

ANNUAL REPORT
FOR THE WESTERN SNOWY PLOVER
AT SAN LUIS OBISPO COAST DISTRICT IN 2016

Submitted by

California State Parks
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Recovery Permit #TE-082237-6.4

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INTRODUCTION

This report summarizes the 2016 breeding and non-breeding seasons 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). 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 2016 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) and the California Department of Fish and Wildlife (CDFW).

USFWS Recovery Permit Number TE-082237-6.4 was issued to CSP with the 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, Nicola Petch-Baker, 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 the 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 2016 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. Beginning this year, eBird, a real-time online birding checklist program developed by Cornell Lab of Ornithology and National Audubon Society, was checked weekly for locations of WSP sightings to potentially find new WSP beaches within the District. No new WSP beaches were discovered in 2016.

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 an approximately 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 vegetated 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. The eastern edge of the beach is primarily bordered by a large flat sandy area with sparse native vegetation. To the south of the beach 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 one-half 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 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 located within the town of Cambria and falls under joint jurisdiction of San Luis Obispo County Parks and CSP. The beach is approximately a half mile in length. It is bounded by coastal bluffs to the north and south and by 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 is occasionally used for nesting. 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 2016.

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. An eBird entry reported one WSP at this location on April 17th but was not seen again. 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. The northern unit is located within the town of Cayucos, and the southern unit is located within the City of Morro Bay (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 is residential housing. Old Creek runs through the middle of the beach.

The southern unit of Morro Strand 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 2016 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 section 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 encompasses 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 or North Spoils. The High School section extends from the Boardwalk Corridor to the CSP boundary west of Highway 41. Morro Strand consists primarily of flat sandy beach backed by low foredunes vegetated with a mixture of native coastal dune plants.

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 duration of monitoring on District beaches lasted from March 8th to September 22nd. The beaches within HSSSP were monitored approximately once per week from the beginning of March until the end of July depending on the presence of adult WSP and historic nesting activity.

Beginning March 8th, 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 fifth year monitoring was conducted on the weekends. Monitoring occurred 31 times on the weekends between April 9th and September 17th. Weekend monitoring was conducted outside the symbolic fencing primarily to have a greater CSP presence on the beaches during the busier summer months. From September 6th until the end of the

2016 breeding season, 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 Markers 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. All 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 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. Population censuses were conducted to determine numbers of WSP on District beaches throughout the year (Appendix 3). 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. In the event that an unhealthy WSP was observed while monitoring, the “Procedures for handling injured, sick, or dead WSP (including chicks and eggs)” was followed.

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 a height range were specified. Next, the location of the nest on the beach – lower, middle, upper, foredunes, 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.

Floating Nests

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 if 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. These measurements were compared to a chart of float measurements corresponding to stages of embryo growth developed for 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 2016 breeding season, the District followed USFWS Recovery Unit Five 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 days 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 completely 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 end of 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. In 2016, funding was provided to hire a crew of California Conservation Corps (CCC) members to assist with the installation of symbolic fencing along the main District beaches. The only HSSSP beach that received symbolic fencing was San Simeon Creek Beach, which was fenced on April 15th.

Fencing consisted of metal eye-posts strung with polypropylene 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 viewshed. The corridors at Morro Strand and the Sandspit had yellow signs which allowed these access points to 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.

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.

Symbolic fences were removed the last week of September on all District beaches.

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.

In 2016, a CCC crew repaired a dilapidated permanent fence around the parking lot for the Sandspit. The repair closed off volunteer trails leading into WSP nesting habitat. The CCC crew also installed a cable fence along the beach access corridors and back area at Morro Strand to help protect WSP habitat and native plants.

Restoration efforts to eradicate non-native ice plant (*Carpobrotus edulis*) and European beach grass (*Ammophila arenaria*) in the foredunes were completed this year at Morro Strand – the end of a 15 year project. The project was funded by CDFW Office of Spill Prevention and Response. This project has been successful with these two plants being reduced to maintenance levels and consequently providing more nesting habitat for WSP. In addition to the CDFW funded project, volunteers spent 340 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.

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, were re-treated at a maintenance level. 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. Herbicide treatment of the foredunes occurred from October 2015 through February 2016 to avoid the WSP breeding season, while backdunes treatments occurred year-round. 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. Predator removal activity took place between February 1st and August 5th and was conducted by United States Department of Agriculture (USDA) Wildlife Services. In total, USDA Wildlife Services spent 1,077 hours on predator removal activities within the District.

Methods for removing predators included calling, spot-lighting, and two types of trapping: cage and padded leg-hold. The calling method utilized a handheld or electronic device which produced a sound to lure the predator within range of a firearm. Calling effort is measured in hours spent projecting the call and tracking the target. Spotlighting was used to search for animals in the dark before pursuing with a firearm and is measured by hours spent beaming the light and tailing the target. Cage traps are baited metal enclosures which are sized differently depending on the animal targeted. The leg-trapping method consisted of a padded jaw trap which ensnared the leg of an animal. Effort for trapping is measured in “trap night” or “trap day,” which is when a trap is set in the early evening and checked in the early morning, or set in the morning and checked in the evening, respectively. All target species discovered in traps were immediately euthanized with an injection of sodium pentobarbital.

Traditionally, ten-foot by ten-foot single nest enclosures were used in an attempt to enhance hatch rate success on Morro Strand. Protocol dictates that all enclosures be monitored regularly for effectiveness. By mid-season 2014, it was clear that enclosures were ineffective in promoting hatching success, so their use was discontinued for the remainder of that season. Enclosures have not been used on any District beach since that time.

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 relevant 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, camping, 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 USFWS and CDFW.

On July 4th, WSP monitors assisted CSP Rangers in enforcement of regulations, such as trespassing, illegal fireworks, kite flying, and dogs on beach. The results of this effort, as well as, any other incidents in which Rangers were notified, can be found in the Human Activities section.

Information/Education

Public education is an important aspect of the WSP program and allows CSP to raise awareness of the species and how we can protect it. During the 2016 season, education and outreach activities were undertaken to improve visitor awareness and maintain an educational presence on District beaches.

An interactive Junior Ranger program was developed and undertaken at Morro Strand Campground, Morro Bay State Park Campground, and MDO. The program was aimed at children between the ages of 7 to 12 and ran for one hour most Saturday and Sunday mornings from June 11th through August 21st. Through educational activities, demonstrations, pictures, and taxidermies, the program educated both children and parents on the local ecology and bird life. The main focus of the activities was based on the WSP, their habitat, breeding behavior, and current threats. The program successfully hosted 132 visitors, including 88 children and 44 adults.

From June 18th through August 14th, an educational WSP exhibit was set up at Morro Rock on eight Saturdays or Sundays between the hours of 12 pm and 3 pm, weather permitting. The exhibit consisted of an interpretive display panel depicting the WSP range, breeding cycle and threats, a life-sized nest display, and a variety of brochures and posters for visitors to take home. The exhibit was active a total of 18.5 hours and hosted 267 visitors including 181 adults and 86 children.

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 created 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 booth, which was stationed at Morro Rock every weekend during the summer, was provided with a WSP information binder. Additionally, four WSP interpretive panels were in place at the main access corridors at Villa Creek Beach, Morro Strand, and MDO.

This was the eleventh 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 WSP protection.

On June 25th, 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 informative WSP

brochures and posters. There were approximately 90 visitors to the booth, including approximately 50 adults and 40 children.

On July 4th, four CSP employees and two volunteers were present on Morro Strand from 8 am to 9 pm providing information to beach users of CSP regulations and answering questions. That evening, the nearby town of Cayucos presented a fireworks show which was viewable from Morro Strand. CSP presence on Morro Strand was aimed at reducing incidents of illegal fireworks and foot traffic inside the fenced area. The Sandspit was monitored by two CSP employees from 2:30 pm to 8:30 pm. Villa Creek Beach was monitored by two CSP employees periodically between the hours of 11 am and 5 pm.

Other WSP related outreach activities included 11 talks to local organizations, three articles in local publications, and two WSP programs conducted during the Morro Bay Winter Bird Festival. Three talks were also given by CSP resources staff to other CSP employees with the goal of educating them on the WSP program. In addition to these activities, WSP were also among the topics discussed by Morro Bay Museum of Natural History docents on approximately 300 walks/discussions, as well as information desk shifts and Nature Center programs throughout the year.

Outreach also occurs through regular contact between WSP monitors and the public while out on District beaches. The general public often approach monitors with questions about WSP activity, as well as questions regarding other topics. See the Human Activities/Recreation section for more details.

