the remainder of that season. Exclosures were not used on any District beach in 2015. See the Depredation section for more information.

Another useful predator reduction method was removing trash from the beach. In 2015, the Environmental Center of San Luis Obispo (ECOSLO) in collaboration with Morro Bay Beautiful and Surfrider Foundation coordinated three volunteer tsunami debris cleanups on the Sandspit. On January 24<sup>th</sup>, 80 volunteers removed almost 300 pounds of trash. The second tsunami cleanup was held on April 25<sup>th</sup>. Because this second date was within the active WSP breeding season, two WSP monitors addressed the group before volunteers went out to the beach regarding WSP activity and the need to respect the habitat fencing. WSP monitors were also on the beach addressing volunteer questions, helping with general trash collection, and gathering larger items. Sixty-one volunteers removed 105 pounds of trash and recyclables. In addition, WSP monitors removed one truckload of debris from the Sandspit. The third tsunami cleanup was on July 25<sup>th</sup>. Again, two WSP monitors addressed the group before volunteers began collecting trash and were on the beach to assist with the event. Thirty-seven volunteers removed 90 pounds of trash and recyclables. Again, WSP monitors removed an additional truckload of debris.

On August 1<sup>st</sup>, the Morro Bay Yacht Club sponsored a “Fun Float” trash cleanup on the Sandspit. Sixteen volunteers collected approximately eight bags of trash plus several large items from the bay side of the Sandspit.

The 31<sup>st</sup> annual statewide Coastal Cleanup was held on September 19<sup>th</sup>. Coastal Cleanup Day is California’s largest volunteer event and has been coordinated in San Luis Obispo County by ECOSLO since 2005. Two WSP monitors were available during the cleanup on the Sandspit to monitor activities, act as an information resource, and assist as needed. Monitors debriefed the approximately 25 volunteers about the habitat restrictions, WSP, and safety precautions. Monitors hauled one truckload of refuse, including nearly 500 pounds of trash and 38 pounds of recyclable material from the Sandspit. Other District beaches with WSP habitat included in the cleanup were San Simeon Creek Beach, Santa Rosa Creek Beach, EBSP, and Morro Strand.

In addition, at the time of symbolic fencing installation and removal, CSP employees removed approximately two truckloads of miscellaneous trash off of the beaches.

An updated “Predator Management Plan” for the District is currently being developed. The existing “Interim Predator Management Plan” was created in 2003.

#### Enforcement

Throughout the WSP breeding season monitors maintain a strategic alliance with CSP Rangers designed to maintain healthy lines of communication and expedite coordination of resources when collaboration is necessary. CSP Rangers frequently attended the weekly WSP meetings to discuss enforcement issues, management, and upcoming events. Rangers, WSP monitors, and other CSP staff also attend bi-weekly safety meetings where each group shares information on safety issues germane to the well-being of CSP.

In the field, CSP Rangers patrol a broad area including beaches harboring WSP habitat. While beach patrolling, Ranger vehicle activity is restricted to the wet sand area with a speed of less than ten miles per hour. While WSP monitors are in the field, they often encounter violations of regulations which also represent threats to the WSP. WSP monitors and volunteers contacted visitors who were violating park regulations, and if necessary, CSP Rangers were contacted. These illegal activities included dogs on the beach, trespassing, vandalism, and kite flying. Occasionally, those follow-up contacts with Rangers will result in the offender receiving a citation. If a WSP monitor discovered a nest disturbed by direct human intervention, a Ranger was contacted, who then investigated the incident and filed a report that would be forwarded to the USFWS and CDFW.

On July 4<sup>th</sup>, WSP monitors assisted Rangers in enforcement of regulations, such as trespassing, illegal fireworks, kite flying, and dogs on beach.

Of the many public safety incidents throughout the year, Rangers were called by WSP monitors for ten dogs on the beach, six cases of trespassers in the closed WSP habitat, and one illegal camp.

There were two episodes in which Rangers addressed emergent problems. In response to chronic combined dog and human trespasses just south of the Boardwalk Corridor, a Ranger manned a sunrise stake-out on March 21<sup>st</sup> and again on March 26<sup>th</sup>. The action resulted in one citation, one warning, and the recurrent trespasses were dramatically reduced this year over last year. The second episode began on June 8<sup>th</sup>, when a path was discovered freshly cut through vegetation starting at the back fence between Easter and Sienna Corridors. The path was closely accessible to a house which had been frequently noted as the source of trespasses in the past. Rangers contacted occupants of the house, as well as, a rental agent. After the Ranger contact, the frequency of trespasses from that location was reduced.

### Information/Education

For the 2015 WSP season, efforts were engaged to inform and educate the public and CSP staff and volunteers about the WSP and how they can help protect this species.

Pamphlet holders at Morro Strand and the Sandspit parking lot were stocked throughout the season with the “WSP: Sharing the Beach” brochures provided by CSP headquarters, and “dog-on-leash” brochures provided by Morro Coast Audubon Society (MCAS). The informational kiosk at the Morro Strand Campground also displayed WSP educational information. Each campground kiosk, as well as, the mobile California sea otter (*Enhydra lutris*) educational trailer, which was stationed at Morro Rock every weekend during the summer, was provided with a WSP information binder. Additionally, six WSP interpretive panels were in place at the main access corridors at Villa Creek Beach, Morro Strand, and MDO.

This was the tenth year of displaying children’s art signs along the symbolic fencing at WSP nesting sites within the District. This MCAS sponsored project involved several beach land owners, as well as, children from the community whose artwork emphasized the WSP.

During the 2015 WSP breeding season, WSP monitors and volunteers staffed a WSP educational exhibit. The anchoring feature of the exhibit was a portable interpretive display panel with attractive color pictures and informational diagrams depicting the WSP life cycle, the WSP recovery program, and encouraging park users to share the beach respectfully with the WSP. In addition to the integrated panel, the exhibit included several other features. For hands on activities, there were several binders with pictures – some simply depicting samples of WSP on local beaches and others challenging the visitor to find hidden nests and chicks and camouflaged adult WSP. Another hands-on opportunity was provided alongside an interpretive display box containing a simulated WSP nest among authentic wrack, shells, and sand. Guests were provided a container of sand, fake WSP eggs, and a variety of authentic beach detritus and encouraged to create their own version of a WSP nest. Additionally, a color-by-numbers WSP coloring page,

which could be colored on the spot or taken home, was distributed to interested young artists. A variety of WSP brochures, posters, and other CSP informational material were also available for visitors to take home. The portable exhibit was active a total 47 hours over 24 days between May 23<sup>rd</sup> and August 16<sup>th</sup>. On seven occasions, it was set up near the kiosk at the entry of Morro Strand day use area and campground for a total of 14 hours. Fifteen times, for a combined 30 hours, it was located at the Morro Rock parking lot adjacent to the mobile sea otter educational exhibit operated by CSP docents. Overall, the booth served 547 guests including 382 adults and 165 children.

Visitor outreach also occurred through numerous contacts between WSP monitors and the public while out on District beaches. The public often approached monitors with questions about WSP activity, as well as, various other topics. Overall, monitors spoke with 243 members of the public on Morro Strand, 256 on the Sandspit, 143 on Villa Creek Beach, and 16 at HSSSP. See the Human Activities section for more information on public contacts.

In 2015, Central Coast State Parks Association refreshed the supply dog leashes with “I ♥ State Parks” printed on them. WSP monitors handed the dog on leash walking areas brochure out to visitors on the beach, if they had a dog with them. They also handed out a leash if the dog was not on a leash, and the canine companion was not in possession of a leash. In 2015, WSP monitors recorded handing out 22 brochures and two leashes to people contacted with dogs on the beach. Brochures and leashes were also given to people not in violation of regulations who were seeking information regarding regulations.

Two WSP educational presentations were given to a total of 20 attendees at the Morro Bay Winter Bird Festival in January of 2015. WSP educational presentations were also given to MDO docents, Maintenance staff, Natural Resources staff, campground kiosk attendants, and Rangers.

At the Atascadero High School Career Fair on May 14<sup>th</sup>, a WSP monitor addressed approximately 325 students regarding CSP’s WSP recovery program and career opportunities within CSP.

On June 20<sup>th</sup>, two WSP monitors and one volunteer staffed a WSP educational booth at the Summer Solstice Family Day at Morro Bay State Park. The display included a craft for creating WSP chicks, passive and interactive WSP displays, and informational WSP brochures and posters. Seventy-nine family members, including 46 adults and 33 children, attended the booth, and 30 WSP chicks were created by young artists.

In June of 2015, WSP monitors in collaboration with docents offered four Junior Ranger programs on the topic of WSP. The programs hosted 60 people including 41 children and 19 adults.

On July 4<sup>th</sup>, two volunteers and five CSP employees roamed Morro Strand from 11:00 am to 9:30 pm to inform beach users of CSP regulations and answer questions. Although the

City of Morro Bay did not hold a fireworks display, the town of Cayucos presented a fireworks program which was viewable from Morro Strand. CSP presence on Morro Strand reduced the incidents of illegal fireworks and foot traffic inside symbolically fenced habitat. The Sandspit was monitored by one CSP employee during the day, and Villa Creek Beach was checked periodically between 11:00 am and 6:00 pm by CSP employees. Monitors were also on the beaches from July 3<sup>rd</sup> through July 7<sup>th</sup>.

WSP were among the topics discussed by Morro Bay Museum of Natural History docents on approximately 140 interpretive walks, information desk shifts, and Nature Center programs throughout the year.

The District has been and will continue to be involved with the WSP Working Group for USFWS Recovery Unit Five through attendance at meetings and being involved with the range-wide electronic mailing list which connects all WSP interested parties together through email. The WSP Coordinator also assists Recovery Unit Five by coordinating the winter and breeding window surveys. These efforts facilitate consistent WSP management methodologies and reporting throughout the range.

#### Volunteer Efforts

Overall, WSP recovery program volunteers contributed 312 hours of service. Sixty-eight percent of these hours were devoted to WSP monitoring, 18% to WSP recovery program meetings, 7% to beach use surveys, 5% to training, 2% to outreach, and 1% to fencing.

One experienced volunteer monitored WSP activity on Villa Creek Beach and Morro Strand independently. This individual volunteered approximately 32 hours towards the District WSP program. The volunteer is listed as an authorized individual on the District recovery permits. She has been with the District for 11 years and is an immeasurable benefit to the program in terms of providing continuity, a positive role model, and building cohesive morale among all staff members. Other volunteers engaged in supervised monitoring on District beaches a total of 180 hours. The total WSP monitoring hours contributed by volunteers was 212 hours.

One volunteer with experience and training on topics including WSP life history, how to conduct recreational use surveys without disturbing WSP, and how to contact Rangers to report violations logged 22 hours performing recreational use surveys. The purpose of the survey is to monitor type, intensity, and distribution of recreational uses.

On June 20<sup>th</sup>, two WSP monitors and one volunteer staffed a WSP educational booth at the Summer Solstice Family Day at Morro Bay State Park. For details on this event, see the Information/Education section. The project included five volunteer hours.

On July 4<sup>th</sup>, one volunteer was at Morro Strand for one and a half hours in the evening notifying Rangers of violations. Another volunteer patrolled Morro Strand and Villa Creek Beach for seven hours alongside CSP personnel after helping at the WSP information exhibit for one hour.

One volunteer provided help installing and removing symbolic fencing for a total of four hours on Morro Strand.

Seven volunteers contributed at meetings for a total of 55 hours to keep updated on the WSP recovery program. In addition, seven volunteers participated in a total of 15 hours of WSP recovery related training.

In 2015, ECOSLO coordinated three volunteer tsunami debris cleanups on the Sandspit. On January 24<sup>th</sup>, 80 volunteers removed almost 300 pounds of trash over three hours. On April 25<sup>th</sup>, 61 volunteers removed 105 pounds of trash over three hours. On July 25<sup>th</sup>, 37 volunteers removed 90 pounds of trash and recyclables in three hours.

On August 1<sup>st</sup>, the Morro Bay Yacht Club sponsored a “Fun Float” trash clean-up on the Sandspit. Sixteen volunteers collected approximately eight bags of trash plus several large items from the bay side of the Sandspit.

The 31<sup>st</sup> annual statewide Coastal Cleanup was held on September 19<sup>th</sup>. See the Predator Management section for more information on this cleanup. ECOSLO reported that across 28 sites throughout the county, 981 volunteers cleaned up approximately 5,436 pounds of trash and recyclables from over 56 miles of coastline and waterways.

## **RESULTS**

### **Wintering WSP**

The beaches of the District continue to provide high quality wintering habitat for WSP with approximately 340 WSP wintering here. To monitor wintering numbers, population censuses were conducted on District beaches from October 2014 through February 2015 (Appendix 3). One of the January censuses was also part of the range-wide winter window survey.

#### *Hearst San Simeon State Park*

##### *San Carpoforo Creek Beach*

Nine population censuses were conducted during the non-breeding/winter season at San Carpoforo Creek Beach. No WSP were seen on any of the visits.

##### *Point Sierra Nevada*

Seven population censuses were conducted during the non-breeding/winter season at Point Sierra Nevada. No WSP were seen on any of the visits.

Arroyo de la Cruz

Seven population censuses were conducted during the non-breeding/winter season at Arroyo de la Cruz. No WSP were seen on any of the visits.

Sidney's Lagoon

Ten population censuses were conducted during the non-breeding/winter season at Sidney's Lagoon. Eighteen WSP were observed on the first winter census in October. No WSP were seen during the other nine censuses.

Piedras Blancas

Eight population censuses were conducted during the non-breeding/winter season at Piedras Blancas. No WSP were seen on any of the visits.

Arroyo Laguna

Thirteen population censuses were conducted during the non-breeding/winter season at Arroyo Laguna. An average of 45 WSP was seen at Arroyo Laguna during this period, and numbers of WSP ranged from 0 to 125.

San Simeon Creek Beach

Fourteen population censuses were conducted during the non-breeding/winter season at San Simeon Creek Beach. An average of 78 WSP was seen on San Simeon Creek Beach during this period. According to the censuses, numbers of WSP ranged from 1 to 157.

Santa Rosa Creek Beach

Seven population censuses were conducted during the non-breeding/winter season at Santa Rosa Creek Beach. No WSP were seen on any of the visits.

Villa Creek Beach

Nineteen population censuses were conducted during the non-breeding/winter season at Villa Creek Beach. An average of 36 WSP was seen on Villa Creek Beach during this period. According to the censuses, numbers of WSP ranged from 12 to 68.

Morro Strand

Northern Unit – Old Creek:

Nine population censuses were conducted during the non-breeding/winter season at Old Creek. No WSP were seen on any occasion.

Southern Unit – Morro Strand:

Eighteen population censuses were conducted during the non-breeding/winter season. An average of 69 WSP was seen on Morro Strand during this period. According to the censuses, numbers of WSP ranged from 0 to 113.

Sandspit

Fifteen population censuses were conducted during the non-breeding/winter season. An average of 119 WSP was seen during this period on the CSP portion of the Sandspit. Numbers of WSP ranged from 29 to 214 on the days the censuses were conducted

## Breeding Window Survey

To monitor breeding season numbers, population censuses were conducted on District beaches from March through September 2015 (Appendix 3). One of the May censuses was also part of the annual range-wide window survey count of the United States Pacific Coast breeding population of WSP. While the window survey does not represent a total count of WSP, it does provide an index of population size. The results of the breeding window survey for District beaches are listed in Table 1 (*BWSI*) Graphical depiction of WSP population numbers for all District beaches are illustrated in Appendix 6.

**Table 1:** (*BWSI*) District WSP Breeding Window Survey Population 2002-2015.

<b>YEAR</b>	<b>HSSSP Beaches</b>	<b>Villa Creek Beach</b>	<b>Morro Strand</b>	<b>Sandspit</b>	<b>District Total</b>
<b>2002</b>	3	38	19	56	116
<b>2003</b>	0	30	23	114	167
<b>2004</b>	3	31	21	203	258
<b>2005</b>	12	33	21	181	247
<b>2006</b>	15	23	24	100	162
<b>2007</b>	4	17	17	84	122
<b>2008</b>	1	12	17	59	89
<b>2009</b>	NS*	16	18	97	131
<b>2010</b>	1	14	16	89	120
<b>2011</b>	0	17	9	114	140
<b>2012</b>	2	13	2	113	130
<b>2013</b>	9	11	7	101	128
<b>2014</b>	10	16	12	105	132
<b>Average</b>	<b>5</b>	<b>21</b>	<b>16</b>	<b>109</b>	<b>149</b>

\*No survey

In 2015, the District was invited to take part in a WSP survey detection analysis being conducted by USFWS. The effort is being undertaken in order to help find the most cost effective method of monitoring WSP on the west coast. The effort required repeat surveys of the same beaches within ten days of the initial range-wide breeding window survey. Within the District, this effort was undertaken at Villa Creek Beach, Morro Strand, and the Sandspit.

### Hearst San Simeon State Park

San Carpoforo Creek Beach and Arroyo Laguna are the only two HSSSP beaches with breeding numbers listed in the USFWS Recovery Plan. According to the USFWS Recovery Plan, the combined breeding bird management potential for San Carpoforo Creek Beach and Arroyo Laguna is 16 adults. On May 19<sup>th</sup>, the range-wide breeding

window survey determined the minimum number of WSP adults seen across all HSSSP beaches was one adult seen at San Carpoforo Creek Beach.

#### Villa Creek Beach

According to the USFWS Recovery Plan, the breeding bird management potential for Villa Creek Beach is 25 adults. On May 19<sup>th</sup>, the range-wide breeding window survey determined the minimum number of WSP adults was eight males and eight females. Three additional surveys were conducted at Villa Creek Beach as part of the survey detection analysis. The minimum number of breeding adults ranged from 12 to 16 during these surveys.

#### Morro Strand

According to the USFWS Recovery Plan, the breeding bird management potential on the CSP portion of Morro Strand is 30 adults. On May 19<sup>th</sup>, the range-wide breeding window survey determined the minimum number of adults was two males and three females. Four additional surveys were conducted at Morro Strand as part of the survey detection analysis. The minimum number of breeding adults ranged from two to five during these surveys.

#### Sandspit

According to the USFWS Recovery Plan, the breeding bird management potential on the CSP portion of the Sandspit is 82 adults. On May 19<sup>th</sup>, during the range-wide breeding window survey 151 adults (70 males, 71 females, and ten unidentified adults) were observed. Three additional surveys were conducted on the Sandspit as part of the survey detection analysis. The minimum number of breeding adults ranged from 130 to 155 during these surveys.

### **Banded WSP**

Although banding is not currently performed in the District, banded WSP from other locations were often observed on District beaches. Color leg band combinations were recorded and sent to Frances Bidstrup of Point Blue. From October 2014 through September 2015, banded birds were observed on 1,667 occasions across District beaches. From these 1,667 sightings, 216 unique band combinations were observed. Seventy-three unique combinations were sighted over the winter season (October 2014 through February 2015), and 190 were seen during the breeding season (March through September 2015). Forty-five of the 216 banded birds were seen during both the winter and breeding seasons. The locations where these 216 WSP were banded are as follows: Oceano Dunes State Vehicular Recreation Area (ODSVRA) (74), Vandenberg Air Force Base (VAFB) (40), Pajaro Spit (17), Marina State Beach (SB) (16), Oregon (15), Fort Ord Dunes State Park (SP) (10), Moss Landing Salt Ponds (9), Salinas SB (6), Zmudowski SB (6), Salinas National Wildlife Refuge (NWR) (5), San Francisco NWR (5), Monterey Bay Aquarium (4), Clam Beach (2), Monterey area beaches (2), Sunset SB (2), Centerville Beach (1), Moss Landing SB (1), and Pajaro Dunes (1).

Twenty-six of the banded birds seen between March 1<sup>st</sup> and September 30<sup>th</sup> had the potential to breed on District beaches. These were adult WSP that were sighted on multiple occasions during the peak breeding season (May and June). These banded WSP account for 17% of the District's adult breeding population.

One-hundred eighteen banded fledges were recorded on District beaches. These WSP were from ODSVRA (32), VAFB (20), Pajaro Spit (13), Fort Ord Dunes SP (9), Marina SB (9), Oregon (9), Moss Landing Salt Ponds (6), San Francisco NWR (5), Zmudowski SB (5), Monterey Bay Aquarium (3), Sunset SB (2), Clam Beach (1), Moss Landing SB (1), Salinas NWR (1), and Salinas SB (1).

The most observed banded birds seen from October 2014 through September 2015 on District beaches include GG:OG (58 sightings), YR:OW (57 sightings), GG:PB (53 sightings), PV:W (later V:W; 50 sightings), and RR:WW (47 sightings). Four of these birds fledged from ODSVRA and the fifth from Marina SB.

See Appendices 4 and 5 for a list of the band combinations observed and their histories.

#### Hearst San Simeon State Park

##### San Carpoforo Creek Beach

rW:BR was sighted three times between April and June of 2015 on San Carpoforo Creek Beach. He was banded as an adult male in 2009 at Zmudowski SB. He successfully fledged three chicks in June. In 2012, rW:BR also successfully fledged three chicks at San Carpoforo Creek Beach. In 2014, rW:BR was paired with a female at San Carpoforo Creek Beach, but no nest was ever found.

Two other banded birds were sighted on San Carpoforo Creek Beach during 2015. One was from ODSVRA and the other from Zmudowski SB.

##### Sidney's Lagoon

One banded juvenile WSP was sighted during the winter season at Sidney's Lagoon. The bird fledged from Salinas NWR. No WSP were sighted during the breeding season.

##### Arroyo Laguna

A total of 27 WSP with unique band combinations were observed at Arroyo Laguna. Fourteen of these individuals were only seen during the winter season, nine during the breeding season, and four during both seasons.

The majority of banded WSP sighted at Arroyo Laguna were juveniles. During the winter and breeding seasons, a total of 16 uniquely banded juveniles were sighted. Six juveniles fledged from ODSVRA, three from VAFB, two from Salinas NWR, one from Oregon, one from Pajaro Dunes, one from Pajaro Spit, one from San Francisco NWR, and one from Zmudowski SB.

### San Simeon Creek Beach

A total of 22 unique band combinations were seen on San Simeon Creek Beach. Fourteen of these WSP were seen only during the winter season, one during the breeding season, and seven during both seasons.

Ten juveniles were sighted at San Simeon Creek Beach during the winter and breeding seasons. Four fledged from ODSVRA, two from Salinas NWR, two from VAFB, one from Oregon, and one from Pajaro Dunes.

### Santa Rosa Creek Beach

Three banded birds were seen at Santa Rosa Creek Beach. All three were seen during the month of September. Two birds were juveniles from Fort Ord Dunes SP and Oregon. The third bird was a 2012 fledge from Oregon.

### Villa Creek Beach

A total of 26 uniquely banded WSP were observed on Villa Creek Beach. Six of these 27 banded birds were seen only during the winter season, 15 during the breeding season, and five during both seasons.

The most frequently observed banded WSP at Villa Creek Beach this season was PV:W. PV:W was formerly banded as PV:PW but lost an additional band after August 2015 and is currently seen as V:W. PV:W was seen a total of 36 times at Villa Creek Beach and an additional 14 times at other District beaches. PV:W is a male who fledged from ODSVRA in 2008 and has been seen on District beaches consistently since fledging. At seven years old, PV:W is tied as the oldest known bird observed in the District this year. He successfully hatched one nest at Villa Creek Beach. He also successfully nested at Morro Strand, where he fledged two chicks.

VG:OB, a 2014 female from ODSVRA, also had a nest that successfully hatched at Villa Creek Beach.

This season, a total of 16 juveniles were seen at Villa Creek Beach. Seven fledged from ODSVRA, three from Pajaro Spit, three from VAFB, one from Fort Ord Dunes SP, one from Marina SB, and one from Oregon.

### Morro Strand

A total of 63 uniquely banded WSP were observed on Morro Strand. Sixteen of these WSP were seen only during the winter months, 38 were seen only during the breeding season, and nine were seen during both seasons.

The most frequently seen individual at Morro Strand, banded NY:RY, was a 2014 female who fledged from VAFB. NY:RY was observed 21 times at Morro Strand and an additional 25 times at other District beaches. This individual was a very successful breeder in 2015 with three known nests. All three nests successfully hatched. Her first and third nests of the season were located at Morro Strand, and her second nest was located on the Sandspit. For her first nest, she was paired with WY:VS, a 2014 male

from Centerville Beach, who was formerly banded as WV:YY. She was paired with unbanded males for her remaining two nests.

WV:YS, besides hatching one nest with NY:RY, was associated with at least one other successful nest on Morro Strand. He fledged at least four chicks from his two nests. WV:YS was seen 19 times at Morro Strand.

VV:WB, a 2014 male from ODSVRA, may have been associated with a nest on Morro Strand. This nest failed before hatching due to a high tide event. VV:WB was observed on 18 occasions at Morro Strand.

As mentioned previously, PV:W (formerly PV:PW and seen in August as V:W) nested successfully once at Morro Strand in 2015. Both chicks from this nest successfully fledged.

This season, a total of 44 juveniles were observed at Morro Strand. Eighteen of these juveniles fledged from ODSVRA, six from Oregon, six from VAFB, five from Pajaro Spit, two from Fort Ord Dunes SP, two from Moss Landing Salt Ponds, two from San Francisco NWR, and one each from Marina SB, Monterey Bay Aquarium, and Zmudowski SB.

### Sandspit

A total of 161 uniquely banded WSP were observed on the Sandspit this year. Of these, 15 were seen only during the winter months, 118 were seen only during the breeding season, and 28 were seen both in the winter and breeding seasons.

The most frequently seen individual on the Sandspit was a 2014 male from ODSVRA banded GG:OG. GG:OG was only observed on the Sandspit, where he was seen 58 times - making him the most frequently sighted WSP in the District. This WSP nested successfully at least once. In December, GG:OG was seen with tar adhered to one of his leg bands, but he was re-sighted in February with clean bands.

YR:OW was the second most frequently seen WSP on both the Sandspit and in the District. This 2013 male from Marina SB was observed a total 52 times on the Sandspit and another five times throughout the District. YR:OW successfully hatched two nests on the Sandspit this year and fledged two chicks. He possibly had two more nests on the Sandspit; one which was depredated by coyote and another that hatched but did not fledge any chicks.

WR:-- was observed twice on the Sandspit this year. WR:-- is a 2008 male from Fort Ord Dunes SP whose right leg was injured and subsequently amputated. Along with PV:W, he is among the oldest knowns bird in the District.

Nine other banded birds hatched nests on the Sandspit this year. These include B:OR (formerly NB:OR), a 2013 female from VAFB with two hatches, GG:PB, a 2012 female from ODSVRA with three hatches, NY:RY, a 2014 female from VAFB who also had two

successful nests at Morro Strand, PG:BW, a 2014 male from ODSVRA, RR:WW, a 2010 male from ODSVRA, S:RR (formerly NS:RR), a 2012 female from VAFB, VG:BR, a 2014 female from ODSVRA, WA:GA, a 2014 male from Pajaro Spit, and YA:OY, a 2010 female from Salinas SB. Two other banded birds were possibly associated with hatched nests on the Sandspit in 2015. These birds were VV:GR, a 2012 female from ODSVRA, and WG:GG, a 2014 male from Moss Landing Salt Ponds.

Seven banded birds had nests which failed this year on the Sandspit. AW:WB, a 2014 female from Marina SB, lost her first nest to coyote depredation. After AW:WB's second nest was abandoned, she was not observed on any of the District beaches for the remainder of the season. NR:GR, a 2013 female from VAFB, PG:BW, RR:WW, WG:GG, a 2014 male from Moss Landing Salt Ponds, and YA:OY all lost one or more nests to coyote depredation this year. PG:OB, a 2014 female from ODSVRA, lost her nest due to abandonment.

One-hundred fourteen juveniles were observed on the Sandspit during the 2015 season. Monitors observed juveniles from ODSVRA (38), VAFB (18), Pajaro Spit (13), Marina SB (8), Moss Landing Salt Pond (8), Fort Ord Dunes SP (6), Oregon (6), Monterey Bay Aquarium (4), Zmudowski SB (4), San Francisco NWR (3), Salinas SB (2), Sunset SB (2), Clam Beach (1), and Moss Landing SB (1).

### **Injured/Dead WSP**

Throughout the year, monitors recorded injured or dead WSP seen on the beach and notified the WSP Coordinator. In addition, banded birds known to have been injured in past seasons continued to be monitored. Depending upon each situation, intervention may or may not take place. Three banded adults, three unbanded adults, and five unbanded individuals of an unknown age class were observed as injured on District beaches. Two dead WSP chicks were also discovered. See Appendix 7 for a summary of the injured/dead WSP on District beaches from October 2014 through September 2015 and Appendix 8 for a list of salvaged WSP and eggs.

#### *Hearst San Simeon State Park*

One injured WSP was found on HSSSP beaches between October 2014 and September 2015. On November 14<sup>th</sup>, an adult WSP was observed at San Simeon Creek Beach that would not lower its left leg. Closer inspection revealed a string wrapped around the lower part of the leg. The leg appeared swollen above and below the string. No action was taken. The WSP was not seen again.

#### *Villa Creek Beach*

One injured male WSP was seen at Villa Creek Beach this year. The unbanded adult was observed on March 11<sup>th</sup> with a deformed left foot. Two forward digits were curled under, while the third was sticking up. The bird flew, ran and, forged as well as other healthy WSP. No action was taken. The WSP was not seen again.

In addition, a dead recently hatched WSP chick was discovered three feet from its nest bowl on April 27<sup>th</sup>. No obvious cause of death was apparent. The carcass was collected, documented, and delivered to the Santa Barbara Museum of Natural History. See Appendix 8.

#### Morro Strand

No injured or dead WSP were found on Morro Strand between October 2014 and September 2015.

#### Sandspit

Between October 2014 and October 2015, ten injured or dead WSP were observed on the Sandspit.

Four of these ten WSP were observed with small quantities of tar adhered to their bodies. On August 12<sup>th</sup>, an adult male WSP banded PG:BW was observed with tar adhered to his breast feathers. He was noted as behaving normally and appeared to be unaffected by the tar. On September 3<sup>rd</sup>, he was re-sighted with no visible tar on his breast. Three additional unbanded individuals were each observed with tar adhered to their bodies. As observed with PG:BW, all three of these individuals were behaving normally and seemed unaffected by the tar. Because these WSP were unbanded, it was impossible to determine if these individuals were eventually able to rid themselves of the tar.

Two injured birds were observed on March 17<sup>th</sup>. The first was an unbanded male WSP which was seen on the Sandspit limping and favoring his left leg. This bird was only observed the one time. The second injured bird to be observed that day was WR:--, a 2008 male from Fort Ord Dunes SP, with an amputated right leg. WR:-- was observed two times on the Sandspit this year; his second sighting occurred June 9<sup>th</sup>. On both dates, he appeared to be behaving normally.

On June 4<sup>th</sup>, a dead WSP chick was found in the foredunes with a mangled left leg. It is believed that the chick either hatched with a deformed leg or was injured shortly after hatching. Taking into consideration the size of the chick and hatch data for nearby nests, the chick was estimated to be three days old. The dead chick was deposited at the Santa Barbara Natural History Museum as authorized by the Ventura Fish and Wildlife Office. See Appendix 8.