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

Volunteers are an integral part of the WSP program by contributing their time across a wide array of activities. In 2016, 11 volunteers contributed 226 hours of service, of which the largest portion was attributed to WSP monitoring (149.5 hours). Other activities included outreach, attending monthly WSP meetings, training, conducting recreational surveys, and fencing (Table 1).

Table 1. Volunteer Activities and Hours in 2016.

Volunteer Activities	Hours
WSP Monitoring	149.5
Outreach	29
WSP Monthly Meetings	20.5
Recreational Surveying	13
Volunteer training	8
Fencing	6
Total	226

In addition to WSP program volunteers, ECOSLO coordinated four volunteer tsunami debris cleanups on the Sandspit and Coastal Cleanup throughout San Luis Obispo County. During each of the tsunami debris cleanups, volunteer numbers ranged from 10 to 50. Hundreds of pounds of debris were removed from the Sandspit. On September 17th, ECOSLO reported 132 volunteers cleaned up approximately 1,000 pounds of trash and recyclables from San Simeon Creek Beach, Morro Strand, and the Sandspit. Prior to each cleanup, monitors educated the volunteers about the WSP.

RESULTS

Wintering WSP

To monitor wintering populations, censuses were conducted on District beaches from October 2015 through February 2016 (Appendix 3). One of the censuses conducted in January also contributed to the range-wide winter window survey. The beaches of the District continued to provide high quality wintering habitat for the WSP. By adding together the average number of WSPs at each beach throughout the winter, it was estimated that the population across all District beaches was 420 individuals.

Hearst San Simeon State Park

San Carpoforo Creek Beach

Nine population censuses were conducted during the non-breeding (aka “winter”) season at San Carpoforo Creek Beach. On eight of the visits no WSP were seen, and on one visit five WSP were recorded.

Point Sierra Nevada

Six population censuses were conducted during the non-breeding season at Point Sierra Nevada. On five of the visits zero WSP were seen, and on one visit one WSP was recorded.

Arroyo de la Cruz

Three population censuses were conducted during the winter season at Arroyo de la Cruz. No WSP were seen on any of the visits.

Sidney's Lagoon

Four population censuses were conducted during the non-breeding season at Sidney's Lagoon. No WSP were seen on any of the visits.

Piedras Blancas

Seven population censuses were conducted during the winter season at Piedras Blancas. No WSP were seen on any of the visits.

Arroyo Laguna

Ten population censuses were conducted during the non-breeding season at Arroyo Laguna. An average of 96 WSP was seen at Arroyo Laguna during this period, and numbers of WSP ranged from 0 to 170.

San Simeon Creek Beach

Twelve population censuses were conducted during the winter season at San Simeon Creek Beach. An average of 70 WSP was seen on San Simeon Creek Beach during this period. According to the censuses, numbers of WSP ranged from 12 to 195.

Santa Rosa Creek Beach

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

Villa Creek Beach

Fifteen population censuses were conducted during the non-breeding season at Villa Creek Beach. An average of 34 WSP was seen on Villa Creek Beach during this period. According to the censuses, numbers of WSP ranged from 0 to 102.

Morro Strand

Northern Unit – Old Creek:

Nine population censuses were conducted during the winter season at Old Creek. There were no WSP seen during eight of the visits. However, during one visit one, WSP was recorded.

Southern Unit - Morro Strand

Fifteen population censuses were conducted during the winter season. An average of 92 WSP was seen on Morro Strand during this period. According to the censuses, numbers of WSP ranged from 3 to 212.

Sandspit

Eleven population censuses were conducted during the non-breeding season. An average of 128 WSP was seen during this period on the CSP portion of the Sandspit. Numbers of WSP ranged from 42 to 255 on the days the censuses were conducted.

WSP Breeding Population Window Survey

From March through September 2016, the WSP population was monitored by conducting monthly censuses on District beaches (Appendix 3). One of the censuses, conducted in May, was part of the annual range-wide breeding window survey for the United States Pacific Coast. These surveys have been conducted since 2002, and although they do not represent a total count of WSPs, they provide an index of population size each season and over time (Table 2).

Table 2. District WSP Population During Breeding Window Survey 2002-2016.

YEAR	HSSSP Beaches	Villa Creek Beach	Morro Strand	Sandspit	District Total
2002	3	38	19	56	116
2003	0	30	23	114	167
2004	3	31	21	203	258
2005	12	33	21	181	247
2006	15	23	24	100	162
2007	4	17	17	84	122
2008	1	12	17	59	89
2009	NS*	16	18	97	131
2010	1	14	16	89	120
2011	0	17	9	114	140
2012	2	13	2	113	130
2013	9	11	7	101	128
2014	10	16	12	105	132
2015	1	16	5	151	173
2016	16	8	7	154	185

*No survey

The results from the surveys showed that the WSP population has changed over time across District beaches (Figure 1). The population on HSSSP beaches has been consistently low with fewer than ten WSP recorded since monitoring began in 2002. The exception was in 2005 and 2006 with 12 and 15 WSP recorded respectively. This season saw a large increase in population size with 16 WSP recorded.

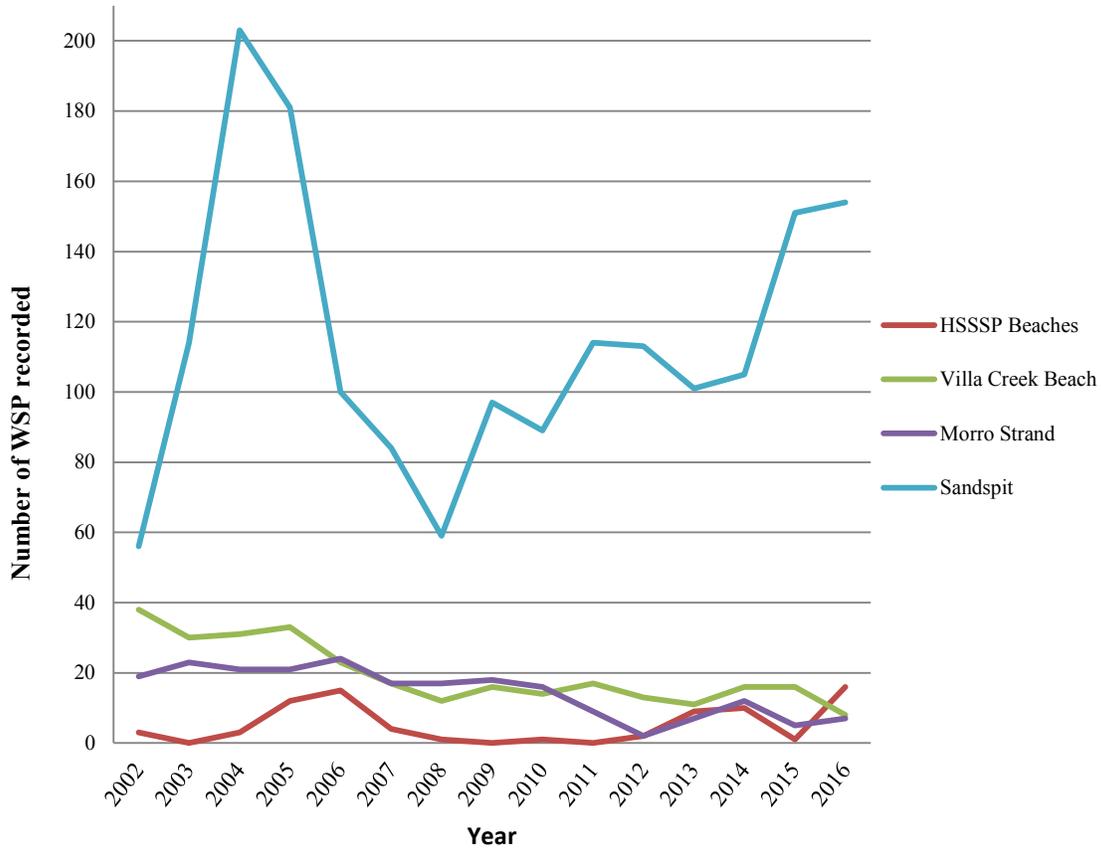
Villa Creek Beach has shown a decline in the WSP population over time. In 2002, the largest population was recorded at 38 WSP. From this time, the population declined until 2008 when the population was recorded at 12 WSP. From 2009 to 2015, the population fluctuated, ranging between 11 and 17 birds. In 2016, the population was recorded at its lowest with eight WSP.