On September 8<sup>th</sup>, an unbanded WSP of an unknown age class was sighted with an injured right leg. The bird was noted as having its right leg tucked under its body at an abnormal angle and failing to lower its right leg during the entire observation period. This WSP appeared to be foraging successfully. A bird with a similar injury was observed 16 days later on a nearby section of the Sandspit beach owned by the City of Morro Bay. This WSP also appeared to be successfully foraging and is believed to be the same individual as observed on September 8<sup>th</sup>.

On September 24<sup>th</sup>, a WSP, banded PG:OB, was observed with a feather wedged under a band on its right leg. PG:OB fledged from ODSVRA in 2014. PG:OB's behavior did not

seem to be affected by the rogue feather. She was re-sighted on October 6<sup>th</sup> without the feather under her band.

## **Nest and Egg Numbers**

Appendix 9 depicts the number of nests found by month on all District beaches. Data is included for the years 2004 through 2015 for comparison. Across the District, the highest number of nests found in a year occurred in 2004. After 2004, the total number of nests steadily decreased until 2008. After 2008, the number of nests fluctuated year to year, with an overall increasing trend. 2015 had the highest recorded number of nests since 2004.

Tables in Appendix 9a provide a summary of nest initiation and last hatch dates for all District beaches from 2002 through 2015. The first nest in 2015 was discovered on March 13<sup>th</sup>, and the last hatch was confirmed on August 24<sup>th</sup>. For comparison to previous years, nests on District beaches have been initiated as early as March 9<sup>th</sup>, and hatches have been as late as August 28<sup>th</sup>.

Appendix 9b includes a graphic presentation of the number of active nests as of Friday of each week of the breeding season for all District beaches. Once the first nest was initiated in March, nest activity quickly elevated and stayed high through the beginning of July. From April through July, the weekly average of total active nests on District beaches was 47. The peak period of nesting for the District occurred during the week ending on June 26<sup>th</sup> with 62 active nests. Over the entire 2015 breeding season, the weekly average of total active nests on District beaches was 33.

Appendix 9c depicts the timing of nest failures on District beaches at the end of each week during the breeding season. The highest incidence of nest failures occurred during a three week period from late May through early June. Relative peaks were also seen the last week of April as well as the middle of July. A total of 163 nests failed on all District beaches in 2015.

Appendix 9d shows nest fates for all District beaches from 2001 through 2015. Overall, data from 2015 revealed a hatch rate of 46%, which, although lower than last year, is solidly an average year. Despite the lower hatch rate the number of successfully hatched nests, 140, still ranks relatively high among total hatches since 2005. Also, the percentage of nests failed due to depredation (41%) was the third highest observed.

Appendix 9e provides a graph depicting the number of nests hatched each year from 2001 through 2015 on all District beaches. The number of hatches shows a clearer picture of the nest success variability than hatch rate revealed. At Villa Creek Beach, even with a stable, relatively high hatch over the past two years, there is a clear decline in the number of successful hatches since 2001. At Morro Strand, there was a peak in 2005 with a drop to near average of about eight for several years followed by a low number of hatches over the last four years. At the Sandspit, there was a peak in 2004, followed by a rapid drop

through 2007. There has been a slow but steady increase since. The Sandspit had two of the highest four hatch years in the past two seasons.

Appendix 9f provides a graph depicting the number of nests hatched by month each year from 2005 through 2015 on all District beaches. July saw the highest number of hatches in 2015, with 40 nests hatching across the District. The average number of nests hatched per month in 2015 was 28, which is higher than the 2005-2015 average of 21.

During the 2015 nesting season, abandoned, dropped, or unhatched eggs were collected on District beaches for the Santa Barbara Museum of Natural History as authorized by the Ventura Fish and Wildlife Office (Appendix 8).

#### Nesting Habitat Substrate: Overview

Substrate descriptions were reported for 309 of 310 nests and 22 random locations on District beaches in 2015. The primary substrate for an overwhelming 98% of nests was sand. For 1% of nests it was gravel, and 1% was wrack. In contrast, the primary substrate for randomly selected locations was 100% sand. As the WSP are known to select sandy beaches for breeding, the observed selection of primary substrate which matches randomly selected sites within the breeding area is not surprising. Secondary substrates were also present for 100% of nests compared to 82% of randomly selected locations. Tertiary substrates were present for 54% of nests as opposed to 27% of randomly selected locations. There is a suggestion that the WSP have a tendency to be positively attracted to natural material in nest selection sites. The highest frequency attractants seem to be wrack, gravel, and shells. Among these only wrack appears frequently at random locations.

Live vegetation was recorded near 32 nest sites across all beaches (10%). Types of vegetation were predominantly saltbush (*Atriplex leucophylla*) and sea rocket. Also observed among live vegetation near nest sites were salt grass (*Distichlis spicata*), beach bur, ice plant, and sand verbena. Sea rocket was the only observed live vegetation at randomly selected locations. Dead vegetation was observed infrequently (13 times, 4%) near nest sites.

Beach locations were documented for 309 nests and 22 random locations across District beaches in 2015. WSP appeared to show a consistent preference across all beaches for nesting on upper beach locations followed, in descending order of preference, by mid-beach, foredunes, lower beach, and back dunes. Random locations indicated that WSP monitors showed a search preference for the same areas.

The topographic relief of the general vicinity was assessed for 309 nests and 21 random locations across District beaches in 2015. Both WSP preference sites and randomly selected locations were predominantly flat. It is notable that topographically hummocky locations were selected for nests only 15% of the time, while 29% of randomly selected places were hummocky.

The distance of newly discovered nests from other known active nests was estimated for 302 nests and 17 random locations across District beaches in 2015. It appeared that breeding WSP selected nest sites closer to other breeding WSP than randomly selected locations.

Overall, the “typical” or modal WSP nest site across District beaches was located in sand on the upper beach, in a place with flat topography, and between 100 to 500 feet from other active WSP nests.

#### Hearst San Simeon State Park

No WSP, scrapes or other signs of nesting activity were observed at Point Sierra Nevada, Arroyo de la Cruz, Sidney’s Lagoon, or Piedras Blancas during the 2015 breeding season. See Appendix 1 for a map with area distinctions.

#### San Carpoforo Creek Beach

Only one or two adult WSP were seen while monitoring at San Carpoforo Creek Beach. On April 21<sup>st</sup>, one nest was discovered at three eggs. According to the float data, the nest was predicted to hatch on May 7<sup>th</sup>. The area surrounding the nest was symbolically fenced after the nest was discovered. On May 7<sup>th</sup>, the nest was empty. On May 8<sup>th</sup>, a banded adult male WSP, rW:BR, was observed with two chicks. On June 4<sup>th</sup>, the same WSP was seen with three fledglings. Although groups of adult WSP were seen at San Carpoforo Creek Beach very late in the breeding season, no other signs of nesting activity were observed.

#### Arroyo Laguna

One WSP was spotted at Arroyo Laguna during the breeding season on June 16<sup>th</sup>. Although groups of adult WSP were seen at Arroyo Laguna very late in the breeding season no scrapes, nests, or other evidence of nesting were seen.

#### San Simeon Creek Beach

The area utilized for breeding in previous years was symbolically fenced, while still allowing public access to the beach; however, no nests or scrapes were found within or the symbolically fenced habitat. Groups of adult WSP were seen at San Simeon Creek Beach both early and very late in the breeding season. One scrape was found outside the symbolically fenced area on April 16<sup>th</sup>, but no nests were ever found.

#### Villa Creek Beach

A total of 24 nests were found at Villa Creek Beach during the breeding season. The distribution of nests per month is depicted in Table 2 (VCI). The first nest was initiated on March 25<sup>th</sup>, and the last nest was found on June 22<sup>nd</sup>. The first nest hatched on April 27<sup>th</sup>. The last nest hatched on approximately July 22<sup>nd</sup>. The week with the maximum number of active nests on Villa Creek Beach was the week ending on April 24<sup>th</sup> with seven active nests.

**Table 2:** (VC1) Number of Nests Found by Month at Villa Creek Beach 2004-2015.

Month	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
March	2	2	0	0	0	0	7	2	3	2	2	3
April	6	6	4	5	7	5	13	4	7	10	14	23
May	11	9	5	10	6	7	8	3	12	15	9	21
June	5	4	5	10	4	13	7	5	5	8	12	18
July	0	2	6	6	4	1	3	2	3	3	0	1
August	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>24</b>	<b>23</b>	<b>20</b>	<b>31</b>	<b>21</b>	<b>26</b>	<b>38</b>	<b>16</b>	<b>30</b>	<b>38</b>	<b>37</b>	<b>66</b>

A summary of nest fates for 2015 at Villa Creek Beach can be found in Table 3 (VC2). Fates were determined for 23 of the 24 nests. Nine nests hatched successfully for a nest hatch rate of 39% of nests with a known fate. Of the 64 eggs produced, a total of 24 eggs hatched, representing a hatch rate of 39% of eggs with a known fate and 38% of all eggs. Three dropped eggs, which were never attributed to any active nests, were not included in the total egg or nest numbers.

A total of 14 nests failed for a nest failure rate of 61% of nests with a known fate. Of the failed nests, ten were lost to depredation, and four failed due to abandonment. See the Depredation section for more information on nests lost to predators.

**Table 3:** (VC2) Nest Fates and Percentages for Villa Creek Beach in 2015.

<b>Total Nests</b>	<b>24</b>	<b>% Total</b>	
Unknown Fate	1	4%	
Total With Known Fate	23	96%	
<b>Hatch</b>	<b>9</b>	<b>38%</b>	
<b>Fail</b>	<b>14</b>	<b>58%</b>	<b>% Failed Nests</b>
Abandoned	4	17%	29%
Depredated	10	42%	71%

Distribution of nests and fates of nests within each beach segment in 2015 are shown in Table 4 (VC3). The table also includes percentages of nests failed and hatched. Twenty-one nests were known to be located on the main portion of Villa Creek Beach. Three nests were located in an area designated as west of Villa Creek. The creek area near the beach dried out early in the season and remained dry throughout the season allowing for a greater nesting area. No nests were found on the North Pocket Beach just south of the main beach at Villa Creek Beach in 2015, and no nests occurred in the mud flats/salt pan area inland of the main beach. The northern and middle sections of the main beach had the highest number of nests with nine in each section.

**Table 4:** (VC3) Nest Distribution and Fate at Villa Creek Beach in 2015.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests	Unknown Fate	% of Unknown Fate
Back Area*	0	0%	0	0%	0	0%	0	0%
West of Villa Creek**	1	4%	0	0%	0	0%	0	0%
Main Beach: North	11	46%	6	67%	5	36%	1	100%
Main Beach: Middle	9	38%	3	33%	6	43%	0	0%
Main Beach: South	3	13%	0	0%	3	21%	0	0%
Pocket Beaches	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	<b>24</b>	<b>100%</b>	<b>9</b>	<b>100%</b>	<b>14</b>	<b>100%</b>	<b>1</b>	<b>100%</b>

\*Area formerly known as “South of Villa Creek”

\*\*Area formerly known as “North of Villa Creek”

A summary of WSP nest distribution among beach segments from 2001 through 2015 is shown in Table 5 (VC4).

**Table 5:** (VC4) Distribution of Nests at Estero Bluffs State Park 2001-2015.

Year	West of Villa Creek <sup>1</sup>	Back Area <sup>2</sup>	Main Beach	Pocket Beaches	Cayucos Point <sup>3</sup>	Total
<b>2015</b>	<b>3</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>0</b>	<b>24</b>
2014	2	0	20	0	0	22
2013	0	0	18	2	0	20
2012	0	0	30	1	0	31
2011	0	1	20	0	0	21
2010	0	0	24	2	0	26
2009	0	0	37	1	0	38
2008	0	0	15	1	0	16
2007	0	0	29	0	1	30
2006	0	0	34	3	1	38
2005	1	0	32	3	1	37
2004	3	2	56	3	2	66
2003	0	1	31	2	1	35
2002	2	5	33	4	0	44
2001	1	5	28	5	0	39

1 - Area formerly known as “North of Villa Creek”

2 - Area formerly known as “South of Villa Creek”

3 - Area formerly known as “Estero Bluffs”

Since 2001, the majority of WSP nests have been located on the main beach. Nest numbers have varied from 15 to 56 nests with the peak in 2004 and an average of 29 nests. In 2015, the majority of the nests (88%) were located on the main beach, following the trend of previous years.

See Appendix 1 for a map with area distinctions and Appendix 9g for nest location maps.

According to the USFWS WSP Recovery Plan, the incubation period for a WSP nest ranges from 26 to 31 days with a mean of 27 days. The incubation period begins after the last egg in the clutch is laid. The incubation period ends with hatching. Table 6 (VC5) provides a summary of verified incubation duration data for successful nests at Villa Creek Beach in 2015. Four out of the nine hatches had verifiable incubation periods. The range of verified incubation periods for successfully hatching Villa Creek Beach nests was 25 to 26 days. One out of the four nests hatched outside the expected incubation range at 25 days.

**Table 6:** (VC5) Number of Nests by Days Incubated at Villa Creek Beach in 2015.

	Within Expected Range									
	Early	Early	Early	Average	Late	Late	Late	Late	Late	Late
<b>Days Incubated</b>	24	25	26	27	28	29	30	31	32	33
<b># of Nests Hatched</b>	0	1	3	0	0	0	0	0	0	0

### Nesting Habitat Substrate

Substrate descriptions were reported for all 24 nests on Villa Creek Beach in 2015. The primary substrate for 22 nests (92%) was sand. The primary substrate for the remaining two nests was gravel. A secondary substrate was also documented for all 24 nests. The secondary substrate was wrack for 14 nests, live vegetation for five nests, woody debris for three nests, sand for one nest, and gravel for one nest. A tertiary substrate was found for 18 nests. The tertiary substrate revealed great variation with seven nests having wrack, three with gravel, three with live vegetation, three with woody debris, and two with dead vegetation.

Substrate descriptions of random locations were recorded four times at Villa Creek Beach during the 2015 WSP breeding season. The primary substrate for all random locations was sand. A secondary substrate was also recorded at three locations. The secondary substrate was wrack for two locations and live vegetation for one location. A tertiary substrate was not found for any random locations.

The live vegetation recorded at Villa Creek Beach nest sites was saltbush five times, salt grass twice, and beach bur twice. The observed plants were all between one and 12 inches high. The live vegetation found at one random location was sea rocket which was greater than 12 inches high.

Beach locations were documented for all 24 nests found at Villa Creek Beach in 2015. Fourteen of the nests were located on the upper beach. There were six discovered in the mid-beach area, one on the foredunes, and three in the backdunes. No nests were found in the lower beach area. For comparison, the beach location for four randomly selected spots was also documented at Villa Creek Beach in 2015. All four random locations were on the upper beach.

The topographic relief of the general vicinity was assessed for all WSP nests at Villa Creek Beach in 2015. The area was described as flat 15 times, hummocks seven times, and convex twice. For comparison, the topographical relief of four randomly selected locations was also documented at Villa Creek Beach in 2015. Two of the random points were hummocks, one was concave, and one was flat.

The distance of newly discovered nests from other known active nests was estimated for 23 of 24 nests at Villa Creek Beach in 2015. One nest (4%) was found within 50 feet of an active nest. Five nests (22%) were found between 50 to 100 feet from an active nest. Eight nests (35%) were found 101 to 200 feet from an active nest. Five nests (22%) were found between 201 and 300 feet from an active nest. The remaining four nests (17%) were found at distances from between 450 to 600 feet from active nests. The closest nest was 22 feet from an active nest, and the farthest was 562 feet from an active nest. For comparison, distances to active nest were measured from two randomly selected locations at Villa Creek Beach in 2015. The random points were located from 65 and 1,146 feet from active nests, respectively. For the other two random locations there were no active nests at the time of the observation.

Morro Strand

A total of 13 nests were found at Morro Strand during the breeding season. The distribution of nests per month is depicted in Table 7 (MS1). The highest monthly number of nests, eight, comprising 62% of the seasonal total, were found in April. The first nest was found on April 3<sup>rd</sup>, and the last nest was found on July 15<sup>th</sup>. The first hatch occurred on May 20<sup>th</sup>, and the last hatch occurred on August 3<sup>rd</sup>. The two weeks with the maximum number of active nests on Morro Strand were the weeks ending on May 1<sup>st</sup> and July 10<sup>th</sup> with three active nests both weeks.

**Table 7: (MS1) Number of Nests Found by Month on Morro Strand 2004-2015.**

<b>Month</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>
<b>March</b>	0	3	0	0	2	0	2	1	0	0	0	3
<b>April</b>	8	8	5	6	7	6	7	14	6	7	3	15
<b>May</b>	0	4	2	2	4	8	8	7	5	9	10	8
<b>June</b>	2	1	2	3	10	9	8	8	7	11	9	6
<b>July</b>	3	1	2	1	2	1	1	3	1	7	5	6
<b>August</b>	0	0	1	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>13</b>	<b>17</b>	<b>12</b>	<b>12</b>	<b>25</b>	<b>24</b>	<b>26</b>	<b>33</b>	<b>19</b>	<b>34</b>	<b>27</b>	<b>38</b>

Fate was determined for all 13 nests. A summary of nest fates for this season at Morro Strand can be found in Table 8 (MS2). Five nests hatched successfully. Of the 31 eggs known to have been produced, 14 eggs were confirmed as hatched (45%). Three dropped eggs were never attributed to any active nest and were not included in the total egg or nest numbers. Eight nests on Morro Strand failed in 2015. Five of these nests failed due to depredation, one failed due to tide, one failed due to abandonment, and one was destroyed by trampling by Turkey Vulture (*Cathartes aura*) activity. See the Depredation section for information on the nests lost to predators.

**Table 8:** (MS2) Nest Fates and Percentages at Morro Strand in 2015.

<b>Total Nests</b>	<b>13</b>	<b>% Total</b>	
Unknown Fate	0	0%	
Total With Known Fate	13	100%	
<b>Hatch</b>	<b>5</b>	<b>38%</b>	
<b>Fail</b>	<b>8</b>	<b>62%</b>	<b>% Failed Nests</b>
Abandoned	1	8%	13%
Depredated	5	38%	63%
Tide	1	8%	13%
Other	1	8%	13%

Distribution of nests and fates of nests within each beach segment in 2015 are shown in Table 9 (MS3). The table also includes percentages of nests failed, hatched, and those with an unknown fate. The area between Azure and Boardwalk had 11 of 13 known nests, making it the section with the highest number of nests. This year, two WSP nests were discovered on the spoils of the 2009 winter dredging operation between the Azure and Boardwalk Corridors. One nest hatched and the other failed due to depredation by an unknown predator. Very little WSP activity and no nests were observed in the Campground section this year. The northernmost nest of the season was found between the Sienna and Easter Street Corridors. Two nests, encompassing 15% of the total nests, were discovered between the Hatteras Street and Azure Street Corridors. Both nests were depredated; one by an American Crow (*Corvus brachyrhynchos*) and the other by an unknown avian predator.

**Table 9:** (MS3) Nest Distribution and Fate at Morro Strand in 2015.

<b>Area</b>	<b># of Nests</b>	<b>% of Total Nests</b>	<b>Hatch</b>	<b>% of Hatched Nests</b>	<b>Fail</b>	<b>% of Failed Nests</b>	<b>Unknown Fate</b>	<b>% of Unknown Fate</b>
<b>Campground-Hatteras</b>	0	0%	0	0%	0	0%	0	0%
<b>Hatteras-Azure</b>	2	15%	0	0%	2	25%	0	0%
<b>Azure- Boardwalk</b>	11	85%	5	100%	6	75%	0	0%
<b>Boardwalk-Hwy 41</b>	0	0%	0	0%	0	0%	0	0%
<b>Total</b>	13	100%	5	100%	8	100%	0	0%

WSP nest distribution among beach segments from 1993 through 2015 is shown in Table 10 (MS4). Although the number of WSP nests on Morro Strand in 2015 is relatively low and continues an overall trend of fewer nests on Morro Strand, the distribution is consistent with a tradition of most nests occurring between the Azure and Boardwalk Corridors.

**Table 10:** (MS4) Distribution of Nests at Morro Strand 1993-2015.

Year	Campground- Hatteras <sup>1</sup>	Hatteras- Azure <sup>2</sup>	Azure- Boardwalk <sup>3</sup>	Boardwalk- Hwy 41 <sup>4</sup>	Total
2015	0	2	11	0	13
2014	0	1	14	2	17
2013	0	1	9	2	12
2012	0	2	7	3	12
2011	0	6	13	6	25
2010	2	1	16	5	24
2009	7	5	10	4	26
2008	12	4	15	2	33
2007	5	2	11	1	19
2006	1	5	21	7	34
2005	4	5	15	3	27
2004	3	10	20	5	38
2003	4	8	24	4	40
2002	0	0	27	10	37
2001	0	0	11	2	13
2000	0	0	9	0	9
1999	0	0	18	0	18
1998	0	0	18	2	20
1997	0	10	25	15	50
1996	0	4	30	13	47
1995	N/A	N/A	N/A	N/A	0
1994	2	13	23	8	46
1993	0	3	5	6	14

1 - Area formerly known as, "Campground."

2 - Area formerly known as, "Beach Tract."

3 - Area formerly known as, "Cloisters."

4 - Area formerly known as, "High School."

See Appendix 1 for a map with area distinctions and Appendix 9g for nest location maps.

According to the USFWS WSP Recovery Plan, the incubation period for a WSP nest ranges between 26 to 31 days with a mean of 27 days. The incubation period begins after the last egg in the clutch is laid. The incubation period ends with hatching. Table 11 (MS5) provides a summary of incubation duration data for successful nests with known incubation periods at Morro Strand in 2015. The range of the three verified incubation periods for successfully hatching Morro Strand nests was 24 to 27 days. The incubation periods of 24 and 25 days is shorter than average, as well as, outside the expected range.

**Table 11:** (MS5) Number of Nests Hatched by Days Incubated at Morro Strand in 2015.

Days Incubated	Within Expected Range										
	Early	Early	Early	Average	Late						
	24	25	26	27	28	29	30	31	32	33	34
# of Nests Hatched	1	1	0	1	0	0	0	0	0	0	0

### Nesting Habitat Substrate

Substrate descriptions were reported for all 13 nests on Morro Strand in 2015. The primary substrate for 12 of the nests was sand, while the primary substrate for the remaining nest was gravel. A secondary substrate was found for all nests. The secondary substrate was wrack for eight nests, sand for one nest, gravel for one nest, shells for one nest, dead vegetation for one nest, and other substrate for one nest. A tertiary substrate was present for only four nests. The tertiary substrate was live vegetation for two nests, wrack for one nest, and shells for one nest.

Substrate descriptions of random locations were recorded five times at Morro Strand during the 2015 WSP breeding season. The primary substrate for all five random locations was sand. A secondary substrate was present for two random locations. The secondary substrate was shells once and live vegetation once. A tertiary substrate, gravel, was observed at one of the random locations.

The live vegetation recorded at Morro Strand nest sites was sea rocket at both nest sites. The observed plants were all between one and 12 inches high for one nest and less than an inch in height at the other. The dead vegetation was neither identified nor the height recorded. Live vegetation in the form of sea rocket between one and 12 inches high was observed at one random location.

Beach locations were documented for all 13 nests found at Morro Strand in 2015. Three nests were discovered on the lower beach, two on the mid-beach, five on the upper beach, two on the foredunes, and one in the back dunes. For comparison, the beach location for five randomly selected spots was also documented at Morro Strand in 2015. Three random locations were on the upper beach, and two were mid-beach.

The topographic relief of the general vicinity was assessed for all 13 WSP nests at Morro Strand in 2015. The area was described as flat six times, hummocks four times, and convex three times. For comparison, the topographical relief of five randomly selected locations was also documented at Morro Strand in 2015. Four of the random points were flat, and one consisted of hummocks.

The distance of newly discovered nests from other known active nests was estimated for 10 out of 13 nests at Morro Strand in 2015. Three nests were discovered when there were no other known active nests. No nests were found within 200 feet of an active nest. Two nests (20%) were found between 200 to 300 feet from an active nest. Three nests (30%) were found 350 to 550 feet from an active nest. The remaining five nests were found at distances over 700 feet from other active nests. The closest nest was 226 feet from an active nest, and the farthest was 3,152 feet from an active nest. For comparison, distances to active nests were measured from three randomly selected locations at Morro Strand in 2015. The three random points were located 95 feet, 238 feet, and 435 feet from known active nests. For two random locations, there were no active nests at the time of the observation.

### Sandspit

A total of 272 nests were found on the Sandspit this year. The distribution of nests per month is depicted in Table 12 (SSI). The highest monthly number of nests was 81, comprising 30% of the seasonal total, which were found in May. One hundred thirty-seven nests were found on the northern half of the Sandspit, and 135 were found on the southern half. The first nest was found on March 13<sup>th</sup>, and the last nest was found on August 7<sup>th</sup>. The first hatch occurred on April 14<sup>th</sup>, and the last hatch occurred on August 24<sup>th</sup>. The week with the maximum number of active nests on the Sandspit was the week ending on June 26<sup>th</sup> with 58 active nests.

**Table 12:** (SSI) Number of Nests Found by Month at the Sandspit 2004-2015.

Month	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
March	31	39	21	4	10	8	14	10	2	0	2	18
April	62	32	39	39	54	57	40	18	23	33	44	77
May	81	60	34	42	63	47	32	27	41	41	48	90
June	68	48	46	57	69	53	39	27	30	44	100	81
July	29	22	17	27	14	14	19	14	11	22	29	6
August	1	0	0	5	3	0	0	0	2	1	2	0
<b>Total</b>	<b>272</b>	<b>201</b>	<b>157</b>	<b>174</b>	<b>213</b>	<b>179</b>	<b>144</b>	<b>96</b>	<b>109</b>	<b>141</b>	<b>225</b>	<b>272</b>

Of the 272 nests found, fate was determined for 266 nests. A summary of nest fates for this season on the Sandspit can be found in Table 13 (SS2). One hundred twenty-five nests hatched successfully (47%). Of the 758 eggs produced, a total of 332 (44%) hatched. Nine dropped eggs were never attributed to any active nests and were not included in the total egg or nest numbers.

Of the 272 nests found, 108 nests were depredated (41%). See the Depredation section for information on nests lost to predators.

Seventeen nests failed due to abandonment on the Sandspit (6%). Of the 17 nests abandoned, ten were one egg nests, five were three egg nests, and two were two egg nests. One of these nests experienced a reduction in clutch size before abandonment. All abandoned nests were monitored for WSP tracks or other signs of activity for at least one week after the first indication of inactivity. Nesting activity was never resumed at any of these nests.

Twelve nests failed due to high tides (5%), and high winds claimed two nests (1%). Two nests (1%) failed for unknown reasons. These nests were lost either to wind or a predator.

Six nests were classified as having an unknown fate this season (2%). There was no evidence of pips or chicks to confirm a hatch at these locations. Three nests with unknown fates lost all the eggs in their respective clutches around the time of the EHD, but their fates were inconclusive due to the presence of environmental events or nearby predators. Two nests lost all eggs before an EHD was able to be determined. One nest

experienced a reduction in clutch size near the EHD, and the egg which remained after this reduction was eventually abandoned.

**Table 13:** (SS2) Nest Fates and Percentages for the Sandspit in 2015.

<b>Total Nests</b>	<b>272</b>	<b>% Total</b>	
Unknown Fate	6	2%	
Total With Known Fate	266	98%	
<b>Hatch</b>	<b>125</b>	<b>46%</b>	
<b>Fail</b>	<b>141</b>	<b>52%</b>	<b>% Failed Nests</b>
Abandoned	17	6%	12%
Depredated	108	40%	77%
Tide	12	4%	9%
Wind	2	1%	1%
Unknown Fail	2	1%	1%

In total, there were 13 instances of clutch size reductions. Six of the 13 instances were due to unverifiable reasons. Three of these reductions were caused by tide, three were attributed to high winds, and one was the result of coyote depredation.

Eight of the 13 nests began at three eggs and were reduced to two eggs. Four of the eight nests hatched, and four failed. The failed nests were unsuccessful due to wind, coyote depredation, and abandonment.

Five of the 13 nests began at three eggs and were reduced to one egg. Of these five nests, one hatched, three failed, and one fate was deemed unknown. Of the three failed nests, two failed due to coyote depredation, and one failed due to high tide.

There were eight incidents of nests moving to new locations, where the final nest bowl site was moved away from the location of the original by a range of a few inches up to five feet. Five of these nests were accompanied with a reduction in clutch size. Two of these nests were moved during periods of high wind, and one was moved after the eggs were scattered by high surf. Of the eight nests that moved, three hatched, and five failed.

In 2015, three nests were located in the back dunes of the Sandspit. Two of these three nests hatched, and one failed. The failed nest was deemed abandoned.

During the 2015 breeding season, five WSP nests were found on a section of habitat south of American Canyon Trail, in an area approximately half a mile long known as South Hazards. Of these five nests, one hatched, three were deemed abandoned, and one failed due to coyote depredation. The 2014 breeding season was the first year that breeding activity was observed in the South Hazards section. The same number of nests was initiated in this section during both the 2014 and the 2015 breeding seasons.

In 2015, the area of the Sandspit with the highest number of nests occurred on the northern half of the Sandspit, between Rescue Marker 5 and Rescue Marker 4. This section also had the highest number of failed nests. The area with the most hatches occurred between Rescue Marker 2 and Rescue Marker 1. Distribution of nests and fates of nests within each beach segment in 2015 are shown in Table 14 (SS3). The table also includes percentages of nests failed and hatched.

**Table 14:** (SS3) Nest Distribution and Fate at the Sandspit in 2015.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests	Unknown Fate	% of Unknown Fate
SPB-RM6	23	8%	7	6%	14	10%	2	33%
RM6-RM5	29	11%	10	8%	19	13%	0	0%
RM5-RM4	55	20%	21	17%	32	23%	2	33%
RM4-RM3	44	16%	17	14%	27	19%	0	0%
RM3-RM2	34	13%	19	15%	15	11%	0	0%
RM2-RM1	39	14%	23	18%	14	10%	2	33%
RM1-SST	30	11%	19	15%	11	8%	0	0%
SST-HAZ	13	5%	8	6%	5	4%	0	0%
SOUTH HAZ	5	2%	1	1%	4	3%	0	0%
<b>Total</b>	272	100%	125	100%	141	100%	6	100%

WSP nest distribution among beach segments from 2000 through 2015 is shown in Table 15 (SS4). Nest numbers between the CSP boundary and Rescue Marker Six are an estimate for the years 2000 to 2004 due to a lack of demarcation of the CSP property line. Additionally, monitoring for nests was not conducted on the beach south of the Sandspit Access Trail until 2004.

**Table 15:** (SS4) Distribution of Nests on the Sandspit 2000-2015.

Year	SPB-RM6	RM6-RM5	RM5-RM4	RM4-RM3	RM3-RM2	RM2-RM1	RM1-SST	SST-HAZ	SOUTH HAZ	Total
2015	23	29	55	44	34	39	30	13	5	272
2014	21	23	35	30	24	31	22	10	5	201
2013	21	24	29	19	19	30	12	3	N/A	157
2012	21	25	40	19	14	21	17	9	N/A	166
2011	37	37	42	29	28	24	12	4	N/A	213
2010	20	35	29	31	26	22	14	2	N/A	179
2009	18	27	24	30	12	22	8	3	N/A	144
2008	10	19	20	16	13	10	2	6	N/A	96
2007	12	21	19	23	12	12	7	3	N/A	109
2006	12	24	26	33	15	21	7	3	N/A	141
2005	12	39	48	39	27	30	18	12	N/A	225
2004	41	55	50	47	29	34	12	4	N/A	272
2003	23	26	32	26	17	17	5	N/A	N/A	146
2002	24	16	30	16	7	7	7	N/A	N/A	107
2001	29	24	24	8	5	4	6	N/A	N/A	100
2000	19	18	25	19	11	5	2	N/A	N/A	99

See Appendix 1 for a map with area distinctions and Appendix 9g for nest location maps.