Morro Strand has also seen a decrease in WSP population since 2002. Between 2002 and 2010, the population size ranged between 16 and 24 WSP. In 2011, the population dropped to nine WSP and continued down to two WSP in 2012. The following years' numbers showed a slight increase ranging between 7 and 12 WSP.

The Sandspit consistently has a larger population of WSPs than other beaches in the District. From 2004 to 2008, the population reduced significantly from 203 WSP, being the highest recorded population, to 59 WSP in 2008. Since this decrease, the population has been increasing over time with a large increase in 2015 to 151 WSP, which continued this season with 154 WSP.

Although some beaches have shown a decrease in WSP populations, the overall trend across the District shows that the population is increasing. Between the years of 2004 to 2008, population numbers decreased significantly from 258 WSP to 89 WSP. Since that time, the population has been slowly increasing with the highest number of WSP, 185, recorded this season.

Figure 1. District WSP Breeding Window Survey Results from 2002 to 2016.



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 18th, the range-wide breeding window survey determined the minimum number of WSP adults seen across all HSSSP beaches was 16 individuals. WSP were observed at San Carpoforo Creek Beach, Arroyo Laguna, and San Simeon 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 17th, the range-wide breeding window survey determined the minimum number of WSP adults was four males and four females. One additional survey was conducted at Villa Creek Beach in May. The minimum number of breeding adults was recorded as six during this survey.

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 17th, the range-wide breeding window survey determined the minimum number of adults was five males and two females. Two additional surveys were conducted on Morro Strand during the month of May. The minimum number of breeding adults recorded during each survey was ten.

Sandspit

According to the USFWS Recovery Plan, the breeding bird management potential on the CSP portion of the Sandspit is 82 adults. On May 17th, the range-wide breeding window survey recorded 154 adults (66 males, 81 females, and 7 unidentified adults). One additional survey was conducted on the Sandspit in May. The minimum number of breeding adults recorded was 131.

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. This was the first year that banded WSP sightings from eBird were included in the District's banded bird database. From October 2015 through September 2016, banded WSP were observed on 1,587 occasions across District beaches. From these 1,587 sightings, 162 unique band combinations were observed. Ninety-four unique combinations were sighted over the winter season (October 2015 through February 2016), and 116 were seen during the breeding season (March through September 2016). Forty-eight of the 162 banded WSP were seen during both the winter and breeding seasons. The banding locations of WSP observed on District beaches during the 2016 season are located in Table 3.

Table 3. Banding Locations of WSP Observed on District Beaches October 2015 through September 2016.

Banding Location	# of WSP
ODSVRA	55
VAFB	34
Fort Ord Dunes State Park (SP)	14
Pajaro Spit	9
Marina State Beach (SB)	8
Oregon	8
Salinas National Wildlife Refuge (NWR)	8
Salinas SB	6
Zmudowski SB	4
Monterey Bay	2
Moss Landing Salt Ponds	2
Moss Landing SB	2
San Francisco Bay NWR	2
Centerville Beach	1
Eden Landing, San Francisco Bay	1
Monterey Bay Aquarium	1
Monterey SB	1
Pajaro Dunes	1
Sea World, San Diego	1
Sunset SB	1
Zmudowski SB or Fort Ord Dunes SP	1

Twenty-five of the banded WSP seen between March 1st and September 30th 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 accounted for 14% of the District's adult breeding population.

Eighty-six banded fledges were recorded on District beaches. The banding locations of WSP fledges observed on District beaches between October 2015 and September 2016 are located in Table 4.

Table 4. Banding Locations of WSP Fledges Observed on District Beaches October 2015 through September 2016.

Banding Location	# of WSP Fledges
ODSVRA	28
VAFB	21
Fort Ord Dunes SP	11
Oregon	5
Marina SB	4
Salinas NWR	4
Pajaro Spit	3
Moss Landing SB	2
Salinas SB	2
Zmudowski SB	2
Eden Landing, San Francisco Bay	1
Monterey Bay	1
San Francisco Bay NWR	1
Sunset SB	1

Many banded WSP were observed frequently on District beaches between October 2015 and September 2016. The most frequently observed were OW:WR (75 sightings, the most observations of any banded WSP), GG:OG (57 sightings), PG:BW (55 sightings), GG:PB (54 sightings), WA:GA (54 sightings), and RR:WW (53 sightings). Four of these WSPs fledged from ODSVRA; the other two fledged from Fort Ord Dunes SP and Pajaro Spit.

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

Four WSP with unique band combinations, all juveniles, were sighted at San Carpoforo Creek Beach. Three were seen during the winter season and one was seen during the breeding season. The WSP seen in the winter fledged from ODSVRA, VAFB, and Zmudowski SB. The WSP seen during the breeding season fledged from Salinas SB.

Arroyo Laguna

A total of 39 WSP with unique band combinations were observed at Arroyo Laguna. Twenty-one of these individuals were seen only during the winter season, six only during the breeding season, and 12 during both seasons.

The majority of banded WSP sighted at Arroyo Laguna were juveniles. Between October 2015 and September 2016, a total of 25 banded juveniles were sighted. Nine of the juveniles fledged from ODSVRA, seven from VAFB, three from Salinas NWR, two from

Oregon, and one each from Eden Landing (San Francisco Bay), Fort Ord Dunes SP, Pajaro Spit, and San Francisco Bay NWR.

The most frequently observed banded WSP seen at Arroyo Laguna during the 2016 season were NO:BY (12 sightings), GG:AG (11 sightings), and W:OB (11 sightings). All three are adult birds; two were banded at VAFB and one at ODSVRA.

San Simeon Creek Beach

A total of 39 unique band combinations were seen on San Simeon Creek Beach. Twenty-nine of these individuals were seen only during the winter season, two only during the breeding season, and eight during both seasons.

Twenty banded juveniles were sighted at San Simeon Creek Beach between October 2015 and September 2016. Eight fledged from ODSVRA, four from VAFB, two from Marina SB, two from Oregon, and one each from Eden Landing (San Francisco Bay), Fort Ord Dunes SP, Pajaro Spit, and Salinas NWR.

The most frequently observed banded WSP seen at San Simeon Creek Beach were NO:PB (12 sightings), AN:YY (11 sightings), and WR:AR (10 sightings). NO:PB is an adult WSP that was banded at VAFB. AN:YY and WR:AR were both first seen as juveniles during the winter season. They were banded at VAFB and Pajaro Spit, respectively.

Other Hearst San Simeon State Park Beaches

Arroyo de la Cruz, Piedras Blancas, Point Sierra Nevada, Sidney's Lagoon, and Santa Rosa Creek Beach were all monitored during the 2016 season but had no banded WSP present.

Villa Creek Beach

A total of 15 unique band combinations were observed on Villa Creek Beach. Four of these 15 banded WSP were seen only during the winter season, nine only during the breeding season, and two during both seasons.

The most frequently observed banded WSP this season on both Villa Creek Beach and all District beaches was OW:WR (75 sightings). OW:WR, a female who fledged from Fort Ord Dunes SP in 2015, was seen exclusively at Villa Creek Beach during the 2016 season. She was first seen as a juvenile during the winter season and later as an adult during the breeding season. She had one known nest at Villa Creek Beach that failed due to an unknown predator.

Between October 2015 and September 2016, a total of eight banded juveniles were seen at Villa Creek Beach. Three fledged from VAFB, and one each fledged from Fort Ord Dunes SP, Monterey Bay, ODSVRA, Salinas NWR, and Salinas SB.

Morro Strand

A total of 70 unique band combinations were observed at Morro Strand. Twenty-seven of these WSP were seen only during the winter months, 36 were seen only during the breeding season, and seven were seen during both seasons.

The most frequently observed banded WSP at Morro Strand during the 2016 season was V:W (28 sightings). V:W, an adult male, fledged from ODSVRA in 2008 as PV:PW and is among the oldest known birds in the District. He has also successfully nested at Villa Creek Beach and Morro Strand every year since 2009. During the 2016 breeding season, he nested successfully twice at Morro Strand, with two successful fledges from each nest. He was paired with a banded female (B:OR) for his second nest. Interestingly, he was observed with fledges from his first nest while his second nest was active. He was also responsible for two out of the three successfully hatching nests on Morro Strand.

B:OR (formerly NB:OR), a female who fledged from VAFB in 2013, was seen 24 times at Morro Strand during the 2016 season. As previously stated, she was paired with V:W and successfully hatched one nest at Morro Strand. She also may have been associated with a nest that failed due to abandonment.