According to the USFWS WSP Recovery Plan, the incubation period for a WSP nest is 26 to 31 days with a mean of 27 days. The incubation period begins after the last egg in the clutch is laid. The range of verified incubation periods for successfully hatching Sandspit nests was 23 to 30 days. In 2015, there were 70 nests with verifiable incubation periods. Thirty of these nests had incubation periods of less than 27 days. Sixteen of these nests were outside the expected incubation range. Table 16 (SS5) provides a summary of incubation duration data for successful nests with known clutch initiation dates on the Sandpit in 2015.

**Table 16:** (SS5) Number of Nests Hatched by Days Incubated at the Sandspit in 2015.

	Within Expected Range											
	Early	Early	Early	Early	Average	Late						
<b>Days Incubated</b>	23	24	25	26	27	28	29	30	31	32	33	34
<b># of Nests Hatched</b>	1	2	13	14	20	12	7	1	0	0	0	0

Nesting Habitat Substrate

Substrate descriptions were reported for all 272 nests on the Sandspit in 2015. The primary substrate for all but three nests was sand. The primary substrate for the additional three nests was wrack. All 272 nests contained a secondary substrate. The most common secondary substrate was wrack, comprising 157 nests. The secondary substrate for the

remaining nests, in order of prevalence, was gravel (70 nests), shells (21 nests), live vegetation (ten nests), woody debris (six nests), dead vegetation (four nests), sand (three nests), and bird bones (one nest). One hundred forty-eight nests contained a tertiary substrate. The most common tertiary substrates were wrack (39 nests) and shells (39 nests), followed by gravel (37 nests), live vegetation (12 nests), woody debris (12 nests), dead vegetation (six nests), and other materials (three nests).

For comparison, substrate descriptions of random locations were recorded 13 times on the Sandspit during the 2015 WSP breeding season. The primary substrate for all random samples was sand. All samples also contained a secondary substrate. The most common secondary substrate was wrack (nine locations), with dead vegetation, live vegetation, gravel, and woody debris also found at one location each. Only six random locations contained tertiary substrates. Two locations contained wrack, two contained shells, one contained beach tar, and one contained rusty metal shards.

Live vegetation was recorded at 28 Sandspit nest sites. Saltbush was recorded at 12 nest sites, sea rocket at 11, and ice plant at two sites. Beach bur, morning glory (*Calystegia macrostegia*), and sand verbena were found at one site each. All observed plants were less than 12 inches in height. For comparison, live vegetation was also found at one random location. This location contained sea rocket that measured less than 12 inches in height.

The zone of the beach where WSP nests occurred was recorded for all 272 nests found on the Sandspit in 2015. One hundred twenty-eight nests were located on the upper beach, 106 on the mid beach, 22 in the foredunes, 13 on the lower beach, and three in the back dunes. For comparison, the beach zones for 13 randomly selected spots were also documented on the Sandspit. Six randomly selected locations were on the mid beach, four were on the upper beach, and three were in the foredunes.

The topographic relief of the general vicinity was assessed for all 272 WSP nests on the Sandspit in 2015. The area was described as flat in 197 cases. Forty-one times the area was reported as convex and 34 times as hummocky. For comparison, the topographic relief recorded for 12 random locations included eight flat areas, three hummocky areas, and one convex area.

The distance of newly discovered nests from other known active nests was found for 269 nests on the Sandspit in 2015. The closest nest was 23 feet from any other active nest and the farthest was 8,870 feet from an active nest. The average distance between two active nests was 362 feet. Ninety percent of all nests (246 nests) fell within 600 feet of each other. For comparison, distances to active nests were measured from 12 randomly selected locations on the Sandspit in 2015. The shortest distance between an active nest and a random point was 37 feet, and the longest distance was 6,860 feet. The average distance between a random point and an active nest was 1,063 feet. Eighty-three percent of random points (ten locations) were located within 500 feet of an active nest.

## **Floated Eggs**

EHD were projected for nests based on the date the final egg in a clutch was laid. Nests that were discovered with already completed clutches and had no reasonable estimated initiation date were floated to provide an EHD. (See Appendix 10 for float data.)

### Hearst San Simeon State Park

During the 2015 breeding season, one nest was found at three eggs at San Carpoforo Creek Beach. This nest was floated to determine an EHD. All three eggs hatched.

### Villa Creek Beach

During the 2015 breeding season, seven nests were found at three eggs at Villa Creek Beach. One of these nests failed before the eggs could be floated. The nest was depredated by a gull. The remaining six nests found at three eggs were floated to project an EHD. Three of these nests hatched. One nest was lost to an unknown predator one day after being floated, and another was depredated by a striped skunk two days after being floated. The fate of the remaining nest was not determined. The nest bowl was found empty 14 days after floating and two days before the EHD. No chicks, pips, or egg residue was found in the nest bowl. No new broods were seen on the beach. Three nests were discovered at two eggs with a third egg never being produced. Two of these nests were also floated to project an EHD. Both of these nests successfully hatched. Of the 22 eggs floated at Villa Creek Beach, a total of 13 eggs (59%) hatched from five nests with a known fate.

### Morro Strand

During the 2015 breeding season, one nest was found at three eggs at Morro Strand. Because nest abandonment has historically been a problem at Morro Strand and the incubating adult was never far away, the nest was not floated. In addition, one two egg nest was discovered with the bird already incubating the eggs. Floating of this nest was also foregone to prevent abandonment. Both nests hatched.

### Sandspit

During the 2015 breeding season, 73 nests were found at three eggs on the Sandspit. Fifty-eight of these nests were able to be floated, and an EHD was projected for each. Fates were determined for the other 15 nests prior to being able to float the nests. Of the 58 floated three egg nests, 43 hatched. Thirteen of the floated three egg nests failed. Each of these 13 failed nests was depredated by coyote within a range of 1 to 17 days after being floated. In addition, two floated nests had an unknown fate. The first of the nests with unknown fates disappeared one day after its EHD. Coyote depredation was suspected for this nest due to the presence of tracks up to the nest bowl, but evidence was inconclusive as to whether the nest hatched before the depredation event. The second nest with an unknown fate lost its first egg three days after its EHD. Four days after the EHD coyote tracks were found leading up to the nest bowl, and the remaining two eggs disappeared, but 16 days after the EHD one egg reappeared. It is possible that the first egg hatched and that the remaining two eggs were depredated by a coyote or buried by windblown sand.

This season, seven nests remained at two eggs; a third egg was never produced. Four of these nests were floated. Two nests hatched and two nests failed. The first of the failed nests was lost due to coyote depredation one day after it had been floated. The remaining failed nest was lost due to abandonment 13 days after it was floated.

Of the 182 eggs floated on the Sandspit, a total of 120 eggs hatched (66%) from 44 successful nests.

### **Chick/Fledgling Fate**

Banding of chicks is not performed on any of the District beaches. Without a means of identifying individuals, a detailed quantitative assessment of chick and fledgling success could not be completed. Nonetheless, chicks and fledglings were observed on many occasions throughout the season as part of routine beach monitoring procedures and were documented on census counts.

#### Hearst San Simeon State Park

Three chicks hatched from the one successful nest at San Carpoforo Creek Beach. Two chicks were observed being brooded by a banded adult male WSP, rW:BR, on May 8<sup>th</sup>. Three fledglings were confirmed on June 4<sup>th</sup> accompanied by rW:BR. The length of HSSSP's breeding period was approximately 64 days.

#### Villa Creek Beach

Twenty-four chicks hatched from the nine successful nests at Villa Creek Beach in 2015. On or near hatch days, beginning on April 28<sup>th</sup>, chicks were observed on the beach. The highest number of chicks observed on one day at Villa Creek Beach was one. Two fledges from two separate broods were observed at Villa Creek Beach, so the estimated fledge rate was 8%. The first fledgling was observed on June 22<sup>nd</sup> and the second on August 18<sup>th</sup>. Being a relatively small beach, it is fairly certain there were no other fledges. The length of Villa Creek Beach's breeding period was 147 days.

#### Morro Strand

Fourteen chicks hatched from five successful nests at Morro Strand. Chicks were observed throughout the season beginning on May 20<sup>th</sup> after the first hatch. The highest number of chicks observed on one day at Morro Strand was five. At least 13 fledges from five different nests were seen on Morro Strand for a fledge rate of at least 93%. The first fledge was observed on June 23<sup>rd</sup> and the last on September 3<sup>rd</sup>. The length of Morro Strand's breeding period was 151 days.

#### Sandspit

Three hundred thirty-two chicks hatched from the 125 successful nests on the Sandspit. Broods with chicks of varying ages were seen throughout the season after the first hatch on April 14<sup>th</sup>. The first chick seen was on April 14<sup>th</sup>, and the last chick seen was on

September 15<sup>th</sup>. The highest number of chicks observed during one day at the Sandspit occurred on June 9<sup>th</sup> with 15 chicks observed.

The first confirmed fledglings recorded for the Sandspit were two brood mates seen on May 18<sup>th</sup>. The highest number of fledges observed during one day occurred during the May 27<sup>th</sup> census count with nine fledges observed. Confirmation of additional fledges in the District is compromised by the absence of individual bird identification, which would be possible if bird banding practices were incorporated. The high density of nests on the Sandpit exacerbates the problem. It is difficult to link specific fledges precisely to specific nests. For these reasons, only 26 WSP were confirmed to have fledged from the Sandspit in 2015.

After fledging, many juvenile WSP disperse away from their brooding areas to other suitable habitats. Including both dispersed and local Sandspit WSP, the highest number of juveniles seen during one day occurred on August 25<sup>th</sup> with 64 individuals. The first dispersed juvenile known to reach the Sandspit from another beach arrived on June 30<sup>th</sup>. This juvenile, banded OW:WR, fledged from Fort Ord SP. Other dispersed juveniles may have reached the Sandspit at earlier dates, but as stated previously, the lack of individual WSP identification at the Sandspit and at other WSP breeding locations means that only the arrival of a banded bird is considered a confirmed dispersal event. On September 22<sup>nd</sup>, the last two fledges for the Sandspit were confirmed making the length of the Sandspit breeding period 193 days.

## Depredation

A summary of nest depredation on District beaches from 2001-2015 is shown in Appendix 11.

### Predator Presence Across District Beaches

Table 17 (*Depredation 1*) lists the number of monitoring days various mammalian predators were detected on District beaches by observation or tracks during the 2015 breeding season.

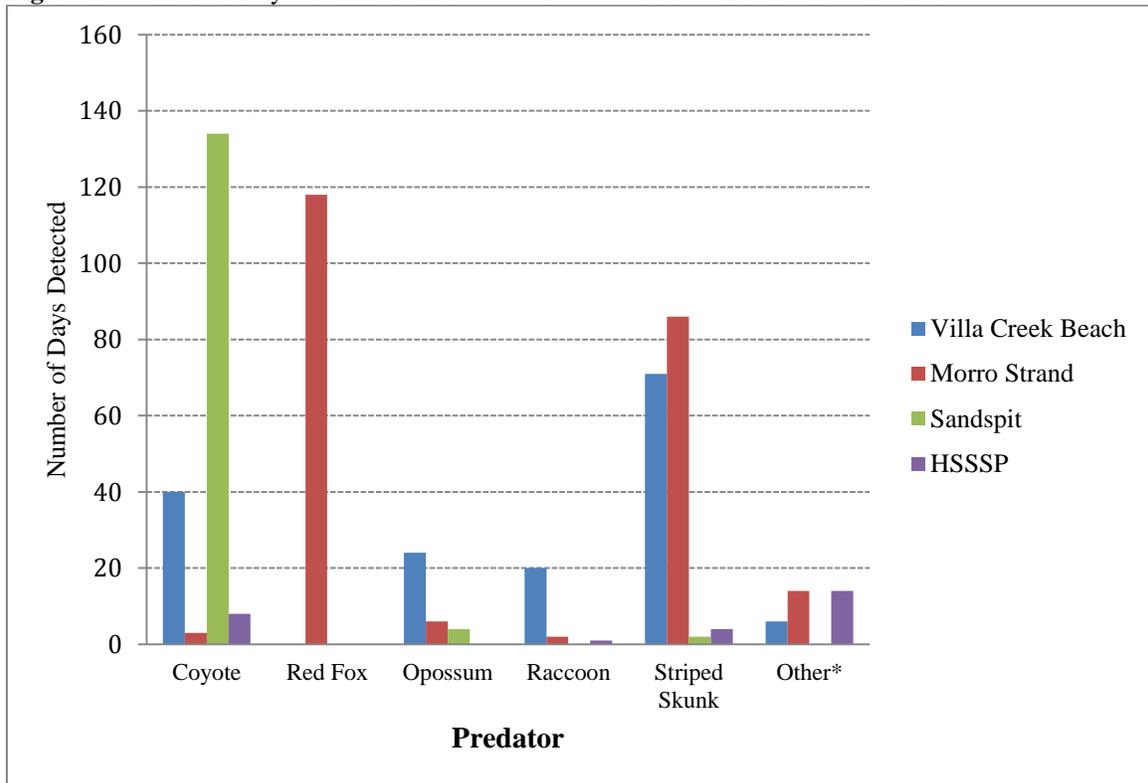
**Table 17:** (*Depredation 1*) Number of Days Mammalian Predators Detected Across District Beaches 2015.

	HSSSP	Villa Creek Beach	Morro Strand	Sandspit
Coyote	8	40	3	134
Red Fox	0	0	118	0
Opossum	0	24	6	4
Raccoon	1	20	2	0
Striped Skunk	4	71	86	2
Other*	14	6	14	0

\*weasel, bobcat, unidentified canid, unidentified rodent, domestic cat, ground squirrel, elephant seal

Figure 1 provides a graphical representation of the number of days mammalian predators were detected across District beaches in 2015.

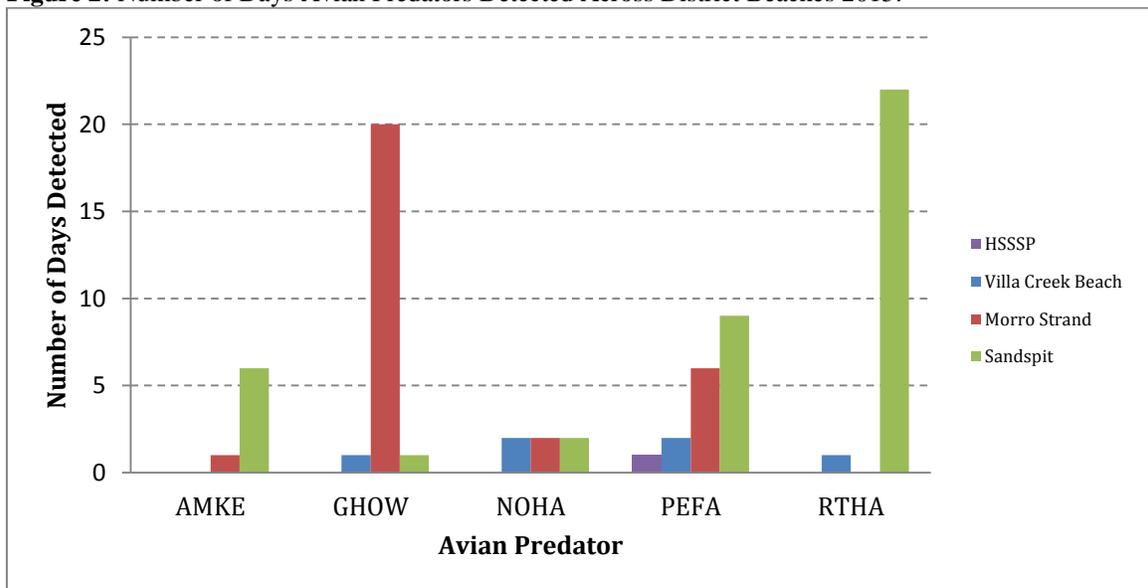
**Figure 1:** Number of Days Mammalian Predators Detected Across District Beaches 2015.



\*weasel, bobcat, unidentified canid, unidentified rodent, domestic cat, ground squirrel, elephant seal

Figure 2 provides a graphical representation of the number of days avian predators were detected across District beaches in 2015.

**Figure 2:** Number of Days Avian Predators Detected Across District Beaches 2015.



Hearst San Simeon State Park

The most prevalent among the live predators observed at HSSSP beaches in 2015 were American Crow, Northern Elephant Seal (*Mirounga angustirostris*), Great Egret (*Ardea alba*), and various gull species. One live coyote and one Peregrine Falcon (*Falco peregrinus*) were also seen. Tracks of coyotes were spotted 18 times, striped skunk seven times, and raccoon once.

Villa Creek Beach

Predators destroyed ten of the 23 nests with a known fate this year at Villa Creek Beach. A summary of nest depredations can be found in Table 18 (VC6). Unknown predators were responsible for five of the depredated nests. Many of the depredated nests were surrounded by driftwood and others by dry and wind-blown sand. These conditions made it difficult for monitors to decipher predator tracks directly at the nest bowl. Therefore, definitive predators could not be assigned to many of the depredations. Among the most probable predators, striped skunks, raccoons, and gulls were suspected. Striped skunk was identified as the predator for two depredated nests. Two nests were also depredated by an unidentified species of gull. One nest was depredated by raccoon.

**Table 18:** (VC6) Nest Depredations by Predator on Villa Creek Beach in 2015.

Total Nests	23	% Total Fated Nests	% Predated Nests
Depredated Nests	10	43%	100%
Raccoon	1	5%	10%
Striped Skunk	2	9%	20%
Gull Species	2	9%	20%
Unknown Predator	5	23%	50%
Unknown Fate	1		

Table 19 (VC7) lists the nest depredations according to predator among beach segments for Villa Creek Beach in 2015.

**Table 19:** (VC7) Distribution of Nest Depredations by Predator at Villa Creek Beach in 2015.

Area	Raccoon	Gull Species	Striped Skunk	Unknown Predator	Total Depredated	Total Nests
Back Area	0	0	0	0	0	0
West of Villa Creek	0	0	0	0	0	3
Main Beach: North	1	0	0	3	4	9
Main Beach: Middle	0	1	2	1	4	9
Main Beach: South	0	1	0	1	2	3
Pocket Beaches	0	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>24</b>

For the protection and preservation of the WSP, a USDA Wildlife Services Specialist was hired in an effort to remove WSP predators from Villa Creek Beach. Cage traps (10"x12"x32") were used to capture predators. Captured predators were immediately euthanized upon discovery. All methods of euthanasia were conducted within the guidelines of the American Veterinary Medical Association (AVMA). One striped skunk and one raccoon were captured in cage traps. One hundred twenty-one trap nights were spent trapping at Villa Creek Beach in an attempt to remove predators. A trap night is where one trap is set for one night. Two traps set for one night would be two trap nights. Thirty trap days were spent trapping at Villa Creek Beach in an attempt to remove predators. A trap day is where one trap was set for the day and removed at night.

Striped skunk tracks were identified 170 times in 2015 on Villa Creek Beach, which was by far the most common type of identifiable tracks left by potential WSP predators. The first monitoring date striped skunk tracks were documented was March 9<sup>th</sup> and continued throughout the season until September 15<sup>th</sup>. Overall, striped skunk tracks were found on 71 of 132 possible sighting dates. Live striped skunks were not seen by WSP monitors.

Coyote tracks were observed 51 times. The first monitoring date coyote tracks were documented was March 12<sup>th</sup> and continued throughout the season until September 15<sup>th</sup>. Overall, coyote tracks were observed on 38 of 132 possible sighting dates. Live coyotes were spotted four times in 2015.

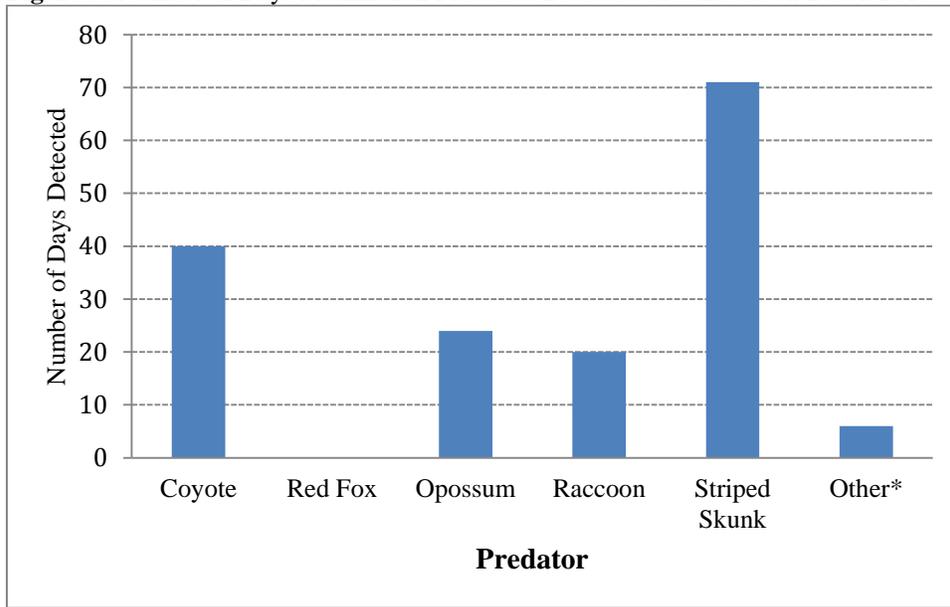
Raccoon tracks were observed 21 times. The first monitoring date raccoon tracks were documented was March 11<sup>th</sup> and continued throughout the season until September 15<sup>th</sup>. Overall, raccoon tracks were found on 20 of 132 possible sighting dates. Live raccoons were not seen.

Virginia opossum (*Didelphis virginiana*) tracks were observed 27 times. The first monitoring date Virginia opossum tracks were documented was April 8<sup>th</sup>, and the last day they were observed was September 22<sup>nd</sup>. Overall, Virginia opossum tracks were found on 24 of 132 possible sighting dates. Live Virginia opossums were not seen by WSP monitors.

Domestic dog tracks were spotted inside the habitat six times.

Figure 3 provides a graphical representation of the number of days mammalian predators were detected on Villa Creek Beach in 2015.

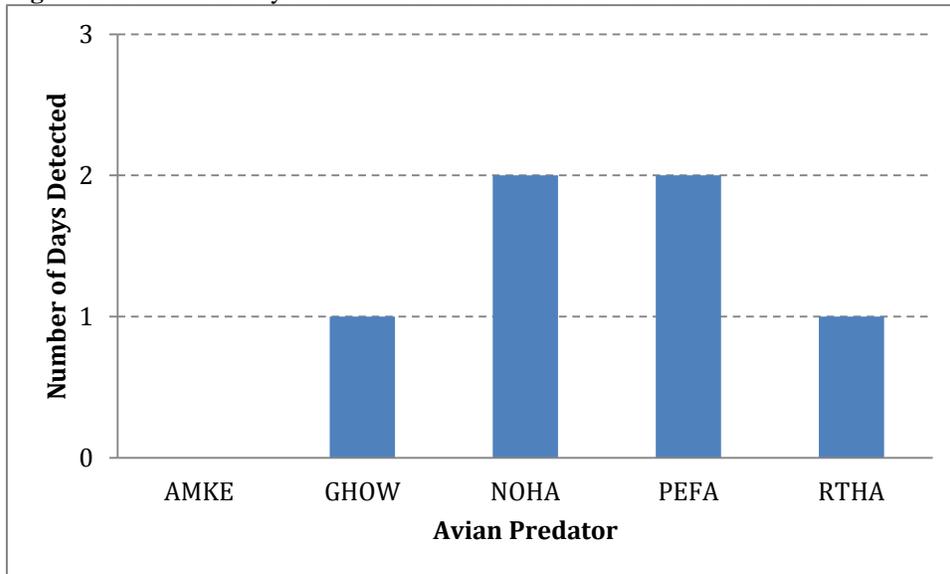
**Figure 3:** Number of Days Mammalian Predators Detected on Villa Creek Beach 2015.



\*weasel, bobcat, ground squirrel, mountain lion

Figure 4 provides a graphical representation of the number of days avian predators were detected on Villa Creek Beach in 2015.

**Figure 4:** Number of Days Avian Predators Detected on Villa Creek Beach 2015.



Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: bobcat (*Lynx rufus*), California ground Squirrel (*Spermophilus beecheyi*), gopher snake (*Pituophis catenifer catenifer*), Great Egret, Great Horned Owl (*Bubo virginianus*), Heermann’s Gull (*Larus heermanni*), mouse, Northern Harrier (*Circus cyaneus*), Peregrine Falcon, Red-tailed Hawk (*Buteo jamaicensis*), weasel (*Mustela spp.*), and Western Gull (*Larus occidentalis*)

*Morro Strand*

Predators destroyed five of the 13 nests this year at Morro Strand. Two of the depredations were attributed to red fox (*Vulpes vulpes*), one to American crow, one to an unknown avian predator, and one an unidentified predator. A summary of nest depredations can be found in Table 20 (MS6).

**Table 20:** (MS6) Nest Depredations by Predator on Morro Strand in 2015.

<b>Total Nests</b>	<b>13</b>		
<b>Derdated Nests</b>	<b>5</b>	<b>% Total Nests</b>	<b>% Predated Nests</b>
Red Fox	2	15%	40%
American Crow	1	8%	20%
Unknown Avian	1	8%	20%
Unknown Predator	1	8%	20%

Table 21 (MS7) lists the nest depredations according to predator among beach segments for Morro Strand in 2015.

**Table 21:** (MS7) Distribution of Nest Depredations by Predator at Morro Strand in 2015.

Area	Predators				Total Depredated	Total Nests
	Crow	Fox	Unknown Avian	Unknown Predator		
Campground-Hatteras	0	0	0	0	0	0
Hatteras-Azure	1	0	1	0	2	2
Azure- Boardwalk	0	2	0	1	3	11
Boardwalk-Hwy 41	0	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>13</b>

American Crows were again observed foraging on the entire length of Morro Strand throughout the breeding season in 2015. American Crows were seen on 87 of 155 possible occasions in murders ranging from 2 to 42. Single crows were spotted 60 times. Murders ranging from two to eight were seen 61 times, and on single occasions, one murder of 16 and another of 42 were seen. Additionally, there were several documented occasions of American Crows following WSP monitors through several sections of habitat.

American Crow tracks were seen inside the breeding habitat but were never found to saturate an area as they had in 2012. In 2013, the number of American Crow sightings decreased – a trend that has since sustained. In 2015, the average number of American Crows seen per day was less than two. Of the five depredated nests, American Crows were identified as the predator on one nest and were among the lead candidates for depredation of two others. American Crows were documented on March 4<sup>th</sup>, the first day of monitoring, and continued to be observed until the last day of monitoring on September 24<sup>th</sup>.

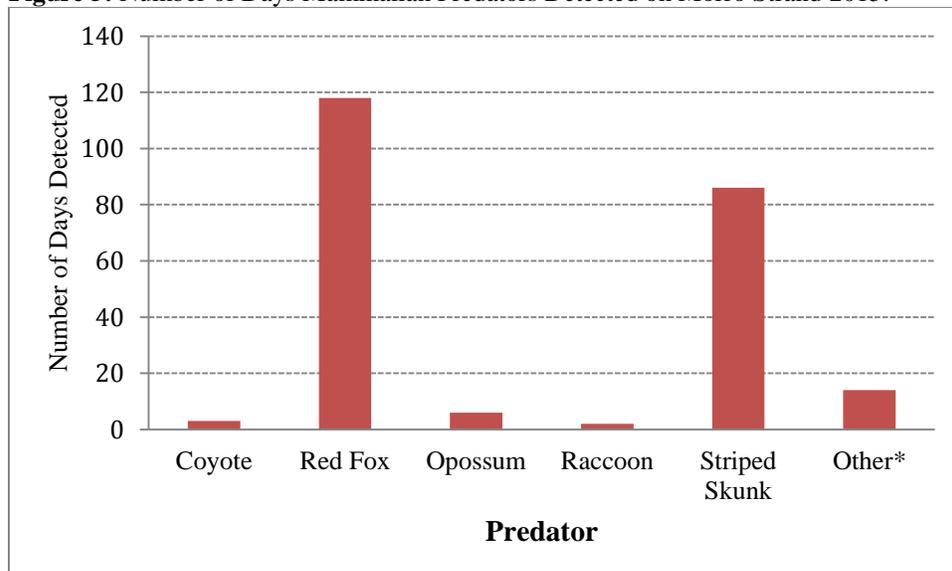
Another species of prominent concern is the red fox. Red fox tracks identifiable as freshly made since the previous monitoring day were found on 118 out of 155 opportunities. Red fox tracks were documented on March 4<sup>th</sup>, the first day of monitoring and continued to be observed until the last day of monitoring on September 24<sup>th</sup>. Live red fox were not seen; however, they were captured on motion-detector cameras on three occasions. Of the five depredated nests, red fox were identified as the predator on two nests and were among the suspected candidates for depredation of another.

Striped skunk has progressed from a species with a minor presence on Morro Strand in 2012 to a prevalent species. In 2015, striped skunk tracks were first documented on March 6<sup>th</sup>, with the last observation on September 24<sup>nd</sup>, the final day of monitoring. Overall, striped skunk tracks were found on 86 of 155 possible sighting dates. Live striped skunks were not seen; however, they were captured on motion detector cameras on three occasions. While there were no WSP nest depredations attributed to striped skunk in 2015, tracks of the species were frequently seen near scrapes and nests.

Virginia opossum tracks were seen eight times. The first monitoring date Virginia opossum tracks were documented was April 6<sup>th</sup>, and the last monitoring day opossum tracks were observed was July 9<sup>th</sup>. Overall, Virginia opossum tracks were found on six of 155 possible sighting dates. Live Virginia opossums were not seen.

Figure 5 provides a graphical representation of the number of days mammalian predators were detected on Morro Strand in 2015. It is perhaps noteworthy that tracks as an index of predator presence may provide an under representation of predator presence on Morro Strand. Meteorological conditions, moist air, and low winds allow tracks to remain for a long time. New tracks are estimated by overlay, so identifying tracks as new became very difficult. Thus, predators may remain active without identification of added tracks.

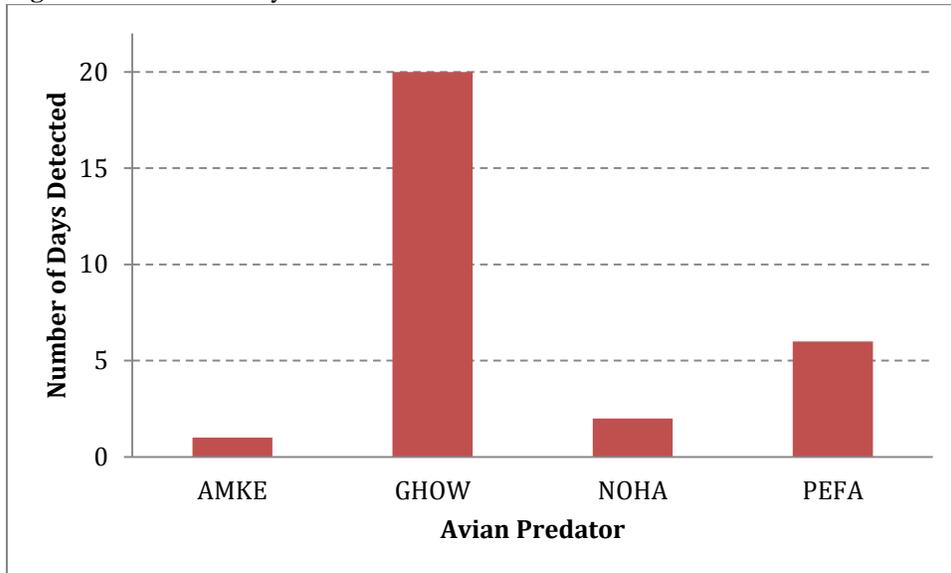
**Figure 5:** Number of Days Mammalian Predators Detected on Morro Strand 2015.



\*domestic cat, ground squirrel, weasel, pot-bellied pig, unidentified canid, unidentified rodent

Figure 6 provides a graphical representation of the number of days avian predators were detected on Morro Strand in 2015.

**Figure 6:** Number of Days Avian Predators Detected on Morro Strand 2015.



The single-nest enclosure paradigm on Morro Strand was reassessed and suspended in 2014. Enclosures were not utilized in 2015. See Appendix 12 for a history of enclosure use on Morro Strand from 2003 through 2015.

WSP monitors or predator management specialists are rarely present to observe nest depredation. Predator identification may not be realized when predators leave little or no evidence behind or tracks are erased by wind-blown sand before nest fates can be investigated. In an attempt to help identify nest predators, a photo infrared digital camera with passive motion detector triggers (Reconyx PC85) was placed near one nest while supervised by a staff member permitted by USFWS for this activity. The nest hatched successfully; however, images of one skunk, one red fox, and an unidentified but transient object were recorded.

In order to supplement documentation of predators and other wildlife, photo infrared digital cameras with passive motion detector triggers (Reconyx PC85) were placed in the habitat at Morro Strand in September- well after the last nest had been documented as hatched. Two locations were selected as having been rich in predator activity and having a concealable spots not easily visible from outside the habitat. These cameras captured images of striped skunks three times, red foxes three times, and an unidentified canid once.

For the protection and preservation of the WSP, a USDA Wildlife Services Specialist was hired in an effort to remove WSP predators from District beaches; however, no predator removal activities were conducted on Morro Strand in 2015.

Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: American Kestrel (*Falco sparverius*), California ground squirrel, California Gull (*Larus californicus*), coyote, domestic cat, domestic dog, Great Blue Heron (*Ardea herodias*), Great Horned Owl, Heermann’s Gull, Northern Harrier, Peregrine Falcon, unidentified rodent, weasel, and Western Gull.

Sandspit

Predators destroyed 108 of the 272 nests this year on the Sandspit (Table 22 (SS6)). Coyotes were responsible for the majority (98%) of all the nest depredations by consuming 106 nests. The additional two nests depredations were attributed to unknown avian predators.

**Table 22:** (SS6) Nest Depredations by Predator on the Sandspit in 2015.

Total Nests	272	% Total Fated Nests	% Predated Nests
<b>Predated Nests</b>	<b>108</b>	<b>41%</b>	<b>100%</b>
Coyote	106	40%	98%
Unknown Avian	2	1%	2%
Unknown Fate	6	-	-

A summary of nest locations and predations can be found in Table 23 (SS7).

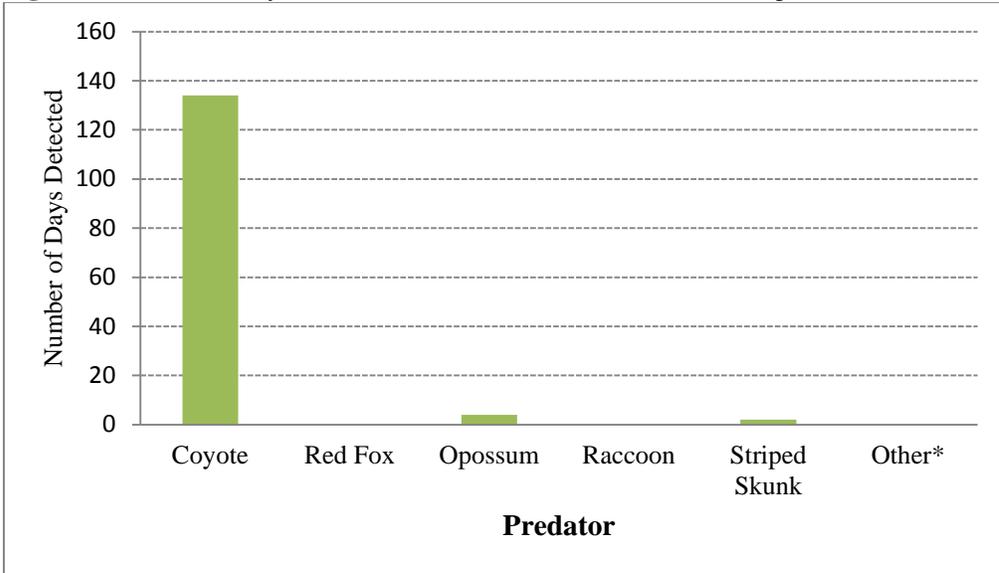
**Table 23:** (SS7) Distribution of Nest Depredations by Predator at the Sandspit in 2015.

Area	Coyote	Unknown Avian	Total Depredated	Total Nests
<b>SPB-RM 6</b>	9	1	10	23
<b>RM 6-RM 5</b>	17	0	17	29
<b>RM 5-RM 4</b>	29	0	29	55
<b>RM 4-RM 3</b>	19	1	20	44
<b>RM 3-RM 2</b>	12	0	12	34
<b>RM 2-RM 1</b>	9	0	9	39
<b>RM 1-SST</b>	7	0	7	30
<b>SST-HAZ</b>	3	0	3	13
<b>South HAZ</b>	1	0	1	5
<b>Total</b>	<b>106</b>	<b>2</b>	<b>108</b>	<b>272</b>

This season, the highest incidence of coyote depredation occurred the week of May 18<sup>th</sup>. During this time, there were 22 nests lost to coyote depredation. The locations of these depredated nests were split evenly between the northern and southern halves of the Sandspit, with 11 nests lost on each half. Furthermore, almost daily throughout the season, coyote tracks were seen in or near the habitat – sometimes within a few inches of a nest bowl. In addition, two live coyotes were sighted this year on the Sandspit. Coyotes were by far the most prevalent predator on the Sandspit, with 134 days detected during the monitoring season.

Figure 7 provides a graphical representation of the number of days mammalian predators were detected on the Sandspit in 2015.

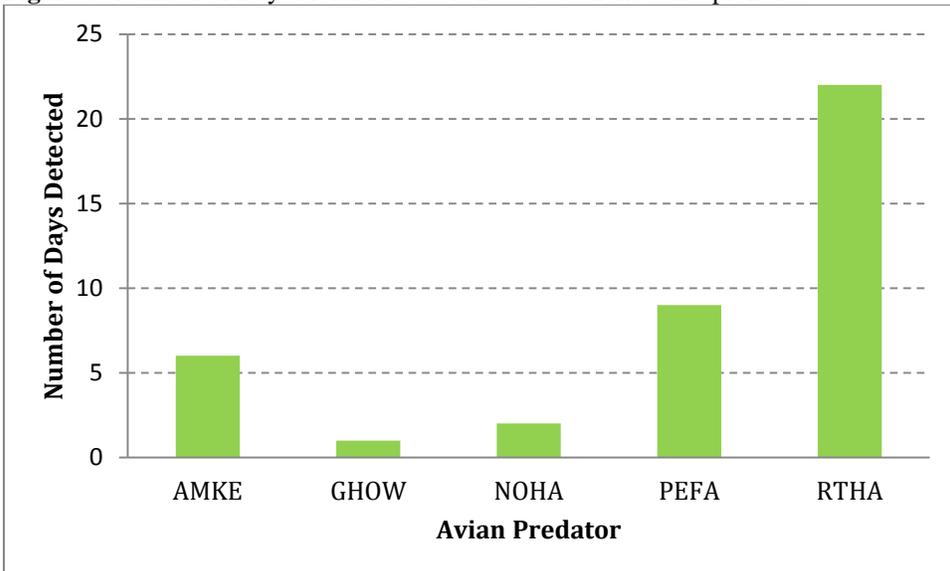
**Figure 7:** Number of Days Mammalian Predators Detected on the Sandspit 2015.



In 2015, monitors sighted six species of avian predators on the Sandspit, including American Crow, American Kestrel, Great Horned Owl, Northern Harrier, Peregrine Falcon, and Red-tailed Hawk. The majority of avian predators sighted by monitors appeared to be causing no distress to the WSP. On only one occasion, on June 10<sup>th</sup>, was a group of WSP noted as alarm calling due to the presence of an American Kestrel foraging over the habitat. No avian depredation events were witnessed in 2015.

Figure 8 provides a graphical representation of the number of days avian predators were detected on the Sandspit in 2015.

**Figure 8:** Number of Days Avian Predators Detected on the Sandspit 2015.



For the protection and preservation of the WSP, a USDA Wildlife Services Specialist was hired in an effort to remove WSP predators. Since the vast majority of depredation events on the Sandspit were due to coyotes, removal efforts targeted these canids. Two methods were employed to remove coyotes: calling and leg-trapping. The calling method utilized a handheld or electronic device which produced a sound to lure the predator within range of a firearm. The leg-trapping method consisted of a padded jaw trap which ensnared the leg of a coyote. The combined efforts of 48 call stands, nine trap nights, and three trap days resulted in the removal of two coyotes from the Sandspit. Both methods resulted in the removal of one coyote each.

Other predatory species identified by observation or tracks on the Sandspit in 2015 included: Black-crowned Night Heron (*Nycticorax nycticorax*), California Gull, Great Blue Heron, Great Egret, Heerman's Gull, and Western Gull.

### **Human Activities/Recreation**

For access information on these sites, see the Survey Area section of the report.

#### Hearst San Simeon State Park

Recreation was not routinely monitored at HSSSP beaches. While visitors were rarely seen when monitoring remote locations, visitors were usually encountered at Arroyo Laguna and San Simeon Creek Beach. The most common activities included beachcombing, fishing, photography, and surfing. There were eight public contacts by WSP monitors at HSSSP beaches involving 16 people. WSP monitors answered questions on topics not just related to the WSP and the recovery program but a variety of additional topics.

#### Villa Creek Beach

Recreational activity observed by WSP monitors at Villa Creek Beach during the 2015 breeding season included beachcombing, surfing, kayaking, and bird watching with walking, photography, and fishing being the most prevalent activities. WSP protection measures to eliminate pedestrian access through nesting habitat continued this year. Former trails continued to be fenced off, and "Do Not Enter" signs were clearly posted.

There were 135 documented incidents of human foot traffic inside the habitat, although the actual number of people entering the habitat could be higher due to the difficulty of deciphering individual footprints. The highest number of incidents, 51 (38%), occurred on the North Pocket Beach. On the main beach, most foot traffic trespassers were on the southern and northern portions of the beach with relatively few incursions in the middle.

When possible, trespassers were contacted and informed about rules and regulations regarding trail closures and educated about the WSP. Monitors witnessed 12 individuals inside the WSP habitat on seven separate episodes. Ten were contacted. All seven events were classified as positive with trespassers leaving the habitat immediately at the request of the WSP monitors. On June 3<sup>rd</sup>, an individual was observed sleeping in the

habitat. Rangers were contacted. During the follow-up by the Rangers, it was determined the individual had several outstanding warrants, so the individual was arrested.

Fifty-six additional public contacts were noted at EBSB either with individuals or groups of up to 12 people. A total of 143 members of the public were encountered overall. WSP monitors answered questions on topics not just related to the WSP and the recovery program but a variety of additional topics.

Villa Creek Beach was monitored on days surrounding the Independence Day holiday. On July 4<sup>th</sup>, CSP employees patrolled intermittently in the afternoon. WSP monitors counted 38 beach users on Villa Creek Beach around 3:30 pm. There were two trespassers on the pocket beach, who left when asked to do so by the CSP employee. There was one dog on leash on the entry path. The owner was advised of regulation and left immediately.

Acts of vandalism on Villa Creek Beach were very rare. The events included a fire on the beach, a dismantled CSP regulatory sign, and a driftwood fort inside the symbolically fenced habitat.

#### Morro Strand

Morro Strand is easily accessible to local residents and visitors and has the highest level of recreational use of all District beaches. From March through September, a volunteer counted 1,023 beach users (with no habitat trespassers) in 19 recreational survey hours. Although these surveys indicated higher rates of beach usage on weekend days, there were significant levels of beach activity on weekdays, as well. Recreational activity observed included beachcombing, picnicking, jogging, illegal dog walking, horseback riding, biking, fishing, surfing, swimming, bird watching, sunbathing, playing ball and Frisbee. Stationary activities accounted for 44%, walking/jogging 32%, and water activities 14% of beach recreation. Combined the three classes of activities accounted for 90% of beach activities.

There were 1,387 documented incidents of human foot traffic inside the symbolically fenced habitat. Twice foot traffic passed near an active nest. There were seven sets of bicycle tracks, four drag marks from various objects, and three instances where the foot traffic was accompanied by sand graffiti. Monitors also found evidence of digging, traces of blankets, and various toys inside the symbolically fenced habitat. Foot traffic was not evenly distributed among the sections. Most infractions occurred on the northern sections with 41% found near the Campground and 24% found between the Hatteras and Azure Corridors. The highest number of foot traffic infractions during any one month occurred in June, with 24% of the yearly infractions. The next highest month was August with 19% of the infractions. Approximately 10% of infractions occurred during each of the months from March through May. The actual number of people entering the habitat could be higher due to the difficulty of deciphering individual footprints when individuals entered the habitat at the same location or in large quantities.

On June 5<sup>th</sup>, a path was discovered that had been cut from the back fencing between Easter Street Corridor and Sienna Street Corridor, through vegetation, and onto the dunes leading to the beach. The path had been established near the rear entrance of a house on Beachcomber Street associated with frequent foot traffic and chronic trespassing in past years. Rangers attempted to contact the owners of the house and succeeded in contacting a rental agent. On July 4<sup>th</sup>, a public contact with house renters revealed that the house rental book recommended the path be used for access to the beach. Although the owners were not contacted directly after the Ranger contact with the rental agent and the public contact with a vacation renter, trespasses originating in that area from that house diminished.

Trespassing was also indicated by other forms of trace evidence. Domestic dog tracks accompanied the foot traffic on 14 occasions. In 2014, there were 64 such incidents and 60 involved a set of highly distinctive footprints usually accompanied by two sets of dog tracks. These most often appeared between the Highway 41 Corridor and Boardwalk Corridor. Also in 2014, a motion activated camera installed in the habitat for the purpose of identifying passing wildlife captured images of a woman with one dog on leash that matched the footprint pattern. This distinctive pattern was seen four times in early March of 2015 and then abruptly ceased. One similar set of dog plus foot traffic prints was identified in August and another in September. The remaining sets of the dog plus human trespasses were dissimilar.

Monitors witnessed 31 individuals trespassing in the WSP habitat across 13 incidents. Twenty-nine of either the trespassers or supervising guardians were contacted by monitors. Two were contacted by Rangers. Ten of the 13 contacts were positive, three were neutral, and none were negative. On 13 occasions people outside the habitat were requested to remove items they had attached to the symbolic fence.

There were 118 additional public contacts at Morro Strand either with individuals or groups of up to nine people. One hundred twenty-four of all contacts were considered positive. Seven were considered neutral, and none were classified as negative. As part of the public contact WSP monitors answered questions, provided information about various aspects of the WSP recovery program, informed beach users of beach regulations, and discussed various additional topics. Several times the contact was initiated in order to express appreciation of the work accomplished by CSP personnel.

A Superintendent's Posted Order was posted at the kiosks that states that no person shall operate, fly, release, or cause to be operated, flown, or released any size kite, or other device, free flying, or by remote control within or 300 feet adjacent to the symbolically fenced WSP habitat. Regulatory signs stating that kite flying is not allowed were placed at each access corridor to Morro Strand. Volunteers observed three kite flyers during recreational use surveys. WSP monitors observed only one kite flying incident. A Ranger, who was on the beach nearby, contacted the group, and the kite was taken down.

Starting in 2009, a sandwich board with a "No Dogs on Beach" sign was placed at the southern CSP boundary near the high tide line. Since the sign is not a permanent installation, its condition was checked on a daily basis throughout the season. This sign

established a more visible City/CSP boundary marker to lessen confusion about the change in regulations. (Dogs are allowed on leash on City beaches.) Permanent, “No Dogs on Beach,” signs cannot be positioned closer to the water due to the fluctuating tides. Maps were also placed at the kiosks at the north and south ends of Morro Strand which differentiated areas of where dogs are and are not allowed. In 2011, another sandwich board sign was added near the entrance to the beach at the Highway 41 Corridor. This sign illustrates with arrows the City/CSP boundary and in which direction “dogs on leash” are allowed. In 2014, a third sandwich board with “No Dogs on Beach” signs was placed at the northern end of Morro Strand.

The sandwich boards were prominent, but they were not always noticed by visitors to Morro Strand. When these beachgoers were contacted, they often apologized and then complied with the regulation. That is, the sign was usually respected when noticed. Nonetheless, the sandwich boards were the subject of mild vandalism on four occasions in 2015.

Despite posted signs, volunteers counted six dog walkers with eight dogs; five of the dogs were on leash, and three dogs were off leash. Monitors contacted dog owners 98 times. Overall, dog contacts involved 166 people and 112 dogs. Forty-three of the dogs were off leash. Of the contacts, 79 were rated as positive, 17 were rated as neutral, and two were rated as negative. Monitors also observed 13 sets of dog owners with a total of 14 dogs who were not contacted verbally. Five of these dogs were on leash, and nine were off leash. Usually, these dog owners would see the WSP monitor and then leave the beach immediately. Additionally, 55 sets of dog tracks were observed along the beach and 75 sets in the WSP habitat. There were ten instances of positive public contact in which dog owners inquired about dog regulations while approaching a beach access point or while enjoying the beach without the dog. Other beach walkers reported informing dog owners of CSP’s “no dogs on beach” rule. See the Information/Education section for information about the distribution of dog information brochures and leashes.

Morro Strand was frequently used by equestrians accessing the beach at the Highway 41 entrance. Volunteers spotted 31 equestrians across six occasions. CSP monitors counted 113 equestrians on horseback and fourteen horses being led on 45 occasions. Equestrians often rode along the shore, slowly in the wet sand; however, in 17 cases the horses were either galloping, cantering or being ridden at a fast pace. Very few horses were ridden near the symbolic fencing. On one occasion horse tracks lead up to the habitat, where the rider dismounted and urinated into the habitat.

Morro Strand was monitored on all days around the July 4<sup>th</sup> holiday. One to two monitors were on the beach on the 4<sup>th</sup> of July from noon until 5:00 pm. After 5:00 pm until about 9:30 pm, three monitors and two volunteers were on the beach to answer questions, ensure visitors were following CSP regulations, and monitor WSP activity. The City did not have a fireworks display this year, which led to fewer violations than previous years. Monitors still made 11 dog contacts, six public contacts, four trespass contacts, one fireworks contact, and one open fire contact.

Occasionally acts of vandalism occurred on Morro Strand. Symbolic fencing was vandalized on 17 occasions. In most cases either rope was cut or eye poles bent. Signage was vandalized on five occasions.

The “Miracle Miles for Kids” run organized by Family Care Network, with a course spanning the beach from Morro Rock to Cayucos Pier, was held on May 9<sup>th</sup>. The Frequently Asked Questions list for the run included notification that dogs were not allowed, as well as, information on WSP, and a request to keep the beaches clean. Almost all official race participants were well behaved. Two sets of participants were accompanied by non-bibbed participants with dogs. Both were intercepted at the Highway 41 Corridor and advised on how to rejoin the race beyond North Point. There were seven public contacts during the race time period. All contacts were positive. Per race organizers, the race had 1,569 registered participants, hundreds of non-registered participants, and 250+ staff and volunteers throughout the course and post-race party. Extraneous to the race, there was one dog contact at the Highway 41 Corridor and one public contact involving trespassers into the habitat, which were resolved positively.

The “Morro Bay Bands on the Run” event, sponsored by the Morro Bay High School Music Boosters, was held on May 23<sup>rd</sup>. There were three races included in the event: a 5K run, a 10K run, and a half marathon. The routes of all races included sections of Morro Strand. WSP monitors went to the staging area before warm ups and met with the race coordinator. The coordinator accepted WSP brochures and displayed them prominently at the registration table. The event website informed participants that dogs could not participate in the beach portion of the race. During the race, all participants were observed as following CSP regulations with no incidents of participants crossing into WSP habitat or running with dogs. During the race, four public contacts and three dog contacts were made, all involving non-participants and resulting in positive or neutral outcomes. Per the event website, 119 runners participated in the 5K, 82 runners participated in the 10K, and 47 runners participated in the half marathon.

On July 18<sup>th</sup>, the “Brian Waterbury Memorial Rock to Pier Fun Run” and “Rock 'n Around the Pier Half Marathon” were held simultaneously with routes of both races extending through Morro Strand. Two WSP monitors were present at various points along Morro Strand throughout the races to ensure that the participants stayed on the wet sand, followed CSP regulations, and caused no disturbance to WSP. During the race, two participants were intercepted at the border of the City beach and Morro Strand with a dog on leash. Once informed of the dog regulations and how to rejoin the race using streets and walkways, they elected to drop out of the race and return to the City beach. Times were recorded for 895 Rock-to-Pier participants and 210 half marathon runners.

### Sandspit

Due to the lack of access points, the Sandspit experiences a lower intensity of recreational activity compared to other District beaches. The types of recreational activity observed on the Sandspit include walking, beachcombing, horseback riding, jogging, picnicking, fishing, surfing, illegal dog walking, kayaking, and sand-boarding.

The highest concentration of recreational activities occurred at the south end of the Sandspit. Equestrians and pedestrians gained access to the beach from the Hazard Reef Trail, American Canyon Trail, Sandspit Trail, Rim Trail, Army Road, and Shark's Inlet Corridor. The main pedestrian access point is the Sandspit Trail. This trail is popular with first time park visitors and is a regular route for surfers to access the ocean.

In 2015, WSP monitors witnessed 18 trespass violations involving 37 violators. Five trespass incidents occurred on the north Sandspit, while 13 trespass incidents occurred on the southern half. When possible, trespassers were contacted by WSP monitors. This year, 25 violators were contacted by WSP monitors. Six of these violators appeared to be walking directly towards a WSP nest and were prevented from further approaching the nest by a WSP monitor. The majority of trespassers who were not contacted were either too far away from the monitor or ran away from the monitor.

Paddlers (i.e., kayakers, stand-up paddle boarders, and boaters) reached the Sandspit from various mainland launching areas. Maps were given to local kayak concessionaires, so they could inform their customers of the beach access corridors. Large red flags were placed on the bayside corridor entrances to guide kayakers to the non-restricted points of access. The flags were visible from most of the kayak launching areas on the mainland. In addition, laminated maps attached to posts and symbolic fencing were placed on the bayside of the Sandspit at the restricted landing spots. These maps informed individuals of their current location and the location of beach access corridors nearby. However, patterns of foot traffic indicated that people sometimes ignored signs and continued west to the beach through WSP habitat. Of the 37 trespassers observed in the habitat, nine (24%) were paddlers who crossed from the bayside to the ocean.

The presence of footprints found within the habitat was also used as a measurement for determining the number of restricted area violators. In 2015, monitors recorded 659 incidents of foot traffic inside the WSP habitat, with 75% of these incidents occurring on the southern half of the Sandspit. The actual number of violators could be higher, as individual footprints are often difficult to count at locations where more than one person has entered the habitat. Additionally, soft sand and wind often obscure individual footprints making them hard to differentiate and count. On five occasions, trespassers walked within a foot of an active nest.

Monitors made 28 dog contacts on the Sandspit in 2015. Two dog contacts occurred on the north half of the Sandspit, and 26 occurred on the south half. Monitors were able to personally contact the owner of the dogs on 24 occasions. The other four dogs and their owners were too far away to be contacted. Furthermore, one dog was found tied to a driftwood log with no owner nearby. In this instance, a Ranger was contacted and a citation was given to the owner, who had been surfing and did not exit the water when WSP monitors originally approached the dog. Dog tracks were also observed 24 times inside the habitat and 15 times outside the habitat. The dog tracks were often accompanied by human tracks.

Only one violator of the kite restriction rule was observed this year. One group of two people was found flying a kite on the southern half of the Sandspit. They were directed towards the Hazards Reef area and reacted positively when informed of the rule.

During the breeding season, 355 horses were sighted by WSP monitors. Forty-one were seen on the northern half of the Sandspit, and 314 were seen on the southern half. Three horses and their riders were found inside the habitat and escorted outside; all other horses were sighted outside of the habitat. On multiple occasions riders were witnessed being thrown from their horses, but no emergencies were ever reported. On several of these events, the horse traveled a considerable distance before the rider was able to capture it, but in all witnessed events the rider-less horse stayed outside of the ropes designating WSP habitat.

Several forms of vandalism occurred on the Sandspit in 2015. These included four incidences where the symbolic fencing rope was deliberately broken or cut, four incidences of fence poles being removed, and one incident where poles were bent. There were several incidences of signs found missing, bent, or defaced. In one incident, a post holding a “no dogs” and “no horses” sign was dug up and dragged into the WSP habitat. In another incident, the large wooden “Sandspit” sign denoting the parking lot for beach access was stolen. Evidence of three illegal campfires was also observed.

On July 4<sup>th</sup>, one monitor observed the Sandspit for four hours between 2:20 pm and 6:20 pm. The highest number of beachgoers observed at any given time was 60. Illegal activity was expected, but no incidences of campfires, fireworks, kite flying, dog walking, or trespassing were witnessed. However, two groups of footprints were observed inside the habitat the following Monday. One group was comprised of two people and a dog, and the second group consisted of approximately 11 people.

## CONCLUSIONS

In 2015, San Luis Obispo Coast District continued to work towards reaching its WSP recovery goals. The range-wide breeding window survey determined the minimum number of WSP adults on District beaches were 81 males, 82 females, and ten unidentified adults. The first nest was found on March 13<sup>th</sup>. The first hatch occurred on April 15<sup>th</sup>. The last nest was found on August 7<sup>th</sup>. The last hatch occurred on August 24<sup>th</sup>. The peak period of nesting for the District occurred during the week ending on June 26<sup>th</sup> with 62 active nests. The 2015 breeding season hatched 140 of 303 known fate clutches, for a 46% hatch rate. Seven nests had unknown fates this season. The total number of nests at 310 was above the average of 224. The hatch rate was 2% below the average of 48% (Appendix 9d). Three hundred seventy-three chicks hatched from the 140 successful nests. The main cause of nest failure was depredation. The main predators were varied according to specific beaches. The most frequent depredation at Villa Creek Beach was by an unknown predator followed by striped skunk and gull. At

Morro Strand, the main cause of nest depredation was red fox, and at the Sandspit, coyote was the foremost predator (Appendix 11). All of the depredations combined accounted for 41% of the nest fates – much higher than the average of 29%. Seven percent of the nests were abandoned. Tidal wash destroyed 4%. Two percent of the nests were lost due to wind and to either unknown or other reasons.

Appendix 13 provides a graphical representation of cumulative nest fate percentages on District beaches from 2001 through 2015. By combining data from the last 15 years, it is apparent that HSSSP has by far the highest overall hatch rate at 69%. The Sandspit has the second highest overall hatch rate (50%), followed by Villa Creek Beach (37%) and then Morro Strand (32%). By far the most successful beach in terms of productivity is the Sandspit with 2,547 nests and 50% hatching. Villa Creek Beach had slightly more nests than Morro Strand, 490 versus 376. Examination of nest failures reveals that WSP at District beaches are vulnerable to the same threats. However, it is notable that at Villa Creek Beach the loss from depredation is higher (44%), while the depredation rate at other beaches is close to the overall average of 29%. Morro Strand has had the most nests in the District lost to abandonment with 18% lost over the past 15 years; far above the District average of 8%. Failed nests at HSSSP are most often due to unknown causes (13%) because of reduced monitoring efforts on those beaches.

There were 44 confirmed fledges on District beaches in 2015. The lack of individual WSP identification precludes determining fledging success on the Sandspit, so the actual numbers of fledges is most likely much larger. Due to the fact that there are relatively few nests at Villa Creek Beach and Morro Strand, the likelihood of observing fledglings was much greater than on the Sandspit. The first fledgling observed on District beaches was on May 18<sup>th</sup>, and the last was on September 22<sup>nd</sup>. The length of the District breeding period was 193 days.

Funding for the 2015 WSP season was provided by CSP Natural Resources Maintenance funding, MDO mitigation funds, and District Home Base funding. Approximately, \$62,000 was spent on the WSP program this season. This amount does not include the WSP Coordinator's time.

Other than the banded WSP, the 2015 WSP annual report does not include WSP data from the City property.

## **Future Management**

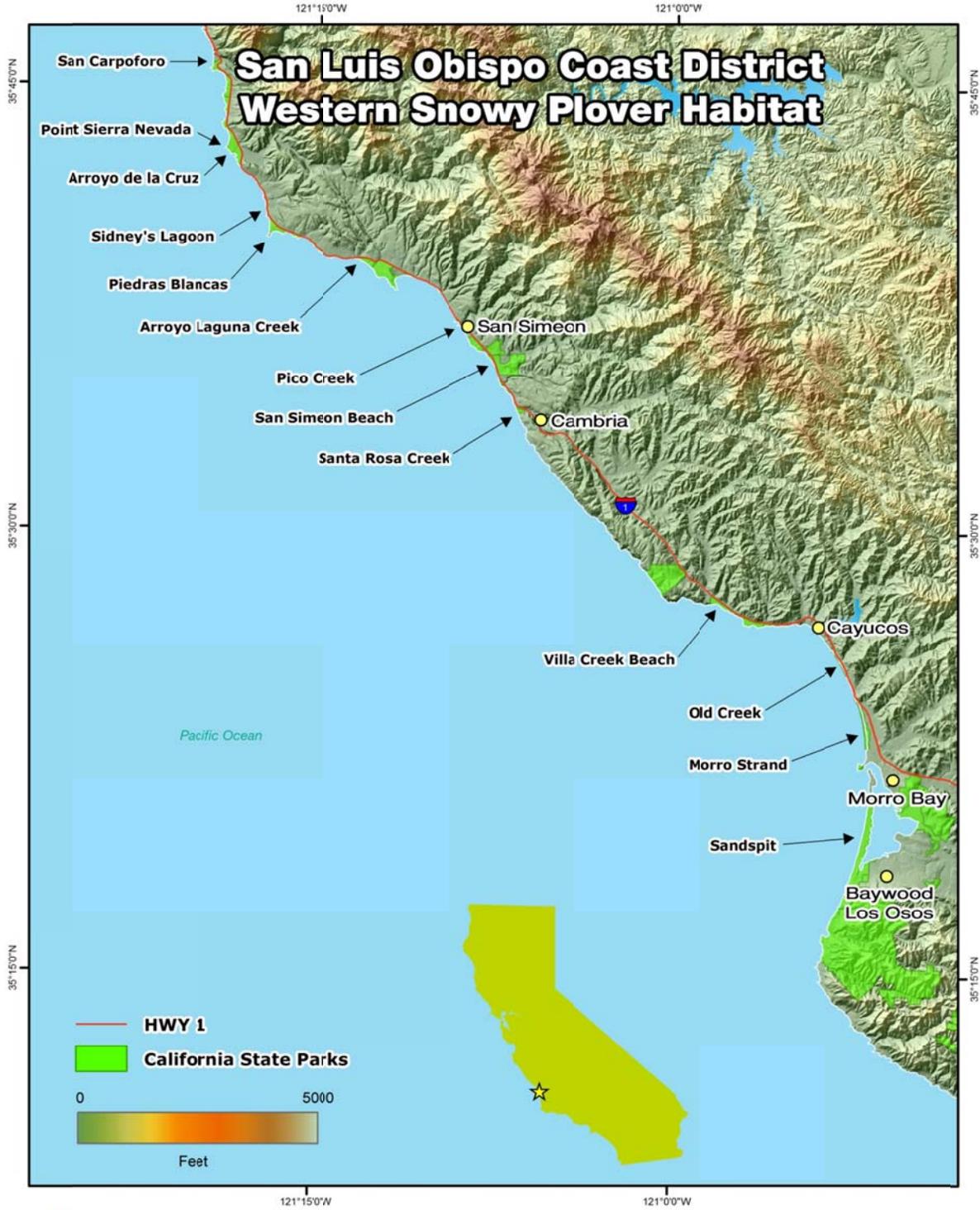
Following in non-prioritized order is what the District would like to accomplish with future WSP management efforts. These objectives may change and be prioritized depending on available funding. In order to maintain and improve nest success for future years, it is important to maintain and improve the management of the WSP program. The goal of increasing the numbers of breeding adult WSP and providing long term protection of breeding and wintering WSP and their habitat is a priority for the District.