NY:RY, a female who fledged from VAFB in 2014, was seen 21 times at Morro Strand this season. During the 2016 season, NY:RY had one nest at Morro Strand that failed due to American Crow (*Corvus brachyrhynchos*) depredation. In addition to this nest, she lost two nests to coyote (*Canis latrans*) depredation at the Sandspit. She also had one nest with an unknown fate on private property to the north of Morro Strand.

VV:OR, a male who fledged from ODSVRA in 2015, was observed at Morro Strand on 21 occasions this season. While paired with PV:RY, another 2015 fledge from ODSVRA, he had one successful nest with at least one fledged chick.

PV:RY was seen 18 times at Morro Strand during the 2016 season. Besides the successful nest while paired with VV:OR, she also lost a nest at Morro Strand due to American Crow depredation.

Between October 2015 and September 2016, a total of 41 banded juveniles were observed at Morro Strand. Twelve of these juveniles fledged from ODSVRA, eleven from VAFB, five from Fort Ord Dunes SP, three from Salinas NWR, two each from Marina SB, Moss Landing SB, and Oregon, and one each from Eden Landing (San Francisco Bay), Pajaro Spit, Salinas SB, and Sunset SB.

Sandspit

A total of 100 unique band combinations were observed on the Sandspit this year. Twenty-five were seen only during the winter months, 56 were seen only during the breeding season, and 19 were seen during both seasons.

The most frequently observed banded individual at the Sandspit this season was GG:OG (57 sightings). A 2014 fledge from ODSVRA, GG:OG was seen exclusively on the

Sandspit during the 2016 season. He successfully hatched two nests this season and possibly had one other nest that failed due to tidal wash.

PG:BW (56 sightings) was the second most frequently observed banded WSP on the Sandspit this season. PG:BW, a male, fledged from ODSVRA in 2014. He successfully hatched one nest on the Sandspit in 2016.

WA:GA (54 sightings) was the third most frequently observed banded WSP on the Sandspit this season. WA:GA is a male that fledged from Pajaro Spit in 2014. He successfully hatched one nest on the Sandspit this season and possibly lost two other nests due to coyote depredation.

Twelve other banded WSP, all of whom were among the most frequently observed birds on the Sandspit, successfully hatched nests on the Sandspit this year. These include GG:PB and S:RR (formerly NS:RR), both of whom fledged in 2012, respectively from ODSVRA and VAFB. Both WSP successfully hatched two nests on the Sandspit in 2016. BB:GB, a male who fledged from ODSVRA in 2015, successfully hatched one nest with two fledged chicks. PG:OB, a 2014 female from ODSVRA, successfully hatched one nest and was possibly successful with another nest. Other individuals who successfully nested include AY:AA (2014, male, Marina SB), GG:WB (2013, male, ODSVRA), NR:GG (2015, male, VAFB), OA:YA (2014, male, Pajaro Spit), P:Y/G (2012, male, VAFB), PG:BW (2014, male, ODSVRA), PV:PB (2015, female, ODSVRA), and RB:BG (2015, female, Fort Ord Dunes SP).

Nine banded WSP, who also nested successfully this season, had nests that failed on the Sandspit. BB:GB lost two nests due to coyote depredation. AY:AA, NR:GG, S:RR, and WY:GA also possibly lost nests to coyote depredation. GG:PB lost a nest due to abandonment. P:Y/G possibly lost one nest to an unknown cause. PV:PB possibly lost one nest due to abandonment and another nest to tidal wash. RB:BG possibly lost one nest to tidal wash and one nest to coyote depredation.

Three banded WSP had only failed nests on the Sandspit. NB:YR, a female who fledged in 2015 from VAFB, lost one nest due to high tide. NY:RY and RR:WW, a male from ODSVRA who fledged in 2010, both lost two nests to coyote depredation.

Thirty-nine banded juveniles were observed on the Sandspit between October 2015 and September 2016. Monitors observed juveniles from ODSVRA (15), VAFB (10), Fort Ord Dunes SP (9), Oregon (3), Marina SB (1), and Zmudowski 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 have taken place. Two banded adults, one unbanded adult with an

unknown sex, one unbanded WSP with an unknown sex and age, and one chick were reported as injured on District beaches during the 2016 season. No deceased WSP were observed. See Appendix 7 for a summary of the injured WSP on District beaches from October 2015 through September 2016.

Hearst San Simeon State Park

No injured or deceased WSP were observed in HSSSP during the 2016 season.

Villa Creek Beach

A female WSP, banded PV:GG, was found at ODSVRA on March 9th with a constriction wound on its right leg. The wound was caused by a tightly wrapped hair. PV:GG was rehabilitated at Pacific Wildlife Care in Morro Bay and released onto Villa Creek Beach on March 18th as PV:--. This WSP was seen later in 2016 on the Sandspit.

Morro Strand

Three injured WSP (two adults and one chick) were observed on Morro Strand during the 2016 season.

On January 7th, a male WSP, banded YR:OW in 2013 as a chick at Marina SB, was noted as foraging exclusively on its right leg. He appeared to be foraging successfully, so no action was taken to capture him. YR:OW was not observed again on any District beach.

From July 2nd to July 9th, a WSP chick was seen with a black mark along its right side. The mark was potentially caused by tar. This young WSP was later seen as a fledgling on July 12th, still bearing the mark but showing no signs of negative effects.

On September 15th, a WSP of an unknown sex or age class was recorded as favoring its right leg and walking with a limp. This WSP was roosting with a flock and was able to move around successfully.

Sandspit

Between October 2015 and September 2016, two injured WSP were observed on the Sandspit. The first injured bird was observed on January 20th. This unbanded adult WSP was noted as holding its right leg back with its right foot dangling. This WSP was able to fly well and was not observed any additional times throughout the year.

The second WSP seen with an injury was observed on March 28th. This adult female WSP, banded PV:--, was treated in early March at Pacific Wildlife Care in Morro Bay for a constriction wound on the right leg. PV:-- was observed one additional time on the Sandspit on April 4th. It was behaving normally and appeared to be recovered from its wound.

Nest and Egg Numbers

Table 5 shows the number of nests found each year on District beaches since 2004. There were 265 nests with 705 eggs found on District beaches in 2016.

Table 5. Number of Nests Found by Year at District Beaches 2004-2016.

Location	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
HSSSP	0	5	11	6	2	2	0	0	3	0	0	1	1
Villa Creek Beach	66	37	40	30	16	38	26	21	31	20	23	24	10
Morro Strand	38	27	34	19	33	26	24	25	12	12	17	13	16
Sandspit	272	225	141	109	96	144	179	213	174	157	201	272	238
Total	376	294	226	164	147	210	229	259	220	189	241	310	265

Appendix 8 depicts the number of nests found by month on all District beaches from 2004 through 2016. In 2016, the month with the greatest number of nests found was June (81), followed by May (68), April (59), July (52), and March (5).

Tables in Appendix 8a provide a summary of nest initiation and last hatch dates for all District beaches from 2002 through 2016. The first nest in 2016 was discovered on March 28th, and the last hatch was confirmed on August 13th. The length of the 2016 nesting season for the entire District was 164 days, as calculated from the date of the first nest's discovery to the date of the last known fledge.

Appendix 8b includes a graphic presentation of the number of active nests as of Friday of each week of the breeding season for all District beaches. The 2016 season began slowly, with nest numbers increasing very gradually until mid-April. Nest numbers began to increase more steadily after mid-April and through the end of May, after which nest numbers began to fluctuate dramatically due to depredation events. During the peak active nesting period (April through July), the weekly average of total active nests throughout all beaches was 35. The peak period for nesting in the District occurred during the week of June 24th, with 62 active nests. Sixty-one of these nests were on the Sandspit.

A total of 163 nests failed on all District beaches in 2016. Appendix 8c depicts the timing of nest failures on District beaches at the end of each week during the breeding season. Compared to other weeks of the breeding season, an exceptionally high rate of nest failure occurred during the week ending on July 1st, when 32 nests were lost. Losses were also high (≥ 15 nests/week) during the weeks ending on June 10th and July 8th.

In addition to the 163 failed nests on District beaches in 2016, 99 nests hatched (for a hatch rate of 38%), and three nests had unknown fates. Appendix 8d shows nest fates for all District beaches from 2001 through 2016, while Appendix 8e provides a graph depicting the number of nests hatched each year from 2001 through 2016 on all District beaches. The average number of nests hatched for all beaches throughout the years is

106. Appendix 8f provides a graph depicting the number of nests hatched by month each year from 2005 through 2016 on all District beaches. June saw the highest number of hatches in 2016 with 43 nests hatching across the District. The average number of nests hatched per month in 2016 was 20.