1. Continue monitoring efforts during the breeding and non-breeding seasons. Maintain a core of permitted monitors who possess field experience within the District. Continue managing for the protection of nesting and wintering habitat for WSP and other shorebirds.
2. Continue symbolic fencing and sign installation along WSP nesting habitat to keep recreation out of closed areas and control access points during the breeding season. Continue installing brightly colored WSP signs at the access corridors on District beaches to make the corridors more visible.
3. Continue to move towards fulfilling USFWS WSP Recovery Plan management recommendations.
4. Continue predator management control actions to remove problematic species. Continue utilizing wildlife cameras at appropriate locations to determine target species responsible for predations of nests and adult WSP.
5. Continue informational training on WSP for CSP staff and volunteers at the beginning of the WSP season and at the beginning of summer.
6. Continue cooperation with agencies and others using vehicles on the beach to keep vehicle use on wet sand, at a slow speed, and as infrequent as possible for the protection of breeding and wintering WSP and other shorebirds.
7. Ensure all corridors, facilities, and actions are compliant with Americans with Disabilities Act and California Environmental Quality Act guidelines.
8. Maintain involvement with range-wide and Recovery Unit Five recovery efforts for the WSP.
9. Complete the Predator Management Plan for the District.
10. Continue including CSP Ranger staff in weekly WSP meetings to increase communication and coordination within the District for achieving our WSP recovery goals.
11. Continue to visit other WSP areas to learn about how other programs are managed and monitored.
12. Provide monitors with necessary training to “float eggs” so that approximate hatch dates can be determined.
13. Continue enforcement of CSP regulations throughout the year. Continue daily vehicle patrols by CSP Ranger staff to enforce rules and regulations affecting WSP habitat (i.e., dogs on beach, illegal fires, people inside closed nesting habitat, and kite

flying or kite boarding). Increased patrols will give the public a sense of authoritative presence on the beach.

14. Continue exotic plant removal program to create more WSP habitat.
15. Continue to investigate remedies with the City for the removal of American Crows from Morro Strand.
16. Expand the volunteer outreach program to target beach users before they enter the beach. People are more likely to cooperate with closures, if they are informed.
17. Continue to expand outreach programs, such as the educational booth at Morro Rock and the Morro Strand Campground, educating beach users throughout the summer.
18. Increase communications with Morro Bay High School regarding beach use restrictions and project objectives during the WSP nesting season.
19. Continue with increased staff and volunteers for July 4<sup>th</sup> to prevent disturbance to nesting WSP and to educate visitors.
20. Continue having a WSP informational binder at the campground kiosks to aid in educating the campers.
21. Continue installing “no dog” signs close to the mean high tide line at the southern and northern boundaries of Morro Strand to inform dog owners that dogs are not allowed past this point.
22. Inform Coast Mounted Assistance, horse rental agencies, and any other local horse groups before the WSP season starts about the rules and regulations for equestrians on the beaches. Have WSP informational flyers available for equestrians.
23. Continue marking corridors on the east side (bayside) of the Sandspit utilizing signage, and flags marking the corridors and continue to provide accurate maps to the kayak rental businesses.
24. Continue partnership with the City in assisting them with their fence installation and removal.
25. Create permanent corridor fencing along Morro Strand similar to the one installed at the Morro Strand Campground using posts and cables.
26. Provide training to monitors on how to operate wildlife cameras near WSP nests with minimal disturbance to WSP.

# Appendix 1 – Site Maps



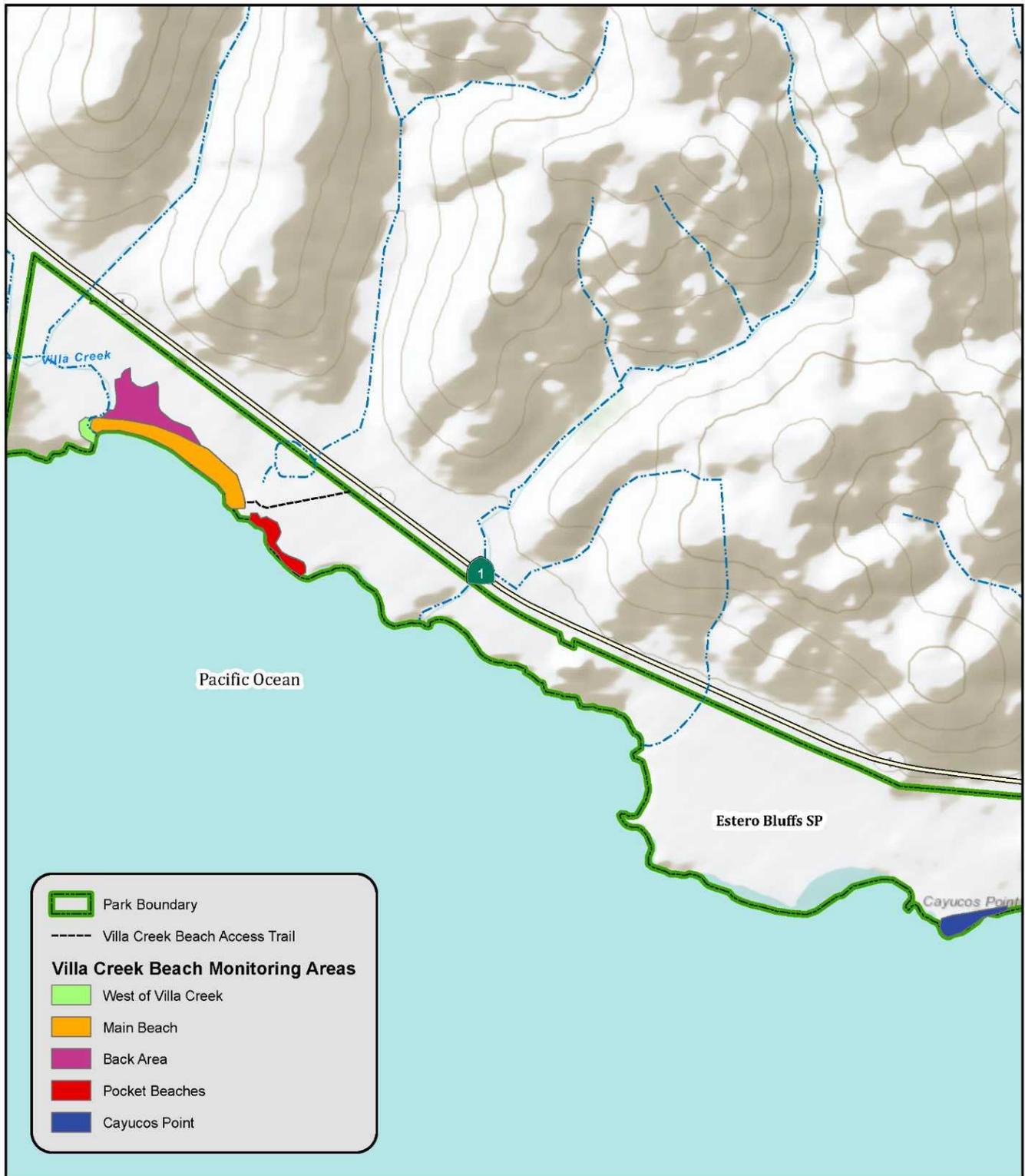
CA Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Jeff Ebner  
September 10, 2014



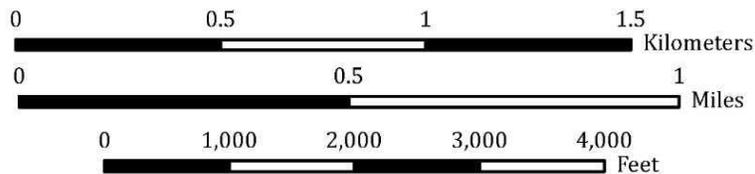
1 : 300,000  
Universal Transverse Mercator Projection  
NAD 1983 UTM Zone 10N



# Estero Bluffs State Park



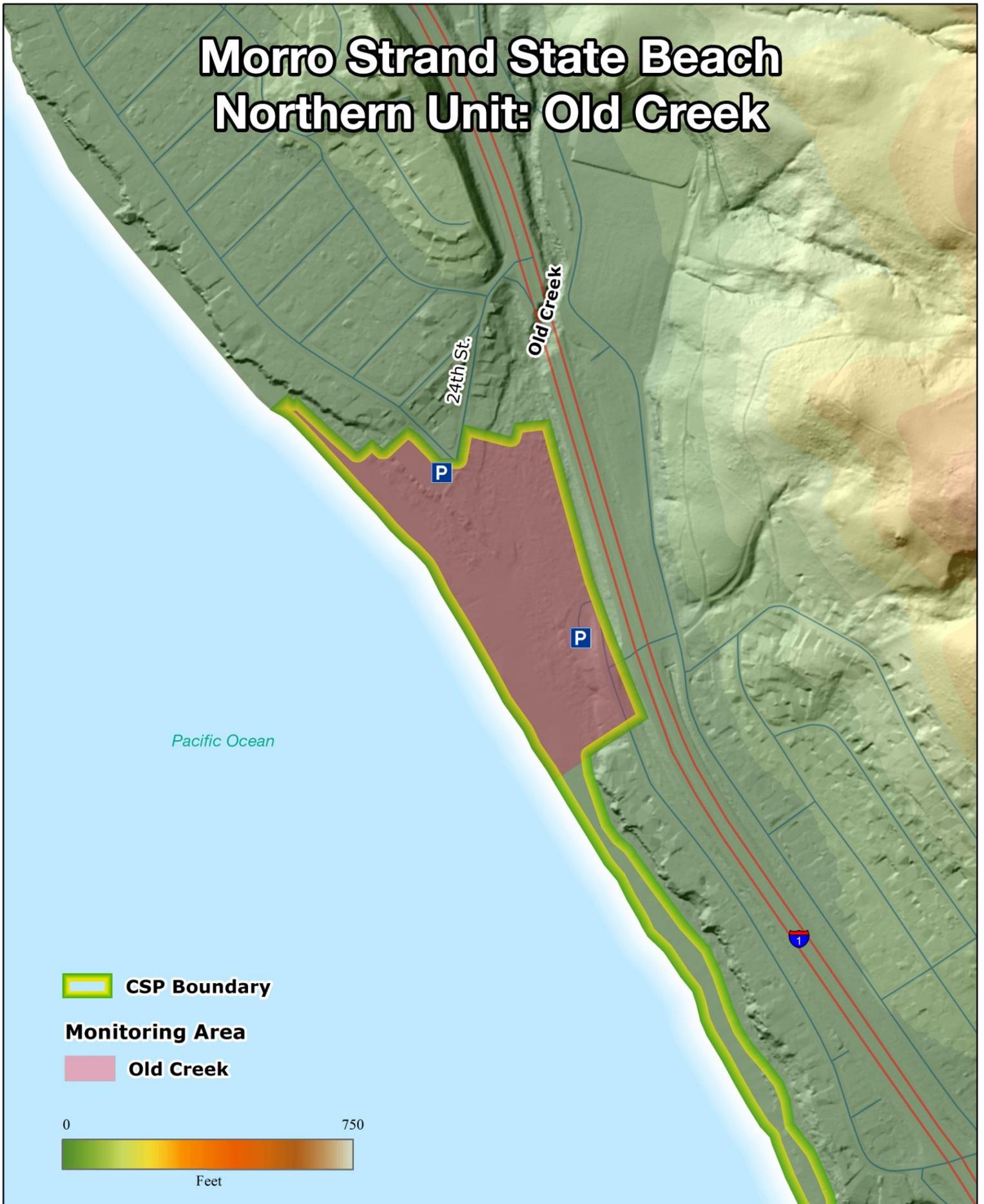
Jeff Ebner  
September 1, 2012



1 : 18,000



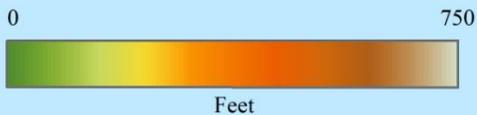
# Morro Strand State Beach Northern Unit: Old Creek



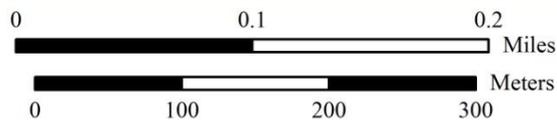
 **CSP Boundary**

**Monitoring Area**

 **Old Creek**



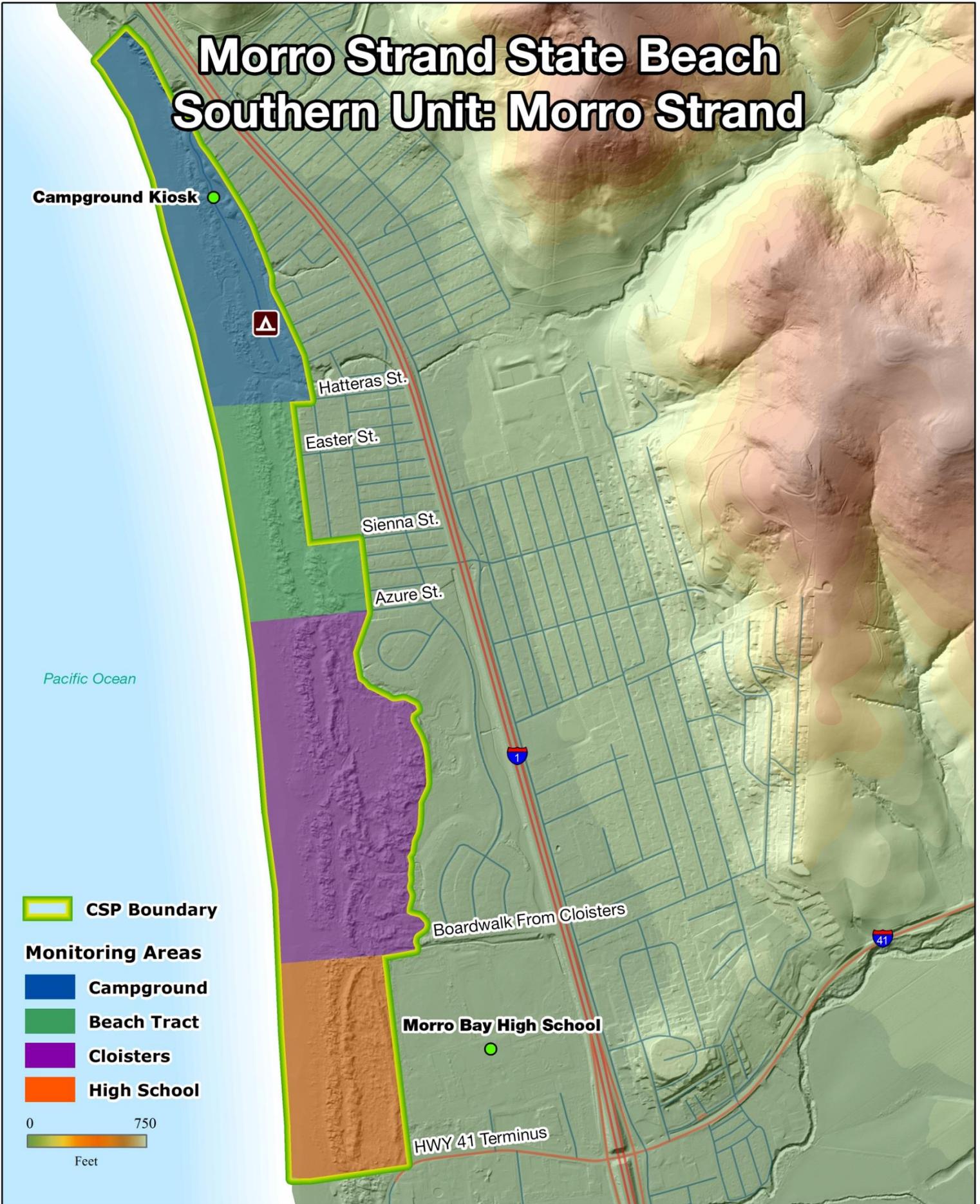
1 : 5,000  
State Plane Coordinate System  
NAD 1983 California Zone V



CA Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Jeff Ebner  
September 17, 2014



# Morro Strand State Beach Southern Unit: Morro Strand



Campground Kiosk



Hatteras St.

Easter St.

Sienna St.

Azure St.

Pacific Ocean

CSP Boundary

**Monitoring Areas**

Campground

Beach Tract

Cloisters

High School



Boardwalk From Cloisters

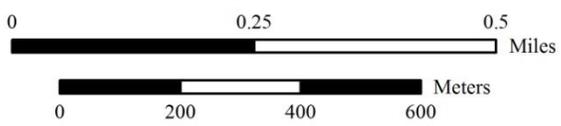
Morro Bay High School

HWY 41 Terminus



1 : 12,000

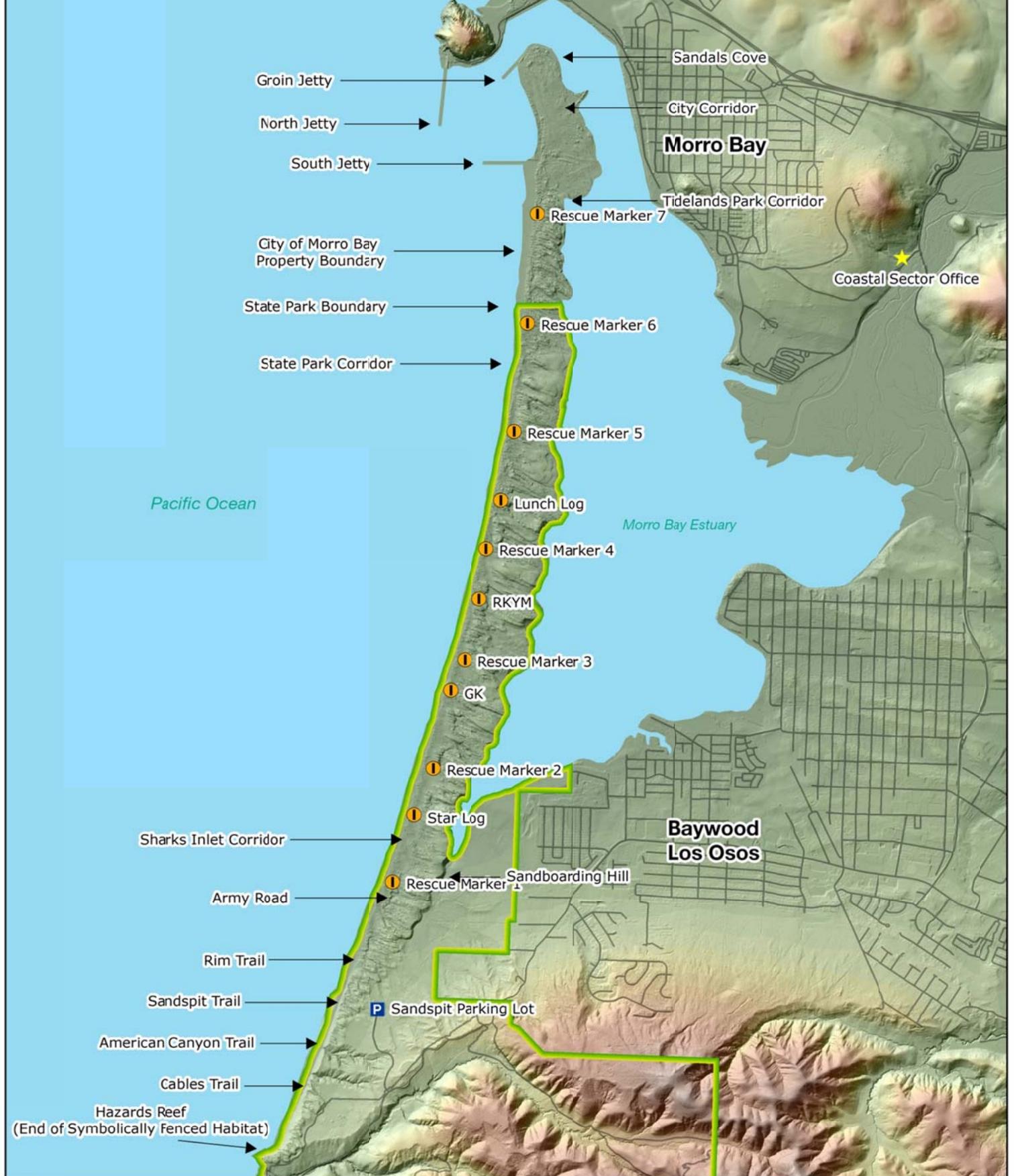
State Plane Coordinate System  
NAD 1983 California Zone V



CA Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Jeff Ebner  
September 17, 2014

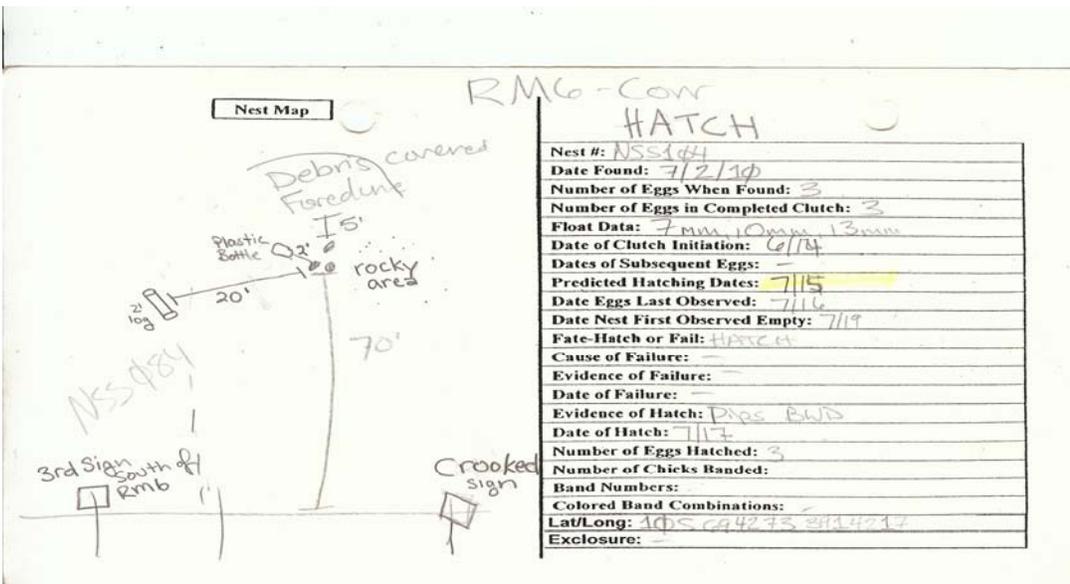
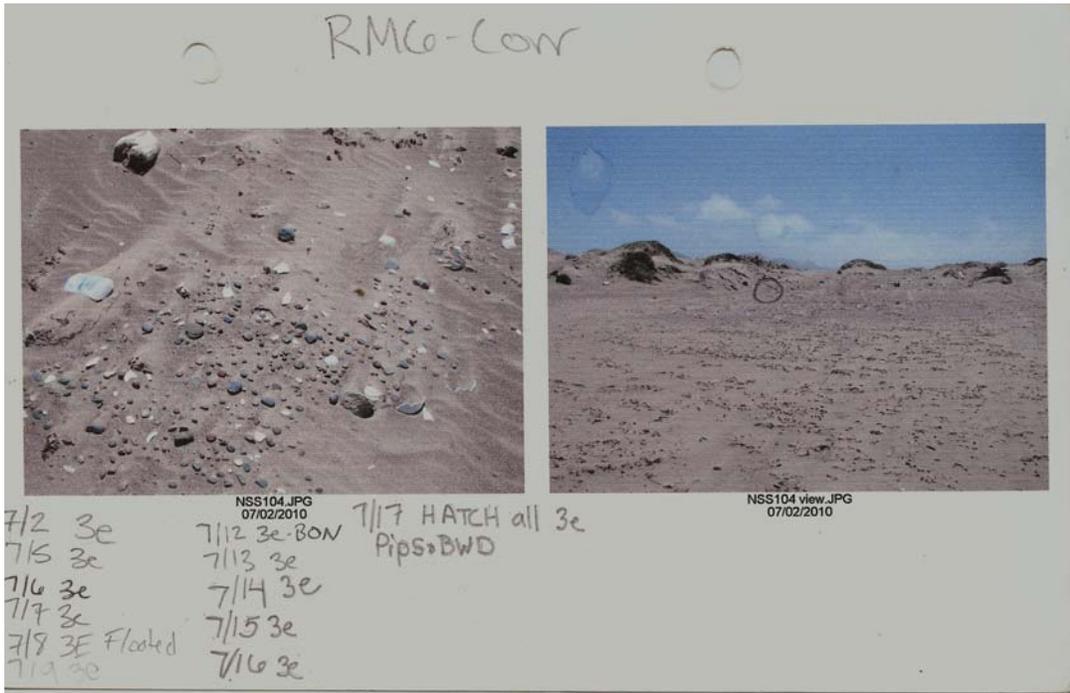


# Montaña De Oro State Park Sandspit



## Appendix 2 – Nest Card Example

Nest Card from nest number NSS104, found on the north half of the Sandspit between Rescue Marker Six and the CSP Corridor.



3e=3eggs; BON= Bird on nest; BWD=Broken wing display;  
Pips=shell fragments found after hatch

Appendix 3 – WSP Population Census Data on District Beaches October 2014-September 2015

Date	Hearst San Simeon State Park	San Carpofooro	Point Sierra Nevada	Arroyo de la Cruz	Sidney's Lagoon	Piedras Blancas	Arroyo Laguna	San Simeon Creek	Santa Rosa Creek	Date	Villa Creek Beach	M	F	Unknown	Juvenile	Chick	Old Creek	Morro Strand	M	F	Unknown	Juvenile	Chick	Sandspit	M	F	Unknown	Juvenile	Chick
10/09/14	93	0	-	-	18	-	74	1	-	10/09/14	31	-	-	31	-	-	0	30	-	-	30	-	-	143	-	-	143	-	-
10/15/14	90	0	-	-	-	-	64	26	-	10/15/14	29	-	-	29	-	-	0	15	-	-	15	-	-	148	-	-	148	-	-
10/22/14	81	0	0	-	-	0	50	31	0	10/22/14	37	-	-	37	-	-	0	42	-	-	42	-	-	167	-	-	174	-	-
10/29/14	102	0	-	0	0	-	67	35	-	10/29/14	32	-	-	32	-	-	0	0	-	-	0	-	-	214	-	-	214	-	-
11/04/14	123	-	0	-	0	0	100	23	-	11/04/14	47	-	-	47	-	-	0	113	-	-	113	-	-	-	-	-	-	-	-
11/14/14	113	0	-	-	0	-	110	3	-	11/13/14	16	-	-	16	-	-	0	38	-	-	38	-	-	-	-	-	-	-	-
11/18/14	151	-	-	0	-	-	125	26	0	11/18/14	31	-	-	31	-	-	-	106	-	-	106	-	-	93	-	-	93	-	-
12/09/14	46	-	-	-	-	0	-	46	-	11/25/14	48	-	-	48	-	-	-	74	-	-	74	-	-	120	-	-	120	-	-
01/07/15	146	-	0	0	0	0	0	146	0	12/03/14	-	-	-	-	-	-	-	76	-	-	76	-	-	-	-	-	-	-	-
01/14/15	153	-	0	0	0	0	0	153	0	12/05/14	12	-	-	12	-	-	0	55	-	-	55	-	-	-	-	-	-	-	-
01/20/15	144	0	0	0	0	0	0	144	0	12/09/15	34	-	-	34	-	-	-	-	-	-	-	-	-	29	-	-	29	-	-
01/28/15	157	0	0	0	0	0	0	157	0	12/17/14	39	-	-	39	-	-	0	55	-	-	55	-	-	131	-	-	131	-	-
02/04/15	151	0	0	0	0	0	0	151	0	12/30/14	37	-	-	37	-	-	-	69	-	-	69	-	-	-	-	-	-	-	-
02/10/15	145	0	-	-	0	-	0	145	-	01/06/15	34	-	-	34	-	-	-	112	-	-	112	-	-	96	-	-	96	-	-
03/05/15	67	-	-	-	-	-	-	67	-	01/13/15	33	-	-	33	-	-	-	53	-	-	53	-	-	95	-	-	95	-	-
03/19/15	36	-	-	-	-	-	-	36	-	01/20/15*	35	-	-	35	-	-	0	106	-	-	106	-	-	130	-	-	130	-	-
03/25/15	52	-	-	-	-	-	-	52	-	01/27/15	36	-	-	36	-	-	-	104	-	-	104	-	-	97	-	-	97	-	-
04/02/15	42	-	-	-	-	-	-	42	-	02/03/15	39	-	-	39	-	-	-	102	-	-	102	-	-	129	-	-	129	-	-
04/21/15	13	2	0	0	0	0	-	11	0	02/10/15	-	-	-	-	-	-	-	-	-	-	-	-	-	107	-	-	107	-	-
05/08/15	1	1	-	-	-	-	-	-	-	02/11/15	68	-	-	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/11/15	1	1	0	-	-	0	0	0	-	02/18/15	37	-	-	37	-	-	-	98	-	-	98	-	-	91	-	-	91	-	-
05/19/15*	1	1	-	-	0	-	0	0	0	03/17/15	15	7	8	0	-	-	-	0	-	-	-	-	-	211	89	98	24	-	-
05/28/15	1	1	-	-	0	-	-	-	-	04/14/15	18	7	11	0	-	-	-	13	6	6	1	-	-	150	61	85	4	-	-
06/04/15	1	1	0	0	0	0	-	0	0	05/12/15	16	8	8	0	-	-	-	5	2	3	0	-	-	131	56	64	11	-	9
06/11/15	2	1	0	-	0	-	-	1	-	05/19/15*	16	8	8	0	-	-	-	5	2	3	0	-	-	151	70	71	10	2	8
06/16/15	0	0	-	0	-	0	-	0	-	05/20/15	13	7	6	0	-	-	-	2	1	1	0	-	-	-	-	-	-	-	-
06/23/15	0	0	0	0	0	0	-	0	0	05/21/15	-	-	-	-	-	-	-	3	1	2	0	-	-	-	-	-	-	-	-
07/30/15	62	0	-	-	0	-	20	42	-	05/26/15	12	6	6	0	-	-	-	3	1	1	1	-	-	129	61	59	9	5	5
08/18/15	23	-	-	-	-	-	-	23	-	05/27/15	-	-	-	-	-	-	-	-	-	-	-	-	-	152	78	74	0	9	14
08/25/15	45	9	0	-	-	-	31	5	-	06/09/15	7	3	4	0	-	-	-	0	0	0	0	-	-	128	58	57	13	3	15
09/03/15	78	16	-	-	0	-	39	0	23	07/28/15	29	1	0	28	-	-	-	2	1	1	0	-	-	249	50	48	96	55	9
09/17/15	95	17	-	0	-	-	54	1	23	08/25/15	32	-	-	32	-	-	-	30	1	0	29	-	5	275	37	39	135	64	14
09/24/15	116	18	-	-	0	-	68	9	21	09/22/15	23	-	-	23	-	-	-	2	-	-	2	-	-	326	6	5	309	6	-
Notes: Totals do not include chicks																													
Sandspit data does not include City property																													
May and June totals do not include Juveniles																													
* Indicates range-wide window survey																													