During the 2016 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 9). The embryonic development of 80 eggs was analyzed. Twenty abandoned nests, out of 21 that were processed, contained eggs with no evidence of fertilization. Of the eggs which remained unhatched in successful nests, 14 out of 21 had no evidence of fertilization. Four unhatched eggs had an embryonic stage of two weeks or less, while three eggs had developed to a stage of at least three weeks.

Nesting Habitat Substrate: Overview

Substrate descriptions were reported for 263 of 265 nest locations on District beaches in 2016. The primary substrate for an overwhelming 97% of nests was sand, with the remaining primary substrates comprised of gravel (less than 3% of nests) and dried mud (less than 1% of nests). Secondary substrates were reported for 261 of 265 nest locations, with wrack (56%) and gravel (24%) comprising the majority of secondary substrates present. Tertiary substrates were present for 192 of 265 nests. Tertiary substrates were more variable, with wrack (26%), shells (23%), gravel (22%), and woody debris (20%) comprising the majority of tertiary substrates.

Of nest locations with reported substrates, live vegetation was recorded as present at 26 nest sites across all beaches (10% of all nests). In order of prevalence, vegetation types recorded at nest sites were saltbush (*Atriplex leucophylla*) (8), beach morning glory (*Calystegia soldanella*) (5), sand verbena (*Abronia sp.*) (5), sea rocket (*Cakile maritima*) (5), dune grass (*Elymus mollis*) (2), and beach bur (*Ambrosia chamissonis*) (1). Dead vegetation was observed infrequently (18 times, 7%) near nest sites.

Beach locations were documented for 263 nest locations across District beaches in 2016. 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, backdunes, foredunes, and lower beach.

The topographic relief of the general vicinity of nest sites was also assessed for 263 nests across District beaches in 2016. WSP showed a preference for nest locations at flat sites (153 sites, 58%), followed by hummocky (58), and convex (51) sites. Only one nest location was recorded as being at a concave site.

The distance of newly discovered nests from other known active nests was estimated for 253 nests across District beaches in 2016. All nests with estimated distances from other known active nests fell within a range of 20 and 4,224 feet. Approximately two-thirds (169) of the nests with recorded distance estimates were between 50 and 400 feet of the nearest known active nest.

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 200 feet from other known active WSP nests.

In addition to the description of each nest location, the substrate, location, topographic relief, and distance to the nearest active nest were also recorded at random locations on the Sandspit during the 2016 WSP breeding season. These were recorded for comparative purposes. However, due to the limited number of samples taken on all of the District beaches, no meaningful comparisons could be made.

Hearst San Simeon State Park

No WSP, scrapes or other signs of nesting activity were observed at Sidney’s Lagoon, Piedras Blancas, or Santa Rosa Creek Beach during the 2016 breeding season. WSP were sighted during the breeding season once each at Arroyo de la Cruz and Point Sierra Nevada, but no nesting activity was ever discovered. See Appendix 1 for a map with area distinctions.

San Carpoforo Creek Beach

Adult WSP were only observed on four surveys of San Carpoforo Creek Beach during the breeding season. Two of these sightings occurred at the beginning of the breeding season, and two towards the end of the season. Two scrapes were observed in April, but no evidence of nests or other nesting activity was ever seen.

Arroyo Laguna

Adult WSP were seen on multiple occasions at Arroyo Laguna during the breeding season. One three egg WSP nest was discovered on May 11th. When the monitor arrived the following week to erect symbolic fencing around the site, the nest was not there. Tire tracks from a motorized vehicle, coming from the direction of an abutting private property, were also observed on the beach in the proximity of the nest bowl. The owners of this property were contacted by Ranger staff and received a warning. However, no obvious signs of either a nest failure or a successful hatch were observed, so the nest fate was classified as unknown. The nest was not floated for an EHD or its location GPS’d. No other signs of scrapes or nesting attempts were observed for the remainder of the breeding season.

San Simeon Creek Beach

The area utilized for breeding in previous years was symbolically fenced in 2016. Adult WSP were spotted on two separate occasions during the breeding season: once in May, and once in July. However, no evidence of nesting activity was found on San Simeon Creek Beach in 2016.

Villa Creek Beach

A total of ten nests were found at Villa Creek Beach during the 2016 breeding season. This is the lowest number of recorded nests since CSP started monitoring the beach in 2004. The distribution of nests per month is depicted in Table 6. The first nest was

initiated on April 13th, and the last nest was found on July 15th. The first nest hatched on June 23rd, and the last nest hatched on approximately July 14th. The nest for the last hatch was discovered after one chick had hatched and left the nest bowl. It was later determined that the remaining egg had no evidence of fertilization. The week with the greatest number of active nests on Villa Creek Beach ended on May 6th with four active nests.

Table 6. Number of Nests Found by Month at Villa Creek Beach 2004-2016.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
March	3	2	2	3	2	7	0	0	0	0	2	2	0
April	23	14	10	7	4	13	5	7	5	4	6	6	4
May	21	9	15	12	3	8	7	6	10	5	9	11	4
June	18	12	8	5	5	7	13	4	10	5	4	5	1
July	1	0	3	3	2	3	1	4	6	6	2	0	1
August	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	66	37	38	30	16	38	26	21	31	20	23	24	10

Fates were determined for nine of the ten nests (Table 7). Of nests with known fates, two hatched successfully (22%) and seven failed (78%). Five of the failed nests were lost to depredation and two to abandonment. See the Depredation section for more information on nests lost to predators.

Table 7. Nest Fates and Percentages for Villa Creek Beach in 2016.

Total Nests	10	% Total	
Unknown Fate	1	10%	
Total With Known Fate	9	90%	
Hatch	2	20%	
Fail	7	70%	% Failed Nests
Abandoned	2	20%	29%
Depredated	5	50%	71%

The ten Villa Creek Beach nests in 2016 produced a total of 23 eggs. Two nests had a clutch size of one, three had a clutch size of two, and five had a clutch size of three. No nests experienced reductions in clutch size or movements to new locations. Out of the 23 total eggs, four eggs (18%) hatched. Monitors also found one dropped egg on the beach that was not attributed to any active nests and not included in the total number of eggs.

Table 8 shows the distribution of nests and their fates at Villa Creek Beach for the 2016 breeding season. The most common WSP nest locations were in the middle and northern sections of the beach. One of the successful hatches occurred on the northern portion of the beach. The other was in the back area, on the edge of a mud flat.

Table 8. Nest Location and Fate at Villa Creek Beach in 2016.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests	Unknown Fate	% of Unknown Fate
Back Area*	1	10%	1	50%	0	0%	0	0%
West of Villa Creek**	0	0%	0	0%	0	0%	0	0%
Main Beach: North	4	40%	1	50%	3	43%	0	0%
Main Beach: Middle	4	40%	0	0%	4	57%	0	0%
Main Beach: South	1	10%	0	0%	0	0%	1	100%
Pocket Beaches	0	0%	0	0%	0	0%	0	0%
Total	10	100%	2	100%	7	100%	1	100%

*Area formerly known as “South of Villa Creek”

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

Table 9 shows a summary of WSP nest distribution across beach segments from 2001 through 2016. Since 2001, the majority of WSP nests have been located on the main beach, where nest numbers have ranged from nine nests in the current year to 56 in 2004. In 2016, the majority of the nests (90%) were located on the main beach. See Appendix 1 for a map with area distinctions and Appendix 10 for nest location maps.

Table 9. Distribution of Nests at Estero Bluffs State Park 2001-2016.

Year	West of Villa Creek ¹	Back Area ²	Main Beach	Pocket Beaches	Cayucos Point ³	Total
2016	0	1	9	0	0	10
2015	1	0	23	0	0	24
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”

Nesting Habitat Substrate

Substrate descriptions were reported for all ten nests on Villa Creek Beach in 2016. In order of prevalence, the primary substrates for the nests were sand (seven nests), gravel (two nests), and dried mud (one nest). A secondary substrate was documented for all but one of the nests. The secondary substrates were gravel (three nests), dead vegetation (three nests), woody debris (two nests), and live vegetation (one nest). A tertiary substrate (woody debris) was found for only one nest.

In the single case of live vegetation being present at a Villa Creek Beach nest site in 2016, the species was saltbush measured between 1 and 12 inches in height.