Appendix 4 - Banded WSP With Known Origins Observed on District Beaches October 2014-February 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
A/B/A:V	J	10/22/2014	2/18/2015	8	Oregon, '14	Villa Creek Beach, Morro Strand, Sandspit	
A/Y/A:V	F	1/27/2015	1/27/2015	1	Oregon, '14	Sandspit	
AB:GO	U	10/8/2014	2/10/2015	13	Salinas NWR, '11	Arroyo Laguna, San Simeon Creek Beach	
AG:GA	J	12/9/2014	12/9/2014	1	Moss Landing Salt Ponds, '14	Sandspit	
AP:RB	J	10/15/2014	2/10/2015	6	Monterey Bay Aquarium, '14	Sandspit	
AR:BW	U	10/15/2014	10/15/2014	1	Marina SB, '13	Sandspit	
AR:YG	F	10/8/2014	2/18/2015	11	Salinas SB, '13	Sandspit	
AW:RG	J	10/29/2014	10/29/2014	1	Pajaro Spit, '14	Sandspit	
B:G/W/G	J	10/22/2014	11/18/2014	4	VAFB, '14	Arroyo Laguna	
bA:WY	F	10/3/2014	2/18/2015	11	Moss Landing Salt Ponds, '14	Morro Strand, Sandspit	Banded as an adult
BY:OA	U	1/7/2015	2/10/2015	6	Salinas NWR, '14	San Simeon Creek Beach	
G/R:V	J	10/22/2014	2/10/2015	7	Oregon, '14	Arroyo Laguna, San Simeon Creek Beach	
GA:AG	F	10/14/2014	1/20/2015	9	ODSVRA, '13	Villa Creek Beach, Morro Strand, Sandspit	
GA:OB	U	11/25/2014	11/25/2014	1	ODSVRA, '10	Villa Creek Beach	
GA:VR	F	10/8/2014	2/18/2015	11	ODSVRA, '09	Morro Strand, Sandspit	
GA:YG	F	10/8/2014	2/10/2015	12	ODSVRA, '13	Arroyo Laguna, San Simeon Creek Beach	
GA:YR	J	11/18/2014	2/18/2015	7	ODSVRA, '14	Sandspit	
GG:AG	U	10/8/2014	2/11/2015	21	ODSVRA, '13 or '14	Arroyo Laguna, San Simeon Creek Beach, Villa Creek Beach, Morro Strand, Sandspit	
GG:AY	U	11/4/2014	1/28/2015	6	ODSVRA, '13	Arroyo Laguna, San Simeon Creek Beach	
GG:BG	J	10/22/2014	10/29/2014	2	ODSVRA, '14	Arroyo Laguna	
GG:BY	U	1/14/2015	1/14/2015	1	ODSVRA, '14	San Simeon Creek Beach	
GG:OG	J	10/17/2014	2/18/2015	12	ODSVRA, '14	Sandspit	
GG:PB	F	10/8/2014	2/18/2015	13	ODSVRA, '12	Arroyo Laguna, San Simeon Creek Beach, Sandspit	
GG:VG	J	10/8/2014	2/4/2015	9	ODSVRA, '14	Arroyo Laguna, San Simeon Creek Beach	
GG:WB	F	10/8/2014	2/18/2015	8	ODSVRA, '13	Sandspit	
GG:YB	U	10/3/2014	12/19/2014	10	ODSVRA, '13	Morro Strand, Sandspit	
NB:OR	F	12/5/2014	2/18/2015	7	VAFB, '13	Villa Creek Beach, Morro Strand	
NB:OW	U	11/4/2014	2/4/2015	6	VAFB, '11	San Simeon Creek Beach	
NO:BY	F	10/29/2014	2/4/2015	9	VAFB, '13	Arroyo Laguna, San Simeon Creek Beach	
NO:GB	U	11/4/2014	1/14/2015	2	VAFB, '13	Arroyo Laguna, San Simeon Creek Beach	
NO:PB	J	10/22/2014	2/10/2015	12	VAFB, '14	Arroyo Laguna, San Simeon Creek Beach	
NW:OB	U	10/15/2014	2/10/2015	12	VAFB, '13	Arroyo Laguna, San Simeon Creek Beach	
NW:PR	J	11/18/2014	11/18/2014	1	VAFB, '14	Sandspit	
NY:BY	J	10/29/2014	11/25/2014	2	VAFB, '14	Sandspit	
NY:RY	J	11/18/2014	2/11/2015	6	VAFB, '14	Villa Creek Beach, Morro Strand, Sandspit	

Appendix 4 - Banded WSP With Known Origins Observed on District Beaches October 2014-February 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
NY:YB	U	10/22/2014	10/22/2014	1	VAFB, '12	Morro Strand	
O:AB	F	10/8/2014	2/13/2015	10	VAFB, '12	Sandspit	Formerly NO:AB
OA:YA	J	10/15/2014	2/18/2015	11	Pajaro Spit, '14	Villa Creek Beach, Morro Strand, Sandspit	
OL:B	U	1/20/2015	1/20/2015	1	Salinas SB, '09	San Simeon Creek Beach	Formerly OL:BP
oO:BY	F	10/8/2014	1/27/2015	10	Monterey, '11	Sandspit	Banded as an adult
OO:RW	J	10/15/2014	10/29/2014	3	Salinas SB, '14	Sandspit	
P:Y/G	M	11/25/2014	2/18/2015	6	VAFB, '12	Sandspit	
PG:BB	J	10/15/2014	12/9/2014	7	ODSVRA, '14	Morro Strand, Sandspit	
PG:BR	J	10/8/2014	10/8/2014	1	ODSVRA, '14	Morro Strand	
PG:BW	J	10/8/2014	2/18/2015	9	ODSVRA, '14	Sandspit	
PG:GR	J	11/14/2014	11/14/2014	1	ODSVRA, '14	Arroyo Laguna	
PG:GY	J	10/15/2014	2/18/2015	12	ODSVRA, '14	Morro Strand, Sandspit	
PG:OB	J	11/18/2014	2/18/2015	10	ODSVRA, '14	Villa Creek Beach, Morro Strand	
PG:PW	J	10/22/2014	2/18/2015	9	ODSVRA, '14	Sandspit	
PG:YG	J	11/25/2014	11/25/2014	1	ODSVRA, '14	Morro Strand	
PV:BW	J	11/14/2014	11/14/2014	1	ODSVRA, '14	San Simeon Creek Beach	
PV:GG	J	10/8/2014	2/18/2015	10	ODSVRA, '14	Villa Creek Beach, Morro Strand, Sandspit	
PV:RW	J	11/4/2014	1/6/2015	5	ODSVRA, '14	Morro Strand, Sandspit	
PV:W	M	10/22/2014	2/3/2015	8	ODSVRA, '08	Morro Strand	Formerly PV:PW
RA:GY	J	10/8/2014	2/10/2015	13	Salinas NWR, '14	Sidney's Lagoon, Arroyo Laguna, San Simeon Creek Beach	
RG:YB	M	10/8/2014	2/18/2015	15	Oregon, '11	Morro Strand, Sandspit	
RR:WW	M	10/8/2014	2/18/2015	7	ODSVRA, '10	Sandspit	
rW:BR	M	10/22/2014	2/4/2015	9	Zmudowski SB, '09	Arroyo Laguna, San Simeon Creek Beach	Banded as an adult
rW:RB	U	1/27/2015	1/27/2015	1	Marina SB, '10	Morro Strand	Banded as an adult
S:RR	F	10/29/2014	2/18/2015	7	VAFB, '12	Sandspit	Formerly NS:RR
VG:OB	J	10/8/2014	2/11/2015	10	ODSVRA, '14	Villa Creek Beach, Morro Strand, Sandspit	
VV:GY	J	10/8/2014	2/11/2015	9	ODSVRA, '14	Sandspit	
VV:WB	J	10/3/2014	2/18/2015	16	ODSVRA, '14	Morro Strand, Sandspit	
VV:YR	J	10/29/2014	1/27/2015	5	ODSVRA, '14	San Simeon Creek Beach, Villa Creek Beach, Morro Strand	
W:G/Y/G	F	12/17/2014	1/27/2015	4	VAFB, '13	Sandspit	
WA:GA	J	10/15/2014	2/18/2015	9	Pajaro Spit, '14	Sandspit	
WA:R	U	10/15/2014	2/10/2015	11	Oregon, '12	Arroyo Laguna, San Simeon Creek Beach	
WG:GG	J	10/8/2014	2/18/2015	7	Moss Landing Salt Ponds, '14	Sandspit	
WY:GA	J	10/8/2014	2/10/2015	12	Pajaro Dunes, '14	Arroyo Laguna, San Simeon Creek Beach	
Y/O:Y:V	J	10/22/2014	12/5/2014	6	Oregon, '14	Morro Strand, Sandspit	

Appendix 4 - Banded WSP With Known Origins Observed on District Beaches October 2014-February 2015

<b>Band Combination</b>	<b>Sex</b>	<b>First Seen</b>	<b>Last Seen</b>	<b># Times Seen</b>	<b>History</b>	<b>Location</b>	<b>Notes</b>
Y:Y/G	F	10/8/2014	2/18/2015	10	VAFB, '13	Sandspit	
YA:OY	F	10/8/2014	2/18/2015	7	Salinas SB, '10	Sandspit	
YR:OW	M	10/3/2014	2/10/2015	11	Marina SB, '13	Morro Strand, Sandspit	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
A/B:A:V	F	4/21/2015	4/21/2015	1	Oregon, '14	Sandspit	
A/Y:A:V	F	3/3/2015	3/3/2015	1	Oregon, '14	Sandspit	
A:G:W	J	9/22/2015	9/22/2015	1	VAFB, '15	Sandspit	
AB:GG	J	8/20/2015	8/20/2015	1	Marina SB, '15	Sandspit	
AB:GO	U	7/30/2015	9/10/2015	8	Salinas NWR, '11	Arroyo Laguna, Sandspit	
AG:BG	M	4/22/2015	4/22/2015	1	Between Marina SB & Salinas NWR, '14	Sandspit	
AG:RO	J	9/22/2015	9/22/2015	1	Marina SB, '15	Sandspit	
AN:NB	J	8/20/2015	8/26/2015	3	VAFB, '15	Villa Creek Beach, Sandspit	
AN:NR	J	7/30/2015	8/19/2015	4	VAFB, '15	Sandspit	
AN:NY	J	8/28/2015	9/15/2015	3	VAFB, '15	Morro Strand, Sandspit	
AN:RR	J	7/28/2015	7/28/2015	1	VAFB, '15	Sandspit	
AO:OO	J	8/7/2015	8/25/2015	4	Pajaro Spit, '15	Morro Strand, Sandspit	
AP:AO	J	7/14/2015	7/14/2015	1	Monterey Bay Aquarium, '15	Morro Strand	
AP:AR	J	8/16/2015	8/20/2015	2	Monterey Bay Aquarium, '15	Sandspit	
AP:BO	J	8/7/2015	8/7/2015	1	Monterey Bay Aquarium, '15	Sandspit	
AP:RO	J	8/4/2015	8/4/2015	1	Monterey Bay Aquarium, '15	Sandspit	
AR:AA	J	9/29/2015	9/29/2015	1	Fort Ord, '15	Sandspit	
AR:OO	J	7/8/2015	7/8/2015	1	Marina SB, '15	Sandspit	
AR:YG	F	3/3/2015	9/24/2015	21	Salinas SB, '13	Sandspit	
AW:RA	F	7/9/2015	8/25/2015	9	Salinas NWR, '14	Sandspit	
AW:WB	F	4/14/2015	6/11/2015	16	Marina SB, '14	Sandspit	One nest failed due to abandonment
AW:WO	J	9/3/2015	9/24/2015	2	Zmudowski SB, '15	San Carpoforo Creek Beach	
AY:AA	M	4/15/2015	9/22/2015	17	Marina SB, '14	Morro Strand, Sandspit	
AY:YO	J	8/10/2015	9/17/2015	7	Marina SB, '15	Morro Strand, Sandspit	
B/A:B:G	J	9/22/2015	9/22/2015	1	Oregon, '15	Sandspit	
B/A:G	J	9/10/2015	9/10/2015	1	Oregon, '15	Sandspit	
B:OR	F	5/27/2015	9/24/2015	13	VAFB, '13	Sandspit	Formerly NB:OR. One hatched nest.
BA:AO	J	8/17/2015	8/21/2015	4	Moss Landing Salt Ponds, '15	Morro Strand, Sandspit	
bA:WY	F	3/3/2015	9/22/2015	13	Moss Landing Salt Ponds, '14	Sandspit	Banded as an adult
BB:GR	J	8/6/2015	8/28/2015	3	ODSVRA, '15	Sandspit	
BB:RB	J	8/7/2015	8/7/2015	1	ODSVRA, '15	Sandspit	
BG:GO	J	8/19/2015	8/19/2015	1	Sunset SB, '15	Sandspit	
BO:AY	J	8/21/2015	8/21/2015	1	Pajaro Spit, '15	Morro Strand	
BO:YO	J	7/14/2015	7/14/2015	1	Marina SB, '15	Villa Creek Beach	
BY:AR	J	8/17/2015	8/25/2015	3	Marina SB, '15	Sandspit	
BY:AY	J	8/11/2015	8/18/2015	3	Moss Landing Salt Ponds, '15	Sandspit	
BY:BB	J	7/21/2015	7/21/2015	1	Pajaro Spit, '15	Sandspit	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
BY:OG	J	7/28/2015	7/30/2015	2	Fort Ord, '15	Sandspit	
bY:RB	M	7/27/2015	9/17/2015	10	Marina SB, '15	Sandspit	Banded as an adult
BY:RO	J	7/27/2015	9/10/2015	9	Pajaro Spit, '15	Villa Creek Beach, Morro Strand, Sandspit	
G/L:G	J	9/1/2015	9/1/2015	1	Oregon, '15	Morro Strand	
G/O:G	J	8/19/2015	8/19/2015	1	Oregon, '15	Sandspit	
G/Y/G:G	J	8/31/2015	8/31/2015	1	Oregon, '15	Morro Strand	
G:G/Y	J	8/19/2015	8/19/2015	1	VAFB, '15	Sandspit	
GA:AR	J	8/7/2015	9/24/2015	7	ODSVRA, '15	Sandspit	
GA:GR	J	9/1/2015	9/1/2015	1	ODSVRA, '15	Morro Strand	
GA:OY	J	8/27/2015	9/24/2015	6	ODSVRA, '15	Sandspit	
GA:PG	J	9/3/2015	9/3/2015	1	ODSVRA, '15	Morro Strand	
GA:VR	F	3/3/2015	9/22/2015	9	ODSVRA, '09	Sandspit	
GA:VW	J	7/27/2015	7/28/2015	2	ODSVRA, '15	Sandspit	
GA:VY	J	9/3/2015	9/3/2015	1	ODSVRA, '15	Sandspit	
GA:YG	F	3/5/2015	3/21/2015	2	ODSVRA, '13	San Simeon Creek Beach	
GA:YR	F	3/3/2015	8/25/2015	2	ODSVRA, '14	San Simeon Creek Beach	
GG:AB	J	9/1/2015	9/1/2015	1	ODSVRA, '15	Morro Strand	
GG:AG	F	3/4/2015	9/24/2015	9	ODSVRA, '13 or '14	Arroyo Laguna, San Simeon Creek Beach, Villa Creek Beach	
GG:BR	F	5/22/2015	5/22/2015	1	ODSVRA, '13 or '14	Sandspit	
GG:GW	J	7/28/2015	8/9/2015	5	ODSVRA, '15	Sandspit	
GG:OG	M	3/11/2015	9/24/2015	46	ODSVRA, '14	Sandspit	One nest hatched
GG:PB	F	3/3/2015	9/17/2015	40	ODSVRA, '12	Arroyo Laguna, Sandspit	One nest hatched. Possible second hatched nest on the Sandspit.
GG:VG	U	7/14/2015	7/14/2015	1	ODSVRA, '14	Sandspit	
GG:WB	F	3/3/2015	9/3/2015	12	ODSVRA, '13	Sandspit	
GG:WG	J	7/30/2015	9/17/2015	6	ODSVRA, '15	Morro Strand, Sandspit	
GG:YB	U	8/14/2015	8/14/2015	1	ODSVRA, '13	Morro Strand	
GO:GB	J	9/22/2015	9/22/2015	1	Reservation Rd, Fort Ord, '15	Sandspit	
GO:GY	J	8/18/2015	9/1/2015	2	Moss Landing Salt Ponds, '15	Morro Strand, Sandspit	
GO:RY	J	7/9/2015	8/19/2015	4	Marina SB, '15	Sandspit	
GO:YW	J	7/21/2015	7/23/2015	2	Moss Landing Salt Ponds, '15	Sandspit	
GY:BB	J	7/27/2015	7/27/2015	1	Clam Beach, '15	Sandspit	
KA:GR	J	9/24/2015	9/24/2015	1	San Francisco Bay, '15	Arroyo Laguna	
NB:OG	J	7/21/2015	7/30/2015	6	VAFB, '15	San Simeon Creek Beach, Villa Creek Beach	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
NB:OR	F	3/6/2015	5/14/2015	16	VAFB, '13	Villa Creek Beach, Morro Strand, Sandspit	One nest hatched on the Sandspit
NB:PB	U	9/3/2015	9/3/2015	1	VAFB, '14	Morro Strand	
NB:YG	J	8/8/2015	8/14/2015	2	VAFB, '15	Morro Strand, Sandspit	
NO:BG	J	8/7/2015	8/7/2015	1	VAFB, '15	Sandspit	
NO:BY	F	3/5/2015	3/5/2015	1	VAFB, '13	San Simeon Creek Beach	
NO:GY	J	9/3/2015	9/3/2015	1	VAFB, '15	Arroyo Laguna	
NO:OW	J	8/21/2015	8/21/2015	1	VAFB, '15	Morro Strand	
NO:PB	F	3/5/2015	8/18/2015	18	VAFB, '14	San Simeon Creek Beach, Villa Creek Beach	
NR:BB	J	9/1/2015	9/10/2015	2	VAFB, '15	Sandspit	
NR:GR	F	3/26/2015	6/9/2015	16	VAFB, '13	Sandspit	One nest depredated by coyote. Possible second nest depredated by coyote.
NR:OY	J	9/8/2015	9/8/2015	1	VAFB, '15	Sandspit	
NW:AW	J	8/11/2015	8/11/2015	1	VAFB, '15	Sandspit	
NY:AG	J	9/22/2015	9/22/2015	1	VAFB, '15	Villa Creek Beach	
NY:NR	J	7/21/2015	7/21/2015	1	VAFB, '15	Sandspit	
NY:OY	J	7/1/2015	8/25/2015	2	VAFB, '15	Morro Strand	
NY:RY	F	3/6/2015	9/24/2015	40	VAFB, '14	Villa Creek Beach, Morro Strand, Sandspit	Two nests hatched on Morro Strand. One nest hatched on the Sandspit. Paired with WV:YS for one nest.
NY:WY	J	9/22/2015	9/22/2015	1	VAFB, '15	Sandspit	
NY:YY	F	3/26/2015	3/26/2015	1	VAFB, '12	Villa Creek Beach	
O:AB	F	3/3/2015	9/24/2015	12	VAFB, '12	Sandspit	Formerly NO:AB
O:GY	U	9/10/2015	9/10/2015	1	VAFB, '13	Sandspit	
OA:YA	M	3/3/2015	3/17/2015	3	Pajaro Spit, '14	Sandspit	
OB:BB	J	8/11/2015	8/11/2015	1	Marina SB, '15	Sandspit	
OB:YO	J	7/9/2015	7/13/2015	2	Pajaro Spit, '15	Sandspit	
OG:AW	J	8/18/2015	8/18/2015	1	Moss Landing Salt Ponds, '15	Sandspit	
ON:YY	J	8/18/2015	8/28/2015	3	San Francisco Bay NWR, '15	Morro Strand, Sandspit	
OO:AO	J	7/14/2015	7/14/2015	1	Zumdowski SB, '15	Sandspit	
oO:BY	F	3/5/2015	9/22/2015	3	Monterey, '11	Sandspit	Banded as an adult
OO:GO	J	8/25/2015	8/25/2015	1	Zmudowski SB, '15	Sandspit	
OR:WR	F	7/13/2015	7/13/2015	1	Clam Beach, '13	Villa Creek Beach	Rebanded as an adult
OW:WR	J	6/30/2015	9/22/2015	17	Fort Ord, '15	Villa Creek Beach, Sandspit	
OY:GO	J	7/6/2015	9/3/2015	6	Zmudowski SB, '15	Arroyo Laguna, Morro Strand, Sandspit	
P:Y/G	M	3/3/2015	9/17/2015	17	VAFB, '12	Sandspit	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
PG:AB	U	7/31/2015	7/31/2015	1	ODSVRA, '14	Sandspit	
PG:BW	M	3/3/2015	9/24/2015	37	ODSVRA, '14	Sandspit	One hatched nest and one nest failed due to coyote depredation
PG:GW	J	7/15/2015	7/17/2015	2	ODSVRA, '15	Sandspit	
PG:GY	F	3/4/2015	3/13/2015	3	ODSVRA, '14	Morro Strand, Sandspit	
PG:OB	F	3/6/2015	9/24/2015	26	ODSVRA, '14	Villa Creek Beach, Sandspit	One nest failed to coyote depredation
PG:OW	J	9/22/2015	9/22/2015	1	ODSVRA, '15	Sandspit	
PG:PB	J	8/29/2015	8/29/2015	1	ODSVRA, '15	Arroyo Laguna	
PG:PW	M	3/3/2015	3/9/2015	2	ODSVRA, '14	Morro Strand, Sandspit	
PG:RW	J	7/7/2015	7/7/2015	1	ODSVRA, '15	Sandspit	
PG:WG	J	9/15/2015	9/24/2015	3	ODSVRA, '15	Sandspit	
PG:WW	J	8/6/2015	8/20/2015	2	ODSVRA, '15	Sandspit	
PG:YB	J	7/29/2015	8/20/2015	7	ODSVRA, '15	Villa Creek Beach, Sandspit	
PG:YG	M	4/24/2015	4/24/2015	1	ODSVRA, '14	Sandspit	
PG:YY	J	9/3/2015	9/10/2015	2	ODSVRA, '15	Sandspit	
PV:AB	U	4/22/2015	9/24/2015	10	ODSVRA, '14 or '15	Morro Strand, Sandspit	
PV:AR	J	9/22/2015	9/24/2015	2	ODSVRA, '15	Sandspit	
PV:BY	J	9/3/2015	9/22/2015	3	ODSVRA, '15	Arroyo Laguna, Sandspit	
PV:GG	U	3/3/2015	8/28/2015	4	ODSVRA, '14 or '15	Morro Strand, Sandspit	
PV:PB	J	8/1/2015	9/22/2015	8	ODSVRA, '15	Sandspit	
PV:PW	U	8/12/2015	8/12/2015	1	ODSVRA, '14	Sandspit	
PV:RY	J	8/19/2015	9/8/2015	6	ODSVRA, '15	Morro Strand, Sandspit	
PV:VR	J	8/27/2015	9/22/2015	2	ODSVRA, '15	Sandspit	
PV:W	M	3/10/2015	7/29/2015	40	ODSVRA, '08	Villa Creek Beach, Morro Strand, Sandspit	Formerly PV:PW. One nest hatched at Villa Creek Beach. See also V:W.
PV:WR	J	8/25/2015	9/15/2015	3	ODSVRA, '15	Villa Creek Beach, Sandspit	
PV:WY	M	4/6/2015	4/6/2015	1	ODSVRA, '14	Sandspit	
PV:YG	J	9/3/2015	9/15/2015	4	ODSVRA, '15	Sandspit	
PV:YW	J	8/18/2015	9/3/2015	5	ODSVRA, '15	Arroyo Laguna, Morro Strand, Sandspit	
R:G	J	8/18/2015	8/18/2015	1	VAFB, '15	Sandspit	
R:G/Y	J	9/1/2015	9/17/2015	4	VAFB, '15	Morro Strand, Sandspit	
RA:BB	F	8/19/2015	8/19/2015	1	Salinas SB, '14	Sandspit	
RA:GY	F	3/19/2015	9/3/2015	18	Salinas NWR, '14	San Simeon Creek Beach, Morro Strand, Sandspit	
RA:WG	J	7/28/2015	7/28/2015	1	Moss Landing Salt Ponds, '15	Sandspit	
RB:BG	J	9/24/2015	9/24/2015	1	Ford Ord, '15	Morro Strand	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
RB:YO	J	7/14/2015	7/14/2015	1	Pajaro Spit, '15	Sandspit	
RG:YB	M	3/5/2015	9/8/2015	8	Oregon, '11	Villa Creek Beach, Morro Strand, Sandspit	
RO:AB	J	7/7/2015	7/7/2015	1	Salinas SB, '15	Sandspit	
RO:BO	J	9/24/2015	9/24/2015	1	Salinas NWR, '15	Arroyo Laguna	
RO:GY	U	9/8/2015	9/8/2015	1	Pajaro Spit, '13	Morro Strand	
RO:OO	J	7/14/2015	7/15/2015	2	Fort Ord, '15	Sandspit	
RR:WW	M	3/3/2015	9/15/2015	40	ODSVRA, '10	Sandspit	One nest hatched. Possible second nest.
rW:BR	M	4/22/2015	6/4/2015	3	Zmudowski SB, '09	San Carpoforo Creek Beach	Fledged 3 chicks
RW:G	J	9/8/2015	9/8/2015	1	Oregon, '15	Morro Strand	
RW:RO	J	9/17/2015	9/17/2015	1	Reservation Rd, Fort Ord, '15	Santa Rosa Creek	
S:RR	F	3/3/2015	9/24/2015	27	VAFB, '12	Sandspit	Formerly NS:RR. One nest hatched.
V:W	M	8/21/2015	9/22/2015	2	ODSVRA, '08	Morro Strand, Sandspit	Formerly PV:W. Fledged 2 chicks at Morro Strand.
VG:BR	F	4/20/2015	8/28/2015	27	ODSVRA, '14	Sandspit	Possible one hatched nest
VG:OB	F	3/6/2015	5/15/2015	30	ODSVRA, '14	Villa Creek Beach, Morro Strand	Possible one hatched nest at Villa Creek Beach
VG:PY	J	9/15/2015	9/24/2015	4	ODSVRA, '15	Sandspit	
VG:VB	J	7/11/2015	7/14/2015	3	ODSVRA, '15	Villa Creek Beach, Morro Strand	
VV:BW	U	8/8/2015	8/8/2015	1	ODSVRA, '14	Sandspit	
VV:GR	F	3/25/2015	7/7/2015	11	ODSVRA, '12	Sandspit	One possible nest
VV:GY	M	3/4/2015	4/23/2015	4	ODSVRA, '14	Sandspit	Paired
VV:OB	J	7/22/2015	7/22/2015	1	ODSVRA, '15	Sandspit	
VV:RG	J	7/28/2015	7/30/2015	2	ODSVRA, '15	Villa Creek Beach, Sandspit	
VV:RW	J	9/1/2015	9/1/2015	1	ODSVRA, '15	Morro Strand	
VV:WB	M	3/4/2015	8/5/2015	11	ODSVRA, '14	Morro Strand, Sandspit	One possible nest failed due to tidal wash at Morro Strand
VV:YR	U	8/25/2015	9/24/2015	2	ODSVRA, '14	San Carpoforo Creek Beach, Arroyo Laguna	
VW:BB	J	7/27/2015	8/12/2015	2	ODSVRA, '15	Sandspit	
W/B:G	J	9/22/2015	9/22/2015	1	Oregon, '15	Sandspit	
W/L:G	J	9/1/2015	9/1/2015	1	Oregon, '15	Morro Strand	
W/R:G	J	9/17/2015	9/24/2015	2	Oregon, '15	Santa Rosa Creek	
W:OB	U	9/17/2015	9/24/2015	2	VAFB, '13	Arroyo Laguna	
WA:GA	M	3/3/2015	9/1/2015	38	Pajaro Spit, '14	Sandspit	One nest hatched
WA:R	U	7/30/2015	9/24/2015	4	Oregon, '12	San Simeon Creek Beach, Santa Rosa Creek	
WA:RR	J	8/3/2015	8/25/2015	6	Reservation Rd, Fort Ord, '15	Morro Strand, Sandspit	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2015

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
WA:RW	J	8/27/2015	8/27/2015	1	Pajaro Spit, '15	Sandspit	
WB:GB	J	8/28/2015	8/28/2015	1	Pajaro Spit, '15	Villa Creek Beach	
WG:GG	M	3/3/2015	9/24/2015	21	Moss Landing Salt Ponds, '14	Sandspit	Two nests failed due to coyote depredation
WG:WY	J	9/3/2015	9/3/2015	1	Pajaro Spit, '15	Arroyo Laguna	
WG:YY	J	8/27/2015	8/27/2015	1	Moss Landing State Beach, '15	Sandspit	
WN:PG	J	8/21/2015	8/21/2015	1	San Francisco Bay NWR, '15	Morro Strand	
WN:WW	J	8/25/2015	8/25/2015	1	San Francisco Bay NWR, '15	Sandspit	
WN:YY	J	9/10/2015	9/10/2015	1	San Francisco Bay NWR, '15	Sandspit	
WR:--	M	3/17/2015	6/9/2015	2	Fort Ord, '08	Sandspit	Formerly WR:BR
WR:BY	J	8/7/2015	8/7/2015	1	Zmudowski SB, '15	Sandspit	
WR:GG	J	8/19/2015	8/20/2015	2	Fort Ord, '15	Sandspit	
WV:YS	M	4/2/2015	9/24/2015	23	Centerville Beach, '14	Morro Strand, Sandspit	Formerly WV:YY. Two nests hatched at Morro Strand with at least 3 fledges. Paired with NY:RY for one nest.
WY:GA	F	3/19/2015	4/17/2015	3	Pajaro Dunes, '14	San Simeon Creek Beach, Sandspit	
Y:Y/G	F	3/4/2015	9/22/2015	28	VAFB, '13	Morro Strand, Sandspit	Paired on the Sandspit
YA:BO	J	8/5/2015	8/5/2015	1	Pajaro Spit, '15	Sandspit	
YA:OY	F	3/10/2015	9/8/2015	22	Salinas SB, '10	Sandspit	One nest failed due to coyote depredation. Possible second nest hatched.
YB:GO	J	8/12/2015	8/12/2015	1	Marina SB, '15	Sandspit	
YO:GO	J	8/25/2015	8/25/2015	1	Sunset SB, '15	Sandspit	
YR:OW	M	3/3/2015	9/22/2015	46	Marina SB, '13	Sandspit	Two nests hatched with at least 2 fledges
yR:WG	M	7/30/2015	8/6/2015	2	Monterey SB, '15	Sandspit	Banded as an adult
YY:GG	J	9/10/2015	9/15/2015	2	Pajaro Spit, '15	Morro Strand, Sandspit	
YY:GY	J	9/3/2015	9/3/2015	1	Pajaro Spit, '15	Sandspit	

Appendix 6 - Breeding Window Survey Census 2002 - 2015



Appendix 7 – Injured and Dead WSP on District Beaches October 2014-September 2015

Date	Location	Sex	Age	Band Combo	Nest	Description of Injury	Actions taken	Comments
10/22/2014	Sandspit	U	Unknown			Chunk of tar adhered to right leg	None	Ran and foraged normally
11/14/2014	San Simeon Creek Beach	U	Unknown			String wrapped around lower part of left leg; leg swollen above and below string. Did not use leg.	None	
3/11/2015	Villa Creek Beach	M	Adult			Left foot deformed - two toes curled under and one sticking up	None	Flew, ran, and foraged fine
3/17/2015	Sandspit	M	Adult	WR:--		Right leg amputated in 2013	None	Appeared unaffected. Observed again on 6/9/15. This bird has been sighted in previous years. Fledged in 2008 from Fort Ord Dunes.
3/17/2015	Sandspit	M	Adult			Limping; holding left leg up	None	
4/28/2015	Villa Creek Beach	U	Chick		VC03	Found dead 3 feet from nest bowl	Deposited at Santa Barbara Natural History Museum	No apparent cause of death
5/19/2015	Sandspit	U	Unknown			Small patch of tar on chest	None	Appeared unaffected
5/27/2015	Sandspit	F	Adult			Chunk of tar dangling from chest	None	Paired. Appeared unaffected.
6/4/2015	Sandspit	U	Chick		SSS047 or SSS044	Chick found dead with mangled left leg	Deposited at Santa Barbara Natural History Museum	Either hatched with deformed leg or was injured shortly after hatch. Chick appeared to have died within a few hours previous to its discovery. Found in the foredunes approximately 90 ft from its nestbowl.
8/12/2015	Sandspit	M	Adult	PG:BW		Small patch of tar on chest	None	Behaved normally. Observed again on 9/3/15 with its chest free of tar. Fledged in 2014 from ODSVRA.
9/8/2015	Sandspit	U	Unknown			Right leg tucked up against body at an abnormal angle	None	
9/24/2015	Sandspit	U	Unknown			Dangling right leg	None	Likely the same bird observed on 9/8/15
9/24/2015	Sandspit	F	Adult	PG:OB		Stray feather wedged under band on right leg	None	Appeared unaffected. Re-sighted on 10/6/15 with no feather under band. Fledged in 2014 from ODSVRA.

Appendix 8 -- 2015 Salvaged WSP and Eggs

Nest #	Date Collected	Nest Initiation	UTM	Nest Fate	Cause of Failure	Fate Date	# of Eggs	Collected By	Comments
<b>Villa Creek Beach</b>									
VC01	4/28/2015	3/25/2015	10 S 684425 3925927	Fail	Abandoned	4/15/2015	3	R Orr	
VC06	5/6/2015	4/17/2015	10 S 684526 3925858	Fail	Abandoned	4/27/2015	2	R Orr	
VC16	5/19/2015	5/13/2015	10 S 684463 3925904	Fail	Abandoned	5/19/2015	1	R Orr	
VC20	6/4/2015	5/29/2015	10 S 684196 3926028	Fail	Abandoned	6/4/2015	1	R Orr	
VC24	7/31/2015	6/26/2015	10 S 684280 3925979	Hatch		7/22/2015	1	J Ebner	partially hatched
VCDE01	5/12/2015	5/6/2015	10 S 684356 3925956	Dropped Egg			1	R Orr	
VCDE02	5/18/2015	5/11/2015	10 S 684454 3925919	Dropped Egg			1	R Orr	
<b>Morro Stand State Beach</b>									
MS02	4/15/2015	4/8/2015	10 S 693957 3918083	Fail	Abandoned	4/15/2015	1	R Orr	
MSDE01	4/15/2015	4/13/2015	10 S 693895 3918268	Dropped Egg			1	R Orr	
MSDE02	5/6/2015	5/4/2015	10 S 693921 3918008	Dropped Egg			1	R Orr	
MSDE03	6/15/2015	6/9/2015	10 S 693879 3917977	Dropped Egg			1	R Orr	
<b>Sandspit</b>									
<b>North</b>									
NSS002	4/29/2015	3/16/2015	10 S 694264 3914253	Fail	Abandoned	4/27/2015	2	R Orr	
NSS015	4/29/2015	3/27/2015	10 S 693925 3911618	Hatch		4/23/2015	1	R Orr	
NSS038	5/28/2015	4/27/2015	10 S 693973 3911865	Hatch		5/25/2015	1	R Orr	
NSS041	5/13/2015	4/29/2015	10 S 694264 3914245	Fail	Abandoned	5/11/2015	1	R Orr	
NSS050	5/13/2015	5/1/2015	10 S 694008 3912033	Fail	Abandoned	5/12/2015	1	R Orr	
NSS063	6/26/2015	5/20/2015	10 S 694263 3914019	Hatch		6/19/2015	1	J Ebner	
NSS066	5/28/2015	5/20/2015	10 S 693960 3911728	Fail	Abandoned	5/25/2015	2	R Orr	
NSS075	8/7/2015	5/25/2015	10 S 693930 3911651	Fail	Tide	6/15/2015	1	R Orr	
NSS084	6/10/2015	5/28/2015	10 S 693935 3911856	Fail	Tide	6/3/2015	3	J Ebner	
NSS088	8/3/2015	5/29/2015	10 S 693920 3911723	Fail	Tide	6/16/2015	1	R Orr	
NSS088	8/7/2015	5/29/2015	10 S 693920 3911723	Fail	Tide	6/16/2015	1	R Orr	
NSS089	8/3/2015	6/2/2015	10 S 694242 3914070	Fail	Tide	6/3/2015	1	R Orr	
NSS089	8/7/2015	6/2/2015	10 S 694242 3914070	Fail	Tide	6/3/2015	1	R Orr	
NSS095	7/20/2015	6/12/2015	10 S 694231 3913633	Hatch		7/9/2015	2	J Ebner	
NSS105	7/20/2015	6/12/2015	10 S 693946 3911723	Hatch		7/9/2015	1	J Ebner	
NSS132	7/27/2015	Unknown	10 S 694045 3912373	Hatch		7/16/2015	2	R Orr	
<b>South</b>									
SSS001	4/30/2015	3/16/2015	10 S 693664 3910484	Fail	Abandoned	4/20/2015	3	R Orr	
SSS016	4/30/2015	4/3/2015	10 S 693775 3910914	Fail	Abandoned	4/27/2015	3	R Orr	
SSS020	5/13/2015	4/6/2015	10 S 693749 3910837	Hatch		5/8/2015	1	R Orr	
SSS036	5/29/2015	4/17/2015	10 S 693361 3909300	Fail	Abandoned	5/25/2015	3	R Orr	
SSS044	6/8/2015	5/4/2015	10 S 693284 3909126	Hatch		6/1/2015	1	J Ebner	
SSS046	5/29/2015	4/30/2015	10 S 693635 3909863	Fail	Abandoned	5/15/2015	3	R Orr	
SSS060	6/15/2015	5/11/2015	10 S 693596 3910184	Fail	Abandoned	6/11/2015	1	J Ebner	
SSS060	6/26/2015	5/11/2015	11 S 693596 3910184	Fail	Abandoned	6/11/2015	1	J Ebner	
SSS086	7/13/2015	6/5/2015	10 S 693419 3909601	Hatch		7/1/2015	1	J Ebner	
SSS088	5/29/2015	5/6/2015	10 S 693564 3909993	Fail	Abandoned	5/13/2015	1	R Orr	
SSS092	7/13/2015	6/17/2015	10 S 692900 3907945	Fail	Abandoned	6/24/2015	1	J Ebner	
SSS096	6/26/2015	6/8/2015	10 S 693802 3911151	Fail	Tide	6/15/2015	1	J Ebner	
SSS096	7/13/2015	6/8/2015	10 S 693802 3911151	Fail	Tide	6/15/2015	2	J Ebner	
SSS103	7/20/2015	6/12/2015	10 S 693884 3911301	Hatch		7/8/2015	1	J Ebner	

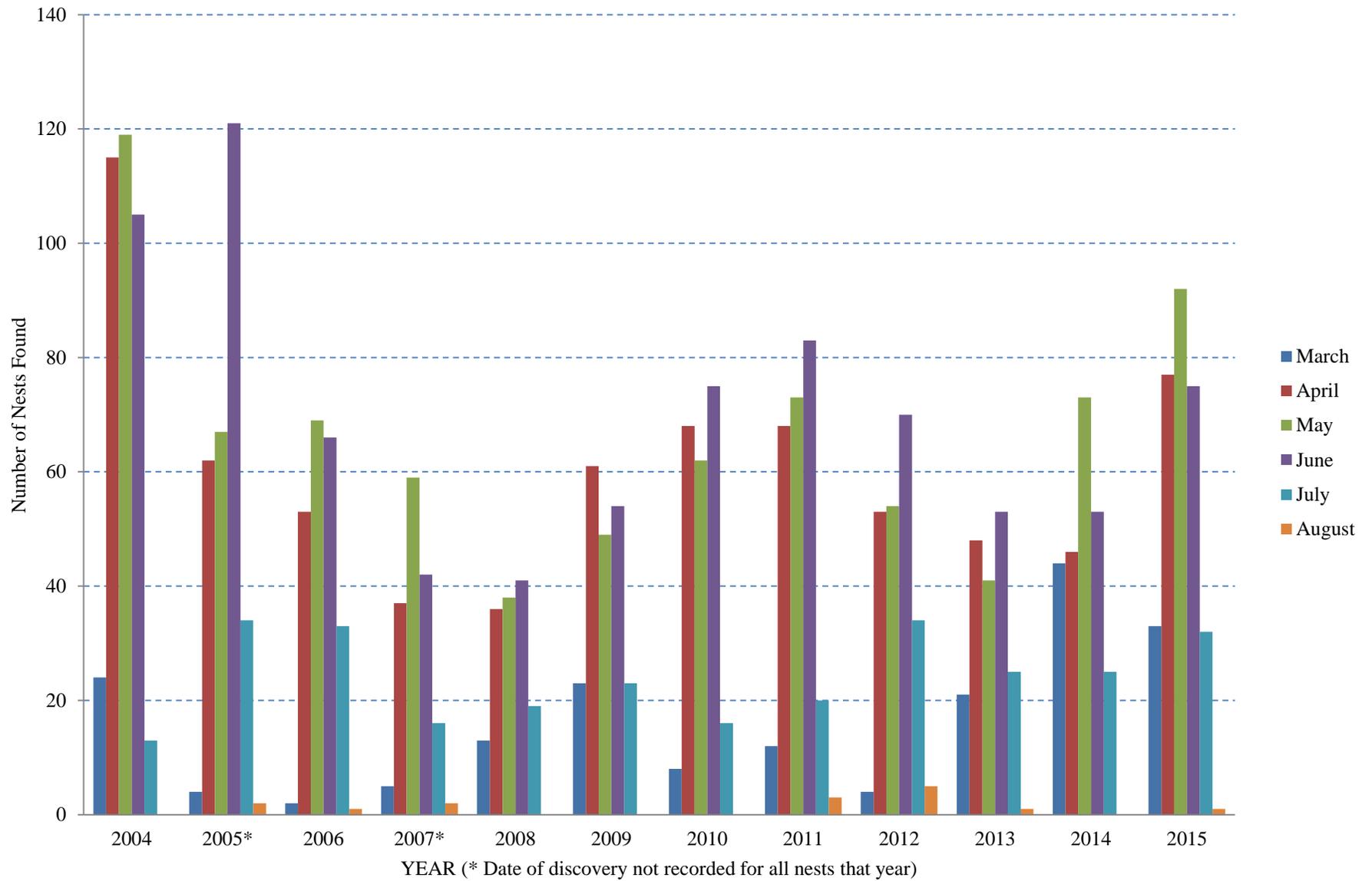
## Appendix 8 -- 2015 Salvaged WSP and Eggs

Nest #	Date Collected	Nest Initiation	UTM	Nest Fate	Cause of Failure	Fate Date	# of Eggs	Collected By	Comments
SSS104	7/13/2015	6/15/2015	10 S 693026 3908285	Fail	Abandoned	6/23/2015	1	J Ebner	
SSS105	7/20/2015	6/15/2015	10 S 693411 3909443	Fail	Abandoned	7/20/2015	1	J Ebner	
SSS106	7/24/2015	6/15/2015	10 S 693543 3909927	Hatch		7/15/2015	1	J Ebner	
SSS109	7/24/2015	6/19/2015	10 S 692890 3907923	Fail	Abandoned	7/13/2015	1	J Ebner	
SSS113	7/20/2015	6/22/2015	10 S 693379 3909365	Fail	Abandoned	7/20/2015	1	J Ebner	
SSS114	8/5/2015	6/22/2015	10 S 693373 3909380	Fail	Abandoned	7/20/2015	1	R Orr	
SSS120	8/5/2015	6/26/2015	10 S 693257 3909050	Hatch		7/27/2015	1	R Orr	
SSS122	8/5/2015	Unknown	10 S 693508 3909790	Hatch		7/26/2015	1	R Orr	
SSS124	7/24/2015	7/13/2015	10 S 692900 3907945	Fail	Abandoned	7/8/2015	1	J Ebner	
SSS127	8/5/2015	Unknown	10 S 693707 3910693	Hatch		8/3/2015	2	R Orr	
SSS129	8/5/2015	Unknown	10 S 693217 3908926	Hatch		7/27/2015	1	R Orr	
SSS135	8/5/2015	Unknown	10 S 693307 3909210	Fail	Tide	7/31/2015	2	R Orr	
SSSDE01	4/14/2015	4/8/2015	10 S 692984 3908154	Dropped Egg			1	R Orr	
SSSDE02	4/15/2015	4/9/2015	10 S 693120 3908556	Dropped Egg			1	J Ebner	
SSSDE03	4/30/2015	4/30/2015	10 S 693447 3909607	Dropped Egg			1	R Orr	
SSSDE04	5/15/2015	5/1/2015	10 S 693038 3908331	Dropped Egg			1	R Orr	
SSSDE06	6/1/2015	6/1/2015	10 S 693306 3909176	Dropped Egg			1	R Orr	
SSSDE07	6/15/2015	6/4/2015	10 S 693336 3909155	Dropped Egg			1	J Ebner	
SSSDE08	6/29/2015	6/19/2015	10 S 693057 3908399	Dropped Egg			1	J Ebner	
SSSDE09	7/24/2015	7/20/2015	10 S 693760 3910859	Dropped Egg			1	J Ebner	

### Salvaged WSP

Location	Associated Nest #	Date Collected	UTM	# of WSP	Age	Collected By	Comments
Villa Creek Beach (Estero Bluffs State Park)	VC03	4/28/2015	10 S 684351 3925967	1	chick, ≈ a few hours old	A Potthoff	Found 3 feet from nest bowl
South Sandspit (Montana de Oro State Park)	SSS044 or SSS047	6/4/2015	10 S 693302 3909078	1	chick, ≈3 days old	M Harrington and A Potthoff	Either hatched with deformed leg or was injured shortly after hatch

Appendix 9 – Number of Nests Found by Month on District Beaches 2004-2015



Appendix 9a -- Nest Initiation and Last Hatch Dates Summary for District Beaches

<b>Hearst San Simeon State Park</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2015	21-Apr*	6-May*
2014	-	-
2013	-	-
2012	6-May*	5-Jun
2011	-	-
2010	-	-
2009	10-Apr	-
2008	-	-
2007	-	-
2006	26-Apr	11-Aug
2005	21-Apr	15-Jul
2004	-	-
2002	29-Apr	26-May*

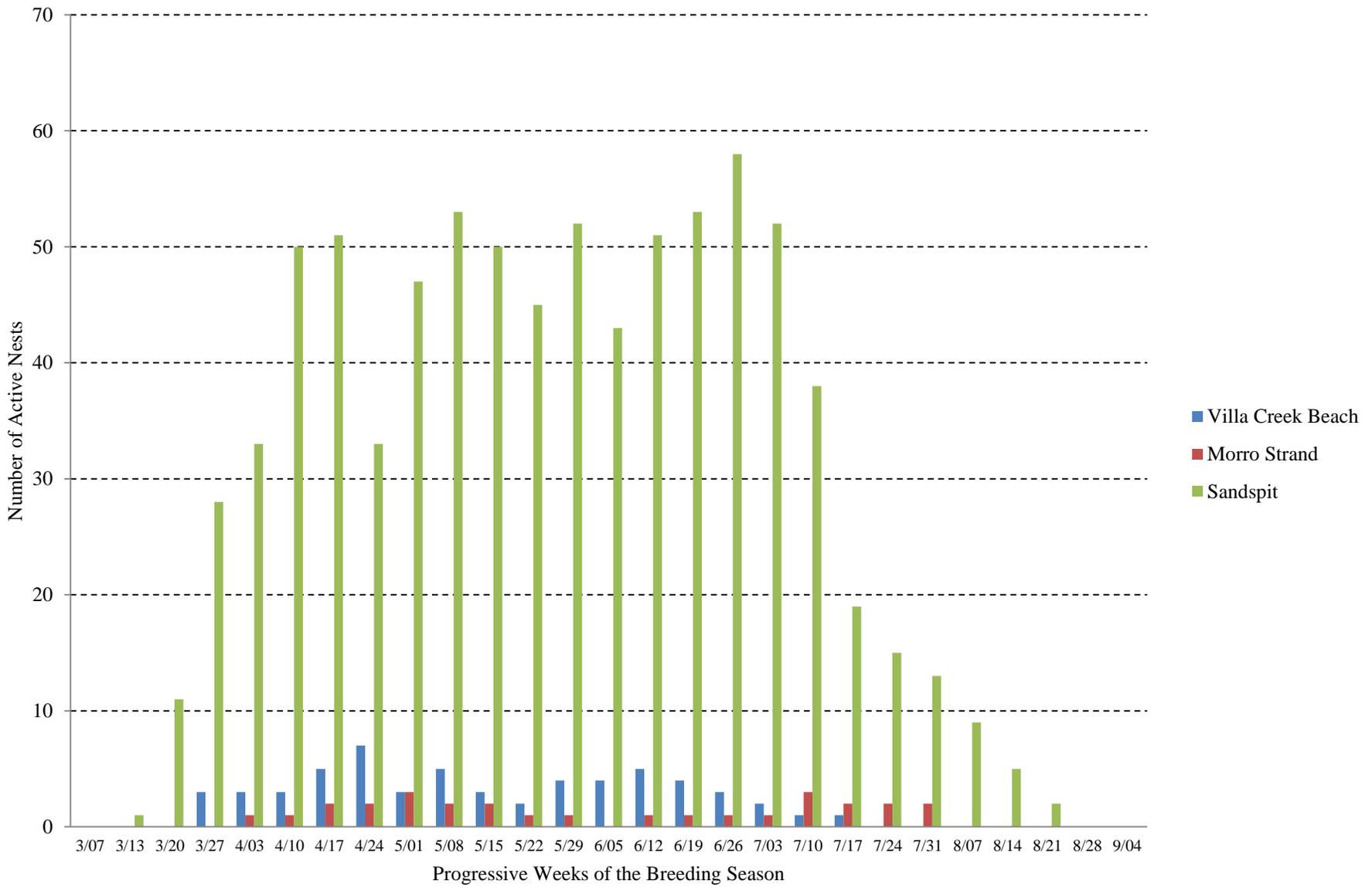
<b>Villa Creek Beach</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2015	25-Mar	22-Jul
2014	21-Mar	21-Jul*
2013	5-Apr	22-Jun
2012	9-Apr	14-Aug
2011	5-Apr	29-Jul
2010	31-Mar*	28-Jul
2009	9-Mar	29-Jun
2008	17-Mar	5-Aug
2007	9-Mar	1-Aug
2006	24-Mar	26-Jul
2005	30-Mar	22-Jul
2004	18-Mar	6-Aug
2003	21-Mar	31-Jul
2002	27-Mar	28-Aug
2001	28-Mar	30-Jul

<b>Morro Strand</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2015	3-Apr	3-Aug
2014	14-Mar	6-Aug
2013	17-Apr	16-Aug*
2012	18-Apr	7-Aug
2011	16-Mar	15-Aug
2010	9-Apr	16-Aug*
2009	20-Mar	3-Aug
2008	24-Mar	25-Jul
2007	6-Apr	16-Aug
2006	7-Apr	11-Aug
2005	25-Apr	20-Aug*
2004	18-Mar	18-Aug
2003	21-Mar	14-Aug*
2002	27-Mar	15-Jul
2001	3-Apr*	13-Aug
2000	28-Mar	3-Jun
1997	13-Apr	20-Aug

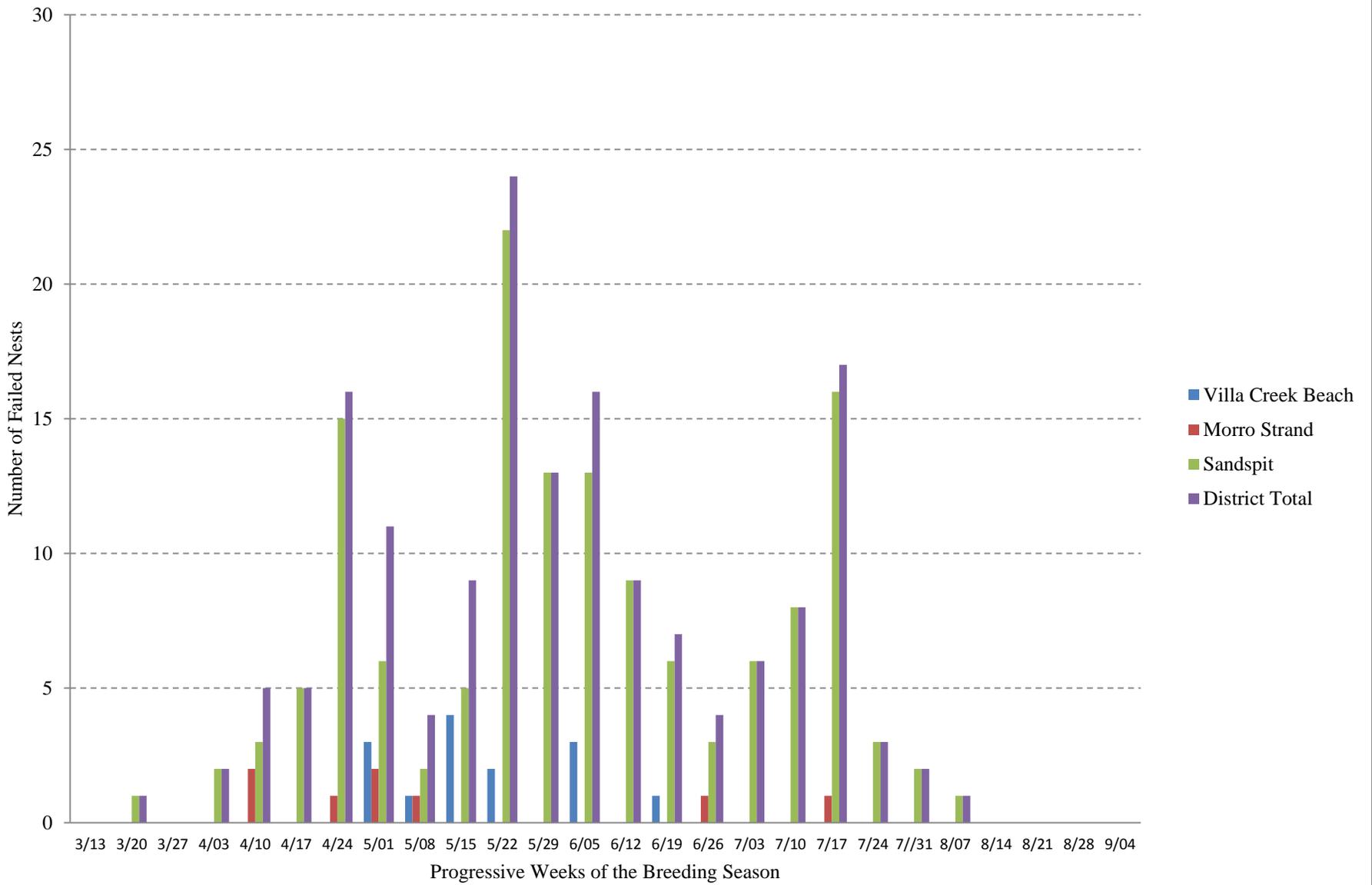
<b>Sandspit</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2015	13-Mar	24-Aug
2014	12-Mar	18-Aug
2013	21-Mar	12-Aug
2012	14-Mar	18-Aug
2011	15-Mar	23-Aug
2010	19-Mar	8-Aug
2009	9-Mar	17-Aug
2008	18-Mar	18-Aug
2007	21-Mar	20-Aug
2006	7-Apr	15-Aug
2005	24-Mar	17-Aug
2004	15-Mar	5-Aug
2003	16-Apr	11-Aug
2002	28-Mar	8-Aug
2001	17-Mar	14-Aug
2000	18-Mar	18-Aug
1987	29-Mar	8-Aug*

\*Approximate date

Appendix 9b – Number of Active Nests Through Progressive Weeks of the 2015 Breeding Season



Appendix 9c – Number of Failed Nests Through Progressive Weeks of the 2015 Breeding Season



Appendix 9d – Summary of Nest Fates at District Beaches 2001-2015

	2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004*		2003*		2002*		2001*			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
<b>Hearst San Simeon State Park</b>																																
Total # of nests	1		0		0		3		0		0		2		2		6		11		5		0		1		1		1		NA	
# nests hatched	1	100%	0		0		1	33%	0		0		0		2	100%	5	83%	7	64%	5	100%	0		0		1	100%	0			
Failed predator	0		0		0		0		0		0		1	50%	0		0		0		0		0		1	100%	0					
Failed wind	0		0		0		0		0		0		1	50%	0		0		0		0		0		0		0					
Failed aband.	0		0		0		2	67%	0		0		0		0		0		0		0		0		0		0					
Failed tide	0		0		0		0		0		0		0		0		1	17%	0		0		0		0		0					
Failed human	0		0		0		0		0		0		0		0		0		0		0		0		0		0					
Failed other	0		0		0		0		0		0		0		0		0		0		0		0		0		0					
Failed unk.	0		0		0		0		0		0		0		0		0		4	36%	0		0		0		0					
Unk. Fate	0		0		0		0		0		0		0		0		0		0		0		0		0		0					
<b>Villa Creek Beach</b>																																
Total # of nests	24		23		20		31		21		26		38		16		30		40		37		66		35		44		39			
# nests hatched	9	39%	9	39%	5	26%	5	16%	7	35%	6	23%	6	17%	8	57%	8	29%	14	36%	16	43%	16	24%	18	51%	25	57%	27	69%		
Failed predator	10	43%	9	39%	13	68%	24	77%	10	50%	13	50%	25	69%	3	21%	16	57%	21	54%	14	38%	29	44%	13	37%	8	18%	6	15%		
Failed wind	0		2	9%	0		0		0		1	4%	1	3%	0		1	4%	0		0		0		0		0					
Failed aband.	4	17%	1	4%	1	5%	1	3%	1	5%	4	15%	1	3%	1	7%	2	7%	2	5%	3	8%	4	6%	0		5	11%	1	3%		
Failed tide	0		1	4%	0		0		2	10%	2	8%	2	6%	2	14%	1	4%	2	5%	4	11%	11	17%	0		2	5%	1	3%		
Failed human**	0		1	4%	0		1	3%	0		0		1	3%	0		0		0		0		1	2%	0		0		3	8%		
Failed other	0		0		0		0		0		0		0		0		0		0		0		0		0		1	2%	0			
Failed unk.	0		0		0		0		0		0		0		0		0		0		0		5	8%	4	11%	3	7%	1	3%		
Unk. Fate	1	4%	0		1	5%	0		1	5%	0		2	5%	2	13%	2	7%	1	3%	0		0		0		0		0			

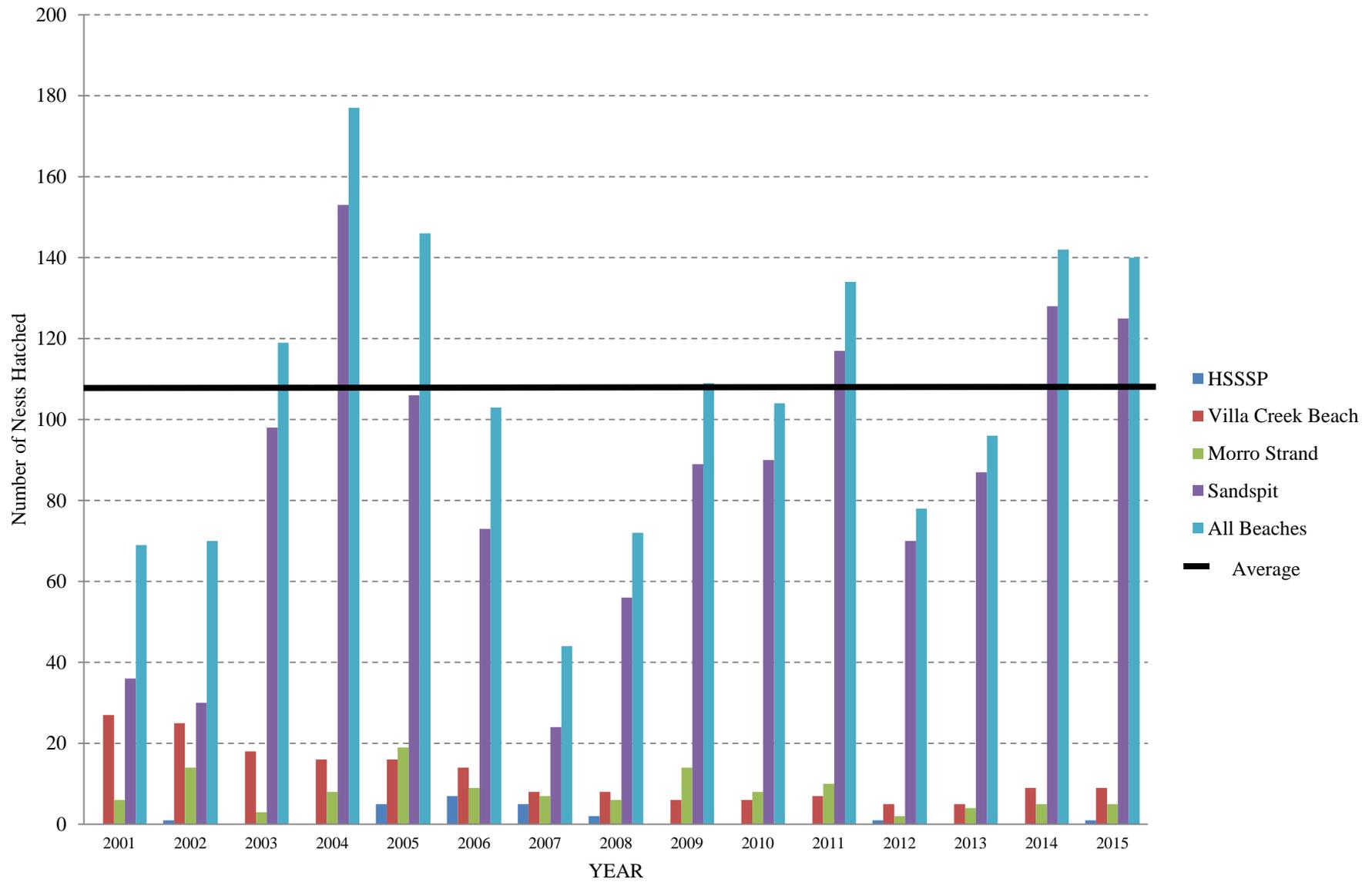
\* Numbers for 2001-02 include Sandspit City property. HSSSP was not monitored in 2001 and 2002-04 numbers only include San Simeon Beach \*\*Includes take by equestrians