Beach locations were documented for all ten nests found at Villa Creek Beach in 2016. Five of the nests were located on the upper beach area, four mid-beach, and one in the backdunes area.

The topographic relief of the general vicinity was assessed for all WSP nests at Villa Creek Beach in 2016. The area was described as flat nine times and convex once.

The distance of newly discovered nests from other known active nests was estimated for four of the ten nests at Villa Creek Beach in 2016. These four nests were found between 100 and 700 feet from any other active nest. The closest nest was 150 feet from any other active nest, and the farthest was 685 feet from an active nest. The average distance between two active nests was 402 feet. Six nests were found when there were no other known active nests.

Morro Strand

A total of 16 nests were found at Morro Strand during the 2016 breeding season. The number of nests found per month from 2004 through 2016 is shown in Table 10. The month of May (8 nests) was the most prolific month in terms of number of new nests. For the season, the first nest was found on April 11th, and the last nest was found on July 6th. The first hatch occurred approximately June 12th, and the last hatch occurred on August 3rd. In 2016, the week with the greatest number of active nests on Morro Strand (4) ended on June 3rd.

Table 10. Number of Nests Found by Month on Morro Strand 2004-2016.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
March	3	0	0	0	1	2	0	2	0	0	3	0	0
April	15	3	7	6	14	7	6	7	6	5	8	8	4
May	8	10	9	5	7	8	8	4	2	2	4	0	8
June	6	9	11	7	8	8	9	10	3	2	1	2	3
July	6	5	7	1	3	1	1	2	1	2	1	3	1
August	0	0	0	0	0	0	0	0	0	1	0	0	0
Total	38	27	34	19	33	26	24	25	12	12	17	13	16

Fates were determined for all 16 nests (Table 11). Three nests hatched successfully (19%) and 13 nests failed (81%). Of the nests that failed, ten nests were depredated, two

were abandoned, and one failed due to an unknown cause. See the “Depredation” section for information on the nests lost to predators.

Table 11. Nest Fates and Percentages for Morro Strand in 2016.

Total Nests	16	% Total	
Unknown Fate	0	0%	
Total With Known Fate	16	100%	
Hatch	3	19%	
Fail	13	81%	% Failed Nests
Abandoned	2	13%	15%
Depredated	10	63%	77%
Unknown Fail	1	6%	8%

The 16 Morro Strand nests in 2016 produced a total of 40 eggs. Two nests had a clutch size of one, five had a clutch size of two, eight had a clutch size of three, and one nest had a clutch size of four. In this case, the nest originally had a clutch size of three, but a nearby dropped egg was later moved by the WSP into the nest bowl. No nests experienced reductions in clutch size or movements to new locations. Out of the 40 total eggs, seven eggs (18%) hatched. Monitors found three additional dropped eggs on the beach that were not attributed to any active nests and not included in the total number of eggs.

The distribution of nests and their fates within each beach segment in 2016 are shown in Table 12. The section with the highest number of nests (15 of the 16 known nests) was between Azure and Boardwalk Corridors. The northernmost nest of the season, also one of three hatches, was found between the Hatteras and Easter Street Corridors.

Table 12. Nest Distribution and Fate at Morro Strand in 2016.

Area	# of Nests	% of		% of		% of	
		Total Nests	Hatch	Hatched Nests	Fail	Failed Nests	Unknown Fate
Campground-Hatteras	0	0%	0	0%	0	0%	0
Hatteras-Azure	1	6%	1	33%	0	0%	0
Azure- Boardwalk	15	94%	2	67%	13	100%	0
Boardwalk-Hwy 41	0	0%	0	0%	0	0%	0
Total	16	100%	3	100%	13	100%	0

WSP nest distribution among Morro Strand beach segments from 1993 through 2016 is shown in Table 13. The number of WSP nests in 2016 was relatively low and continued an overall trend of fewer nests on Morro Strand. However, the distribution of nests was consistent with the trend of most nests occurring between the Azure and Boardwalk Corridors.

Table 13. Distribution of Nests at Morro Strand 1993-2016.

Year	Campground- Hatteras¹	Hatteras- Azure²	Azure- Boardwalk³	Boardwalk- Hwy 41⁴	Total
2016	0	1	15	0	16
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

See Appendix 1 for a map with area distinctions and Appendix 10 for nest location maps.

Nesting Habitat Substrate

Substrate descriptions were reported for all but one of the 16 nests on Morro Strand in 2016. The primary substrate for all 15 of the nests was sand. A secondary substrate was also found for all but one of the nests. In order of prevalence, the secondary substrates were wrack (six nests), gravel (three nests), dead vegetation (three nests), live vegetation (two nests), and shells (one nest). A tertiary substrate was present for only five nests. The tertiary substrates were wrack for two nests, and shells, live vegetation, and dead vegetation for one nest apiece.

Three Morro Strand nest sites were reported as having live vegetation present in 2016. The species present at these nest sites were saltbush, sand verbena, and sea rocket. All observed plants were between 1 and 12 inches in height.

Beach locations were documented for all but one of the 16 nests found at Morro Strand in 2016. Locations for the nests were as follows: upper beach area (six nests), backdunes area (four nests), mid-beach area (three nests), and foredunes area (two nests).

The topographic relief of the general vicinity was also assessed for all but one of the 16 nests at Morro Strand in 2016. The nest areas were described as follows: flat (nine nests), hummocky (three nests), and convex (three nests).

The distance of newly discovered nests from other known active nests was estimated for 12 out of 16 nests at Morro Strand in 2016. The closest nest was 163 feet from any other active nest and the farthest was 1,330 feet from an active nest. The average distance between two active nests was 639 feet. Three nests were found when there were no other known active nests, and the nest bowl location of one nest remained unknown.

Sandspit

A total of 238 nests were found on the Sandspit this year. The distribution of nests per month from 2004 through 2016 is depicted in Table 14. Seventy-seven nests were found in the month of June, comprising 32% of the season total, and making June the month with the highest nest initiation rate. One hundred thirty-eight nests were found on the northern half of the Sandspit, and 100 were found on the southern half. The first nest was found on March 28th, and the last nest was found on July 27th. The first hatch occurred on May 4th, and the last hatch occurred on August 13th. The week with the maximum number of active nests on the Sandspit ended on June 24th with 61 active nests.

Table 14. Number of Nests Found by Month at the Sandspit 2004-2016.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
March	18	2	0	2	10	14	8	10	4	21	39	31	5
April	77	44	33	23	18	40	57	54	39	39	32	62	51
May	90	48	41	41	27	32	47	63	42	34	60	81	55
June	81	100	44	30	27	39	53	69	57	46	48	68	77
July	6	29	22	11	14	19	14	14	27	17	22	29	50
August	0	2	1	2	0	0	0	3	5	0	0	1	0
Total	272	225	141	109	96	144	179	213	174	157	201	272	238

A summary of nest fates for this season on the Sandspit can be found in Table 15. Of the 238 nests found, fates were determined for 237 nests. Ninety-four nests hatched successfully (40%). Of the 642 eggs produced, a total of 244 (38%) hatched. Seven dropped eggs were never attributed to any active nests and were not included in the total egg or nest numbers.

Of the 238 nests found, 98 nests were depredated (41%). See the “Depredation” section for information on nests lost to predators.

Twenty-one nests (9%) failed due to abandonment on the Sandspit. Of the 21 nests abandoned, 11 were one egg nests, five were two egg nests, and five were three egg nests. 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.

Fifteen nests failed due to high tides (6%), and high winds claimed six nests (3%). Two nests (1%) failed for unknown reasons. These nests were lost either to wind or a predator. One nest (<1%) failed due to an “other” cause. In this case, the nesting WSP stayed with its one egg nest for nearly two weeks after its EHD before the egg rolled out of its nest bowl during a high wind event. The egg was subsequently collected. This egg was believed to be non-viable. However, processing of the egg revealed an embryonic development of approximately three weeks.

One nest was classified as having an unknown fate this season (<1%). This nest retained all three of its eggs at least one day past the EHD. No eggs were present the next time the nest was checked. There was no evidence of pips or chicks to confirm a hatch at this location.

Table 15. Nest Fates and Percentages for the Sandspit in 2016.

Total Nests	238	% Total	
Unknown Fate	1	<1%	
Total With Known Fate	237	99%	
Hatch	94	40%	
Fail	143	60%	% Failed Nests
Abandoned	21	9%	15%
Depredated	98	41%	69%
Tide	15	6%	10%
Wind	6	3%	4%
Other	1	<1%	<1%
Unknown Fail	2	1%	1%

Nests on the Sandspit occasionally experienced a reduction in clutch size, which occurred when an egg(s) was removed from the nest bowl or was no longer visible. Six nests experienced a clutch size reduction in 2016. Three of these nests hatched despite losing an egg, and three eventually failed. Most nests (four out of six) started with three eggs but were reduced to two, while two additional nests began with two eggs and were reduced to one.

Causes of clutch size reduction include events such as high tide, high wind, and egg depredation. This year, one nest lost eggs after a high tide event, and one lost an egg after it was buried by wind. Three additional nests likely lost an egg to an avian predator, based on evidence of nearby tracks or the subsequent depredation of the remaining eggs. The remaining had its clutch size reduced for unknown reasons. Of the nests that

eventually failed, two were taken by unknown avian predators, and one was depredated by a coyote.

There were seven incidents of nests moving to new locations, where the final nest bowl site was moved away from the original location by a range of three inches up to 20 feet. Only one of these nests experienced a reduction in clutch size in conjunction with the movement of the nest bowl. Two of these nests were known to have moved during periods of high wind, and three moved after the eggs were scattered by high surf. One nest was moved twice during separate high tide events before ultimately failing to a third tide event. Of the seven nests that moved, two hatched and five failed. Of the nests that failed, three failed due to tidal wash, one was abandoned, and one was buried by wind.

In 2016, the highest number of Sandspit nests occurred between Rescue Marker 5 and Rescue Marker 4. This section also had the highest number of failed nests. The area with the most hatches was located between Rescue Marker 2 and Rescue Marker 1. Four WSP nests were also found within a section of habitat south of American Canyon Trail, an area approximately a half mile long known as South Hazards. The 2014 breeding season was the first year that breeding activity was observed in the South Hazards section. Distribution of nests and fates of nests within each beach segment in 2016 are shown in Table 16. The table also includes percentages of nests failed and hatched.

Table 16. Nest Distribution and Fate at the Sandspit in 2016.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests	Unknown Fate	% of Unknown Fates
SPB-RM6	16	7%	4	4%	12	8%	0	0%
RM6-RM5	36	15%	7	7%	29	20%	0	0%
RM5-RM4	59	25%	13	14%	46	32%	0	0%
RM4-RM3	40	17%	13	14%	27	19%	0	0%
RM3-RM2	27	11%	13	14%	14	10%	0	0%
RM2-RM1	25	11%	19	20%	6	4%	0	0%
RM1-SST	21	9%	17	18%	4	3%	0	0%
SST-HAZ	10	4%	6	6%	3	2%	1	100%
SOUTH HAZ	4	2%	2	2%	2	1%	0	0%
Total	238	100%	94	100%	143	100%	1	100%

WSP nest distribution among beach segments from 2000 through 2016 is shown in Table 17. Nest numbers between the CSP boundary and Rescue Marker 6 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 17. Distribution of Nests on the Sandspit 2000-2016.

Year	SPB- RM6	RM6- RM5	RM5- RM4	RM4- RM3	RM3- RM2	RM2- RM1	RM1- SST	SST- HAZ	SOUTH HAZ	Total
2016	16	36	59	40	27	25	21	10	4	238
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	0	157
2012	21	25	40	19	14	21	17	9	0	166
2011	37	37	42	29	28	24	12	4	0	213
2010	20	35	29	31	26	22	14	2	0	179
2009	18	27	24	30	12	22	8	3	0	144
2008	10	19	20	16	13	10	2	6	0	96
2007	12	21	19	23	12	12	7	3	0	109
2006	12	24	26	33	15	21	7	3	0	141
2005	12	39	48	39	27	30	18	12	0	225
2004	41	55	50	47	29	34	12	4	0	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 10 for nest location maps.

According to the USFWS WSP Recovery Plan, WSP incubation periods begin after the last egg in the clutch is laid. The expected incubation period for a WSP nest is between 26 and 31 days, with a mean of 27 days. In 2016, there were 59 Sandspit nests with verifiable incubation periods. Fifty-three of the nests hatched within the expected range, and six hatched outside of this range. The range of verified incubation periods for successfully hatching nests was between 25 and 36 days. Table 18 provides a summary of incubation duration data for successful nests with known clutch initiation dates on the Sandpit in 2016.

Table 18. Number of Nests Hatched by Days Incubated at the Sandspit in 2016.

	Within Expected Range															
	Early	Early	Early	Early	Average	Late										
Days Incubated	23	24	25	26	27	28	29	30	31	32	33	34	33	34	35	36
# of Nests Hatched	0	0	2	10	23	8	8	4	0	2	0	1	0	0	0	1

Nesting Habitat Substrate

Substrate descriptions were reported for all 238 nests on the Sandspit in 2016. The primary substrate for all but five nests was sand; the primary substrate for the additional five nests was gravel. All but one of the 238 nests contained a secondary substrate. The most common secondary substrate was wrack, comprising 140 nests. The secondary substrate for the remaining nests, in order of prevalence, was gravel (56 nests), live

vegetation (17 nests), woody debris (ten nests), dead vegetation (five nests), sand (four nests), shells (four nests), and bird carcass (one nest). One hundred eighty-six nests contained a tertiary substrate. The most common tertiary substrate was wrack (48 nests), followed by shells (43 nests), gravel (42 nests), woody debris (38 nests), live vegetation (eight nests), dead vegetation (six nests), and sand (one nest).

Live vegetation was recorded at 22 Sandspit nest sites in 2016. Saltbush was recorded at six nest sites, beach morning glory at five sites, and sand verbena and sea rocket at four sites each. Dune grass was found at two sites, and beach bur was found at one. Two nest sites had vegetation (both dune grass) which measured greater than 12 inches in height, and one nest had vegetation (beach morning glory) less than one inch in height. All of the other observed plants at nest sites were measured between 1-12 inches in height.

Beach locations were recorded for all 238 nests found on the Sandspit in 2016. One-hundred fourteen nests were located on the upper beach, 99 were on the mid beach, 13 were in the foredunes, 11 were in the backdunes, and one was on the lower beach.

The topographic relief of the general vicinity was assessed for all 238 WSP nests on the Sandspit in 2016. The area was described as flat at 135 nest sites. The area was reported as hummocky 55 times, convex 47 times, and concave one time.

The distance of newly discovered nests from other known active nests was found for all but one of the nests on the Sandspit in 2016. The closest nest was 20 feet from any other active nest, and the farthest was 4,224 feet from an active nest. The average distance between two active nests was 450 feet. One nest was found when there no other known active nests.

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 11 for float data).

Hearst San Simeon State Park

No eggs were floated on HSSSP beaches in 2016. While one nest was found at three eggs on Arroyo Laguna, this nest went missing before it was able to be floated.

Villa Creek Beach

No nests were found at three eggs this year on Villa Creek Beach.

Morro Strand

Nests on Morro Strand have historically had a high rate of abandonment. In recent years, the floating of nests has often been forgone to reduce potential impacts on nest success at Morro Strand. In 2016, no nests were found at three eggs. Two nests were found at two eggs and depredated by an unknown avian before a third egg was produced.

Sandspit

During the 2016 breeding season, 67 nests were found at three eggs on the Sandspit. Fifty-one of these nests were able to be floated, and an EHD was projected for each. Fates were determined for the other 16 nests prior to being able to float the nests. Of the 51 floated three egg nests, 25 hatched and 25 failed. Nineteen of these 25 failed nests were depredated by coyote within a range of 3 to 23 days after being floated. Of the other six failed nests, four failed due to high tides, one failed due to abandonment, and one failed due to an unknown cause. One floated three egg nest had an unknown fate. This nest disappeared between 2 and 5 days after its EHD. Coyote depredation was suspected for this nest due to the presence of tracks near the nest bowl and shell fragments inside the nest bowl. However, there was uncertainty regarding the age of the tracks, and the evidence was inconclusive as to whether the nest hatched before the potential depredation event.

This season, 11 nests were found and remained at two eggs, with third eggs never being produced. Five of these nests were floated, and all five nests hatched. One nest was found and remained at one egg with a second egg never being produced, so it was also floated to determine an EHD. As previously mentioned in the “Nest and Egg Numbers” section, this one egg nest was classified as a fail due to “other” causes and was collected after being incubated for 56 days by the adult. Egg processing later revealed that the embryo inside this egg had reached a development stage of approximately three weeks.

Of the 164 eggs floated on the Sandspit, a total of 80 eggs hatched (49%) from 30 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

No chicks were seen or known to have fledged from any beaches in HSSSP in 2016.