Appendix 9d – Summary of Nest Fates at District Beaches 2001-2015

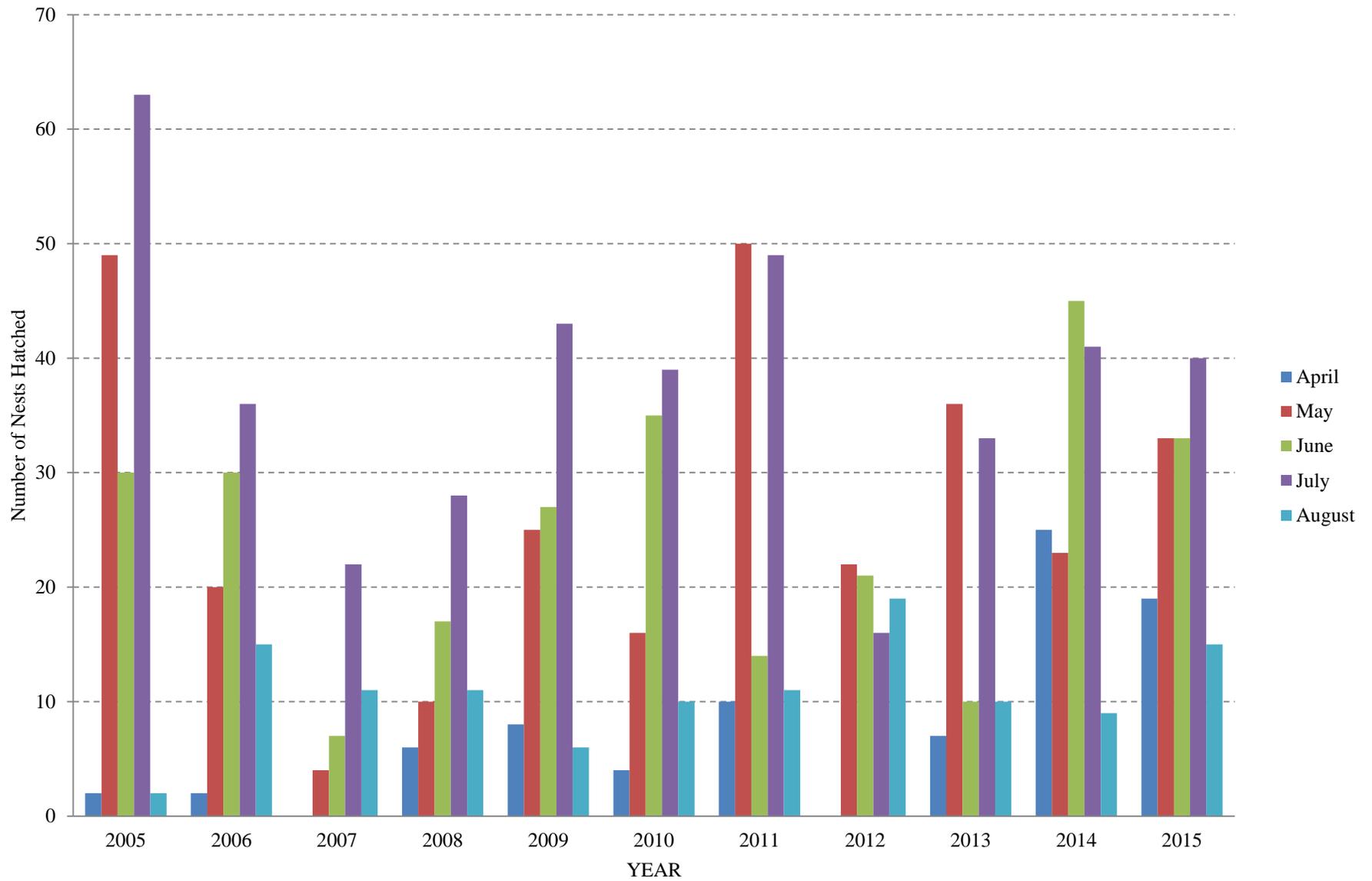
	2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004*		2003*		2002*		2001*	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
<b>Morro Strand</b>																														
Total # of nests	13		17		12		12		25		24		26		33		19		34		27		38		45		37		14	
# nests hatched	5	38%	5	31%	4	33%	2	17%	10	40%	8	35%	14	54%	6	19%	7	37%	9	27%	19	70%	8	21%	3	7%	14	38%	6	43%
Failed predator	5	38%	3	19%	3	25%	6	50%	9	36%	6	26%	6	23%	8	26%	5	26%	2	6%	3	11%	14	37%	33	73%	8	22%	4	29%
Failed wind	0		2	13%	2	17%	2	17%	3	12%	2	9%	1	4%	6	19%	1	5%	0		1	4%	3	8%	0		0		0	
Failed aband.	1	8%	5	31%	3	25%	2	17%	2	8%	5	22%	3	12%	6	19%	6	32%	21	64%	3	11%	6	16%	1	2%	5	14%	0	
Failed tide	1	8%	0		0		0		1	4%	2	9%	1	4%	4	13%	0		0		1	4%	2	5%	6	13%	1	3%	2	14%
Failed human	0		0		0		0		0		0		0		0		0		1	3%	0		1	3%	0		0		0	
Failed other	1	8%	0		0		0		0		0		0		0		0		0		0		2	5%	0		0		0	
Failed unk.	0		1	6%	0		0		0		0		1	4%	1	3%	0		0		0		2	5%	2	4%	9	24%	2	14%
Unk. Fate	0		1	6%	0		0		0		1	4%	0		2	6%	0		1	3%	0		0		0		0		0	
<b>Sandspit</b>																														
Total # of nests	272		201		157		174		213		179		144		96		109		141		225		272		146		109		109	
# nests hatched	125	47%	128	66%	87	56%	70	41%	117	56%	90	51%	89	63%	56	59%	24	22%	73	54%	106	49%	153	56%	98	73%	30	40%	38	36%
Failed predator	108	41%	21	11%	30	19%	74	44%	51	24%	35	20%	23	16%	20	21%	59	54%	46	34%	69	32%	48	18%	9	7%	29	39%	50	47%
Failed wind	2	1%	5	3%	13	8%	5	3%	5	2%	12	7%	10	7%	6	6%	13	12%	1	1%	4	2%	20	7%	10	7%	0		0	
Failed aband.	17	6%	20	10%	11	7%	13	8%	26	12%	13	7%	6	4%	2	2%	8	7%	5	4%	11	5%	7	3%	5	4%	9	12%	7	7%
Failed tide	12	5%	11	6%	13	8%	7	4%	7	3%	23	13%	11	8%	10	11%	5	5%	5	4%	21	10%	28	10%	10	7%	5	7%	8	7%
Failed human**	0		0		0		0		1	0%	0		0		0		0		0		0		0		0		2	3%	4	4%
Failed other	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Failed unk.	2	1%	5	3%	0		0		3	1%	4	2%	3	2%	1	1%	0		6	4%	7	3%	16	6%	2	1%	0		0	
Unk. Fate	6	2%	7	3%	3	2%	5	3%	3	1%	2	1%	2	1%	1	1%	0		5	4%	7	3%	0		12	8%	34	31%	2	2%
<b>Total # of Nests- ALL BEACHES</b>	<b>310</b>		<b>241</b>		<b>189</b>		<b>220</b>		<b>259</b>		<b>229</b>		<b>210</b>		<b>147</b>		<b>164</b>		<b>226</b>		<b>294</b>		<b>376</b>		<b>227</b>		<b>191</b>		<b>162</b>	
<b># Nests Hatched- ALL BEACHES</b>	<b>140</b>	<b>46%</b>	<b>142</b>	<b>61%</b>	<b>96</b>	<b>52%</b>	<b>78</b>	<b>36%</b>	<b>134</b>	<b>53%</b>	<b>104</b>	<b>46%</b>	<b>109</b>	<b>53%</b>	<b>72</b>	<b>51%</b>	<b>44</b>	<b>27%</b>	<b>103</b>	<b>47%</b>	<b>146</b>	<b>51%</b>	<b>177</b>	<b>47%</b>	<b>119</b>	<b>55%</b>	<b>70</b>	<b>45%</b>	<b>71</b>	<b>44%</b>

\* Numbers for 2001-02 include Sandspit City property. HSSSP was not monitored in 2001 and 2002-04 numbers only include San Simeon Beach \*\*Includes take by equestrians

Appendix 9e – Total Nests Hatched on District Beaches 2001-2015



Appendix 9f – Nests Hatched per Month on District Beaches 2005-2015



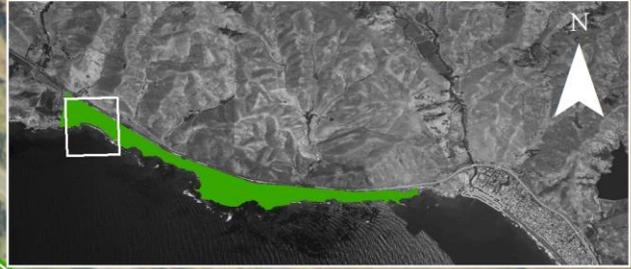
Appendix 9g – 2015 Nest Location Maps



# Estero Bluffs State Park

## Villa Creek Beach

San Luis Obispo County, CA



### Western Snowy Plover *Charadrius nivosus nivosus*

#### 2015 Nest Fates

- Hatch
- Unknown Fate
- Predator Fail**
- Gull Species
- Raccoon
- Striped Skunk
- Unknown Predator
- Other Fail**
- Abandonment

P A C I F I C  
O C E A N

NAD 1983  
California State Plane Zone 5  
2012 Aerial Imagery

State of California  
Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Woodrow Eggers  
October 2015



# Morro Strand State Beach

San Luis Obispo County, CA

## Western Snowy Plover *Charadrius nivosus nivosus*

### 2015 Nest Fates

- H Hatch
- Predator Fail**
- AC American Crow
- RF Red Fox
- UA Unknown Avian
- UP Unknown Predator
- Other Fail**
- A Abandonment
- T Tide
- TV Turkey Vulture



PACIFIC  
OCEAN

NAD 1983  
California State Plane Zone 5  
2005 Aerial Imagery

State of California  
Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Woodrow Eggers  
October 2015



Easter Corridor

Sienna Corridor

Azure Corridor

Boardwalk Corridor



# Montaña de Oro State Park Sandspit

San Luis Obispo County, CA

Western Snowy Plover  
*Charadrius nivosus nivosus*

### 2015 Nest Fates

- Hatch
- Fail
- Unknown



NAD 1983  
California State Plane Zone 5  
2012 Aerial Imagery

State of California  
Department of Parks & Recreation  
San Luis Obispo Coast District  
Created by Woodrow Eggers  
October 2015

Appendix 10 – 2015 Floated Egg Data for District Beaches

Nest #	Float Data	Float Date	Estimated # of Days Before Hatching	Estimated Hatch Date	Actual # of Days Before Hatching	Actual Hatch Date	Fate of Failed Nests	Date Failure	# of Days Before Failing	Floated By
<b>San Carpoforo</b>										
SC01	90°, 9 mm, 12 mm	04/21/15	15	05/07/15	14	05/06/15				R Orr
<b>Villa Creek Beach</b>										
VC02	90°, 2 mm, 11 mm	04/06/15	16	04/22/15			Unknown Fate	04/20/15	14	R Orr
VC03	11 mm, 13 mm	04/15/15	11	04/26/15	11	04/26/15				R Orr
VC05	10°, 10°, 20°	04/15/15	27	05/12/15	28	05/13/15				R Orr
VC08	8 mm upside down, 12 mm (white egg), 14 mm	04/28/15	6	05/04/15			Unknown Predator	04/29/15	1	R Orr
VC14	10°, 10°, 20°	05/12/15	27	06/08/15			Striped Skunk	05/14/15	2	R Orr
VC15	10 mm, 11 mm, 14 mm	05/12/15	11	05/23/15	5	05/17/15				R Orr
VC19	90°, 6 mm, 14 mm	06/04/15	14	06/18/15	19	06/23/15				R Orr
VC21	4 mm, 8 mm	06/08/15	13	06/21/15	16	06/24/15				R Orr
<b>Sandspit</b>										
<b>North</b>										
NSS015*	13 mm, 45°/19 mm, cracked & peeping	04/22/15	2	04/24/15	1	04/23/15				J Iwanicha
NSS022	90°, 90°	04/22/15	16	05/14/15			Coyote	04/23/15	1	R Orr
NSS028*	60°, 16 mm, cracked	04/22/15	3	04/25/15			Unknown Fate	05/11/15	19	J Iwanicha
NSS033	3E cracked & tapping	05/13/15	1	05/14/15	2	05/15/15				R Orr
NSS035*	9 mm, 10 mm, 11 mm	05/13/15	10	05/23/15	11	05/24/15				A Clark
NSS038*	7 mm, 7 mm, 8 mm	05/13/15	14	05/27/15	12	05/25/15				A Clark
NSS042*	13 mm, 2E cracked	05/13/15	6	05/19/15	4	05/17/15				A Clark
NSS043*	8 mm, 9 mm, 10 mm	05/13/15	11	05/24/15	13	05/26/15				A Clark
NSS045*	13 mm, 2E cracked	05/13/15	6	05/19/15	4	05/17/15				A Clark
NSS046*	9 mm, 10 mm, 14 mm	05/13/15	10	05/23/15	12	05/25/15				A Clark
NSS048*	90°, 6 mm, 8 mm	05/13/15	15	05/28/15			Coyote	05/19/15	6	A Clark
NSS057*	60°, 70°, 80°	05/13/15	19	06/01/15			Coyote	05/29/15	16	A Clark
NSS059*	10°, 10°, 20°	05/13/15	27	06/09/15			Coyote	05/29/15	16	A Clark
NSS065	70°, 70°, 80°	05/28/15	20	06/17/15	18	06/15/15				R Orr
NSS068	45°, 70°, 80°	05/28/15	21	06/18/15			Coyote	06/08/15	11	R Orr
NSS087	60°, 70°, 12 mm	06/01/15	19	06/20/15	19	06/20/15				R Orr
NSS094	12 mm, tapping	06/26/15	6	07/02/15	3	06/29/15				J Ebner
NSS099	20°, 45°, 45°	06/10/15	25	07/05/15	23	07/03/15				J Ebner
NSS101	20°, 20°, 45°	06/10/15	26	07/06/15			Coyote	06/11/15	1	J Ebner
NSS105	45°, 45°, 60°	06/15/15	23	07/08/15	24	07/09/15				J Ebner
NSS112	45°, 45°, 60°	06/26/15	17	07/13/15			Coyote	07/02/15	6	J Ebner

Appendix 10 – 2015 Floated Egg Data for District Beaches

Nest #	Float Data	Float Date	Estimated # of Days Before Hatching	Estimated Hatch Date	Actual # of Days Before Hatching	Actual Hatch Date	Fate of Failed Nests	Date Failure	# of Days Before Failing	Floated By
NSS114	80°, 90°, 11 mm	06/26/15	16	07/12/15			Unknown Fate	07/13/15	17	J Ebner
NSS130	85°, 85°, 90°	07/20/15	17	08/06/15	17	08/06/15				J Ebner
NSS131	70°, 85°, 85°	07/20/15	18	08/07/15	18	08/07/15				J Ebner
NSS133	70°, 70°	07/27/15	20	08/16/15	21	08/17/15				R Orr
NSS135	90°, 90°, 90°	07/24/15	16	08/09/15	18	08/11/15				J Ebner
NSS136	60°, 80°, 80°	08/03/15	18	08/21/15	18	08/21/15				R Orr
NSS137	3E cracked w/1 tapping	08/07/15	3	08/10/15	3	08/10/15				R Orr
<b>South</b>										
SSS009*	60°/15 mm, 45°/16 mm, 40°/19 mm	04/22/15	2	04/24/15	2	04/24/15				J Iwanicha
SSS026	10 mm, 11 mm, 11 mm	04/23/15	11	05/04/15	6	04/29/15				R Orr
SSS027*	7 mm, 11 mm, 12 mm	04/22/15	5	04/27/15	11	05/03/15				J Iwanicha
SSS030*	10 mm, 15 mm, 16 mm	04/22/15	7	04/29/15	12	05/04/15				J Iwanicha
SSS035*	90°, 90°, 11 mm	04/22/15	15	05/07/15	15	05/07/15				J Iwanicha
SSS037*	90°, 4 mm, 7 mm	04/22/15	14	05/06/15	18	05/10/15				J Iwanicha
SSS042	12 mm, 14 mm, 14 mm	05/15/15	5	05/20/15			Coyote	05/18/15	3	R Orr
SSS048*	90°, 5 mm, 8 mm	05/13/15	15	05/28/15	14	05/27/15				A Clark
SSS049	90°, 11 mm, 12 mm	05/15/15	9	05/24/15			Coyote	05/18/15	3	R Orr
SSS054	11 mm, 11 mm, 14 mm	05/15/15	8	05/23/15	15	05/30/15				R Orr
SSS055	8 mm, 9 mm, 10 mm	05/15/15	12	05/27/15			Coyote	05/22/15	7	R Orr
SSS058*	6 mm, 9 mm, 9 mm	05/13/15	14	05/27/15			Coyote	05/19/15	6	A Clark
SSS060	90°, 10 mm	05/29/15	12	06/10/15			Abandoned	06/14/15	16	R Orr
SSS063*	30°, 30°, 40°	05/13/15	26	06/08/15			Coyote	05/19/15	6	A Clark
SSS066	7 mm, 11 mm, 13 mm	05/15/15	13	05/28/15	13	05/28/15				R Orr
SSS068	9 mm, 10 mm, 11 mm	05/29/15	14	06/12/15	14	06/12/15				R Orr
SSS070	13 mm, 14 mm, 15 mm	05/29/15	7	06/05/15	6	06/04/15				R Orr
SSS071	11 mm, 12 mm, 14 mm	05/29/15	13	06/11/15	11	06/09/15				R Orr
SSS073	11 mm, 13 mm, 15 mm	06/01/15	13	06/14/15	13	06/14/15				R Orr
SSS079	90°, 90°, 10 mm	05/29/15	16	06/14/15	14	06/12/15				R Orr
SSS084	45°, 60°, 80°	05/29/15	21	06/19/15	19	06/17/15				R Orr
SSS097	12 mm, 13 mm, 15 mm	06/29/15	7	07/06/15	5	07/04/15				J Ebner
SSS103	60°, 70°, 70°	06/15/15	21	07/06/15	23	07/08/15				J Ebner
SSS111	90°, 7 mm, 8 mm	06/26/15	15	07/11/15	13	07/09/15				J Ebner
SSS112	80°, 85°, 90°	06/26/15	18	07/14/15	20	07/16/15				J Ebner
SSS115	90°, 5 mm, 8 mm	06/26/15	15	07/11/15	14	07/10/15				J Ebner
SSS118	11 mm, 12 mm, 12 mm	06/26/15	11	07/07/15	9	07/05/15				J Ebner

Appendix 10 – 2015 Floated Egg Data for District Beaches

Nest #	Float Data	Float Date	Estimated # of Days Before Hatching	Estimated Hatch Date	Actual # of Days Before Hatching	Actual Hatch Date	Fate of Failed Nests	Date Failure	# of Days Before Failing	Floated By
SSS119	30°, 30°, 45°	06/26/15	22	07/18/15			Coyote	07/13/15	17	J Ebner
SSS121	20°, 30°, 30°	06/26/15	25	07/21/15	25	07/21/15				J Ebner
SSS122	10 mm, 12 mm, 13 mm	07/13/15	11	07/24/15	11	07/24/15				J Ebner
SSS127	80°, 85°, 90°	07/13/15	17	07/30/15	21	08/03/15				J Ebner
SSS129	90°, 90°, 5 mm	07/13/15	16	07/29/15	14	07/27/15				J Ebner
SSS130	20°, 30°, 70°	07/13/15	24	08/06/15			Coyote	07/17/15	4	J Ebner
SSS131	10°, 10°, 20°	07/13/15	27	08/09/15	27	08/09/15				J Ebner

Value with degree symbol (°) indicates angle at which egg floats, given Horizontal = 0° and Vertical = 90°

Value with millimeter symbol (mm) indicates diameter of egg visible above the surface of water

SC = San Carpoforo, VC = Villa Creek Beach, NSS = North Sandspit, SSS = South Sandspit

\*Nests floated under supervision of Regena Orr

Appendix 11 - Summary of WSP Nest Depredations on District Beaches 2001-2015

	2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004		2003		2002		2001	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
<b>Hearst San Simeon State Park*</b>																														
Total # of nests	1		0		0		3		0		0		2		2		6		11		5		0		1		1		N/A	
Total Depredated	0		0		0		0		0		0		1	50%	0		0		0		0		0		1	100%	0			
Coyote	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
American Crow	0		0		0		0		0		0		0		0		0		0		0		0		1	100%	0			
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Gull Species	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unk. Avian	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unk. Predator	0		0		0		0		0		0		1	50%	0		0		0		0		0		0		0			
Other	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Fail Unk.	0		0		0		0		0		0		0		0		0		4	36%	0		0		0		0			
Unk. Fate	0		0		0		0		0		0		0		0		0		0		0		0		0		0			
<b>Villa Creek Beach</b>																														
Total # of nests	24		23		20		31		21		26		38		16		30		40		37		66		35		44		39	
Total Depredated	10	43%	10	43%	13	68%	24	77%	10	50%	13	50%	25	69%	3	21%	16	57%	21	54%	14	38%	29	44%	13	37%	8	18%	6	15%
Coyote	0		1	4%	1	5%	0		0		3	12%	0		0		3	11%	0		0		1	2%	6	17%	0		1	3%
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Unk. Canid	0		0		0		0		0		0		0		0		0		0		0		0		0		2	5%	0	
Striped Skunk	2	9%	2	9%	4	21%	1	3%	0		0		2	6%	1	7%	0		0		6	16%	7	11%	0		1	2%	0	
American Crow	0		0		0		0		0		0		0		0		0		0		0		1	2%	0		0		0	
Raccoon	1	4%	0		0		0		0		1	4%	2	6%	0		0		0		0		0		0		2	5%	0	
Gull Species	2	9%	1	4%	0		6	19%	0		2	8%	4	11%	2	14%	3	11%	7	18%	2	5%	2	3%	0		2	5%	2	5%
Ground Squirrel	0		0		0		2	6%	0		0		0		0		2	7%	0		0		0		0		0		0	
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		0		2	6%	0		3	8%
Unk. Avian	0		0		0		1	3%	0		0		0		0		0		0		0		0		0		0		0	
Unk. Predator	5	22%	6	26%	8	42%	14	45%	10	50%	7	27%	17	47%	0		8	29%	14	36%	0		18	27%	4	11%	1	2%	0	
Other	0		0		0		0		0		0		0		0		0		0		6	16%	0		1	3%	0		0	
Fail Unk.	0		0		0		0		0		0		0		0		0		0		0		5	8%	4	11%	3	7%	1	3%
Unk. Fate	1	4%	0		1	5%	0		1	5%	0		2	6%	2	14%	2	7%	1	3%	0		0		0		0		0	

Appendix 11 - Summary of WSP Nest Depredations on District Beaches 2001-2015

	2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004		2003		2002		2001			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
<b>Morro Strand</b>																																
Total # of nests	13		17		12		12		25		24		26		33		19		34		27		38		45		37		14			
Total Depredated	5	38%	3	19%	3	25%	6	50%	9	36%	6	26%	6	23%	8	26%	5	26%	2	6%	3	11%	13	34%	33	73%	8	22%	4	29%		
Coyote	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Red Fox	2	15%	0		2	17%	0		0		0		0		2	6%	0		1	3%	2	7%	0		3	7%	1	3%	3	21%		
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
American Crow	1	8%	0		1	8%	5	42%	4	16%	3	13%	5	19%	3	10%	2	11%	1	3%	0		11	29%	30	67%	6	16%	0			
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	7%		
Gull Species	0		0		0		0		0		0		0		0		0		0		0		1	3%	0		1	3%	0			
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unk. Avian	1	8%	0		0		0		0		0		0		1	3%	0		0		0		0		0		0		0			
Unk. Predator	1	8%	3	19%	0		1	8%	5	20%	3	13%	1	4%	2	6%	3	16%	0		1	4%	1	3%	0		0		0			
Other	0		0		0		0		0		0		0		0		0		0		0		1	3%	0		0		0			
Fail Unk.	0		1	6%	0		0		0		0		1	4%	1	3%	0		0		0		2	5%	2	4%	9	24%	2	14%		
Unk. Fate	0		1	6%	0		0		0		1	4%	0		2	6%	0		1	3%	0		0		0		0		0			
<b>Sandspit</b>																																
Total # of nests	272		201		157		174		213		179		144		96		109		141		225		272		146		109		109			
Total Depredated	108	41%	24	12%	30	19%	74	44%	51	24%	35	20%	23	16%	20	21%	59	54%	46	34%	69	32%	48	18%	9	7%	29	39%	50	47%		
Coyote	106	40%	17	9%	6	4%	16	9%	10	5%	27	15%	22	15%	17	18%	9	8%	33	24%	28	13%	13	5%	0		0		0			
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	1%		
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	1%		
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		30	11%	7	5%	27	36%	43	40%		
American Crow	0		1	1%	1	1%	0		15	7%	0		1	1%	0		0		0		5	2%	0		0		0		0			
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Gull Species	0		0		0		11	7%	0		0		0		0		0		0		10	5%	0		0		0		0			
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		1	0%	0		1	1%	2	2%		
Unk. Avian	2	1%	3	2%	22	14%	24	14%	5	2%	2	1%	0		0		45	41%	6	4%	11	5%	0		1	1%	0		0			
Unk. Predator	0		3	2%	1	1%	23	14%	20	10%	6	3%	0		3	3%	5	5%	7	5%	15	7%	2	1%	1	1%	0		3	3%		
Other	0		0		0		0		1	0%	0		0		0		0		0		0		1	0%	0		1	1%	0			
Fail Unk.	2	1%	5	3%	0		0		3	1%	4	2%	3	2%	1	1%	0		6	4%	7	3%	16	6%	0		0		0			
Unk. Fate	6	2%	6	3%	3	2%	5	3%	3	1%	2	1%	2	1%	1	1%	0		5	4%	7	3%	0		12	9%	34	45%	2	2%		
<b>Total # of Nests- ALL BEACHES</b>	<b>310</b>		<b>241</b>		<b>189</b>		<b>220</b>		<b>259</b>		<b>229</b>		<b>210</b>		<b>147</b>		<b>164</b>		<b>226</b>		<b>294</b>		<b>376</b>		<b>227</b>		<b>191</b>		<b>162</b>			
<b># Nests Depredated- ALL BEACHES</b>	<b>123</b>	<b>41%</b>	<b>37</b>	<b>16%</b>	<b>46</b>	<b>25%</b>	<b>104</b>	<b>48%</b>	<b>70</b>	<b>27%</b>	<b>54</b>	<b>24%</b>	<b>55</b>	<b>27%</b>	<b>31</b>	<b>22%</b>	<b>80</b>	<b>49%</b>	<b>69</b>	<b>32%</b>	<b>86</b>	<b>30%</b>	<b>90</b>	<b>24%</b>	<b>56</b>	<b>26%</b>	<b>45</b>	<b>29%</b>	<b>60</b>	<b>38%</b>		

\*From 2002-2004 Data for Hearst San Simeon State Park only includes San Simeon Creek Beach

Appendix 12 - Exclosed vs. Unexclosed Nest Fate on Morro Strand 2003-2015

	2015	2014 <sup>(2)</sup>	2013	2012	2011	2010	2009	2008	2007 <sup>(3)</sup>	2006 <sup>(4)</sup>	2005 <sup>(5)</sup>	2004 <sup>(6)</sup>	2003													
<b>Exclosure Type: Large; &gt; 10 ft. diam.</b>																										
# of nests exclosed, % of total nests	<b>0</b>	<b>0%</b>	7	41%	7	58%	5	42%	14	56%	14	58%	16	62%	11	33%	7	37%	31	91%	25	93%	22	58%	0	0%
Nests hatched <sup>(1)</sup>	<b>0</b>		1		3		2		10		8		14		6		2		7		19		8			
Nests depredated	<b>0</b>		3		0		0		0		1		0		0		0		1		1		3			
Failed, adult mortality	<b>0</b>		1		0		0		0		0		0		0		0		3		0		0			
Failed, abandoned	<b>0</b>		3		2		2		2		2		2		3		5		18		3		6			
Failed, other causes	<b>0</b>		2		2		1		2		2		0		2		0		1		2		5			
Unknown fate	<b>0</b>		0		0		0		0		1		0		0		0		1		0		0			
Number adults depredated in/near nest	<b>0</b>		1		0		0		0		0		0		0		0		3		1		0			
Number adults entangled in net top	<b>0</b>		0		0		0		0		0		0		0		0		0		1		2			

<b>Exclosure Type: None.</b>																										
# of nests unexclosed, % of total nests:	<b>13</b>	<b>100%</b>	10	59%	5	42%	7	58%	11	44%	10	42%	10	38%	22	67%	12	63%	3	9%	2	7%	16	42%	45	100%
Nests hatched <sup>(1)</sup>	<b>5</b>		4		1		0		0		0		0		0		5		2		0		0		3	
Nests depredated	<b>5</b>		3		3		6		9		5		6		8		5		1		2		11		33	
Failed, abandoned	<b>1</b>		1		1		0		0		3		1		3		1		0		0		0		1	
Failed, other causes	<b>2</b>		1		0		1		2		2		3		9		1		0		0		5		8	
Unknown fate	<b>0</b>		1		0		0		0		0		0		2		0		0		0		0		0	

**NOTES**

1. Nests hatching at least one chick.
2. Nest depredation with exclosures occurred after the nests had failed due to either wind or abandonment. Adult found dead inside exclosure 30 days after being abandoned; suspect predation but the cause of death could not be determined to due to the high level of decomposition and dehydration of the carcass.
3. Red fox circling exclosures. Began adding "wings" and "spikes" to some exclosures.
4. Red-tailed Hawk perching on exclosures & changed net top to 1"x1".
5. Great-horned Owl found inside exclosure.
6. Three crows found inside exclosures & red fox tracks often seen around exclosures.