Villa Creek Beach

Four chicks hatched from the two successful nests at Villa Creek Beach in 2016. The first chicks to be seen on Villa Creek Beach were observed on June 23rd with the first hatch. The highest number of chicks observed on one day at Villa Creek Beach was two. Two confirmed fledges from one brood were observed at Villa Creek Beach on July 20th, so the estimated fledge rate was 50%. Being a relatively small beach, it is fairly certain there were no other fledges. The length of the breeding period at Villa Creek Beach was

113 days. The length of the breeding period was calculated from the day the first nest was found to the last day a chick was observed.

Morro Strand

Seven chicks hatched from three successful nests at Morro Strand in 2016. Chicks were observed throughout the season beginning on June 14th. The highest number of chicks observed on one day at Morro Strand was three. Five fledges from three different nests were seen on Morro Strand for a fledge rate of 71%. The first fledge was observed on July 10th, and the last fledge occurred on August 31st. The length of Morro Strand's breeding period was 143 days.

Sandspit

Two hundred forty-four chicks hatched from the 94 successful nests on the Sandspit in 2016. Broods with chicks of varying ages were seen throughout the season after the first hatch on May 4th, also the date the first chicks were seen. The last chick seen was on September 2nd. The highest number of chicks observed during one day at the Sandspit occurred on June 28th with five chicks observed.

Ten WSP were confirmed to have fledged from the Sandspit in 2016. The highest number of fledges seen during one day occurred on July 18th with seven fledges observed. Only one banded adult, a male marked BB:GB, was associated with fledged chicks on the Sandspit in 2016. Confirmation of additional fledges on the Sandspit was 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 exacerbated the problem and made it difficult to link specific fledges precisely to specific nests.

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 July 19th with 14 individuals. The first dispersed juveniles known to reach the Sandspit from another beach arrived on July 14th. These juveniles, banded BB:RR and BG:YL, fledged from ODSVRA and Marina SB, respectively. 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 7th, the final two chicks fledged, making the length of the breeding season 164 days long.

Depredation

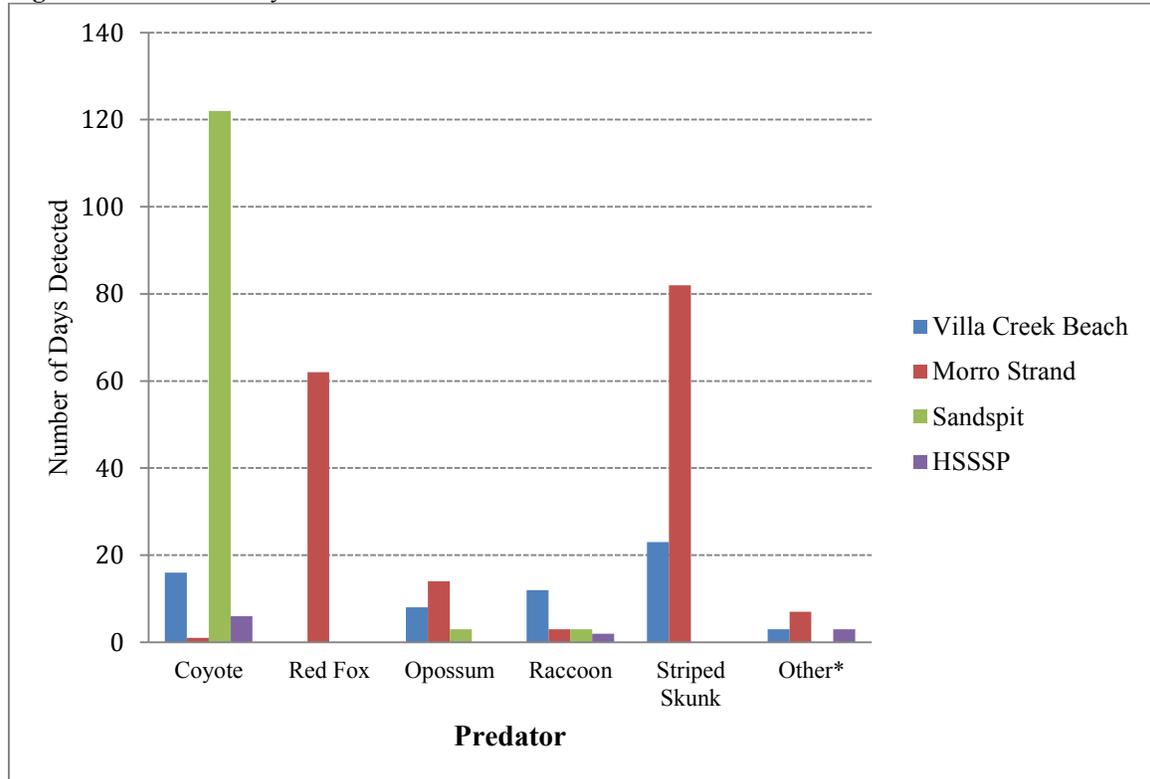
A summary of nest depredation on District beaches from 2001 through 2016 is shown in Appendix 12.

Predator Presence across District Beaches

Figure 2 provides a graphical representation of the number of days mammalian predators were detected by observation or tracks across District beaches in 2016. It is noteworthy

that tracks as an index of predator presence may provide an under representation of predator presence. Fog 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.

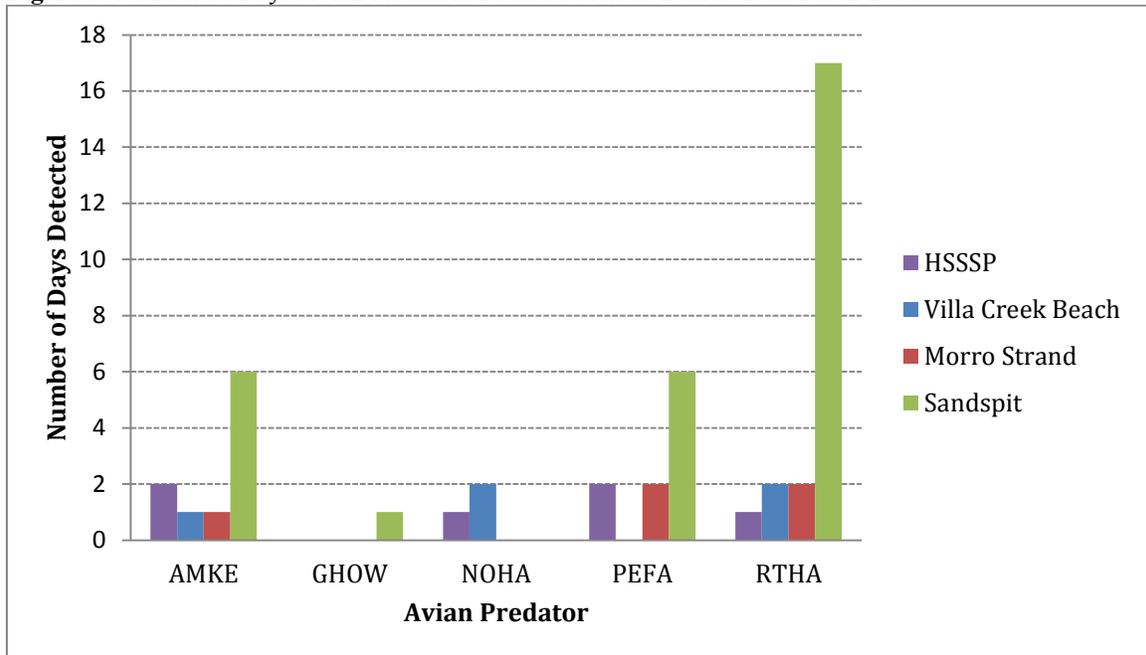
Figure 2. Number of Days Mammalian Predators Detected Across District Beaches in 2016.



*weasel, domestic cat, ground squirrel.

Figure 3 provides a graphical representation of the number of days avian predators were detected across District beaches by observation or tracks in 2016.

Figure 3. Number of Days Avian Predators Detected Across District Beaches in 2016.



Note: American Crow and gull species not included due to high frequency of sightings.

Predator Management across District Beaches

Predator removal activity took place between February 1st and August 5th by USDA Wildlife Services. USDA Wildlife Services spent 1,077 hours on predator removal activities within the District. Individuals removed from District beaches this year included 25 California ground squirrels (*Spermophilus beecheyi*), 16 coyotes, ten Virginia opossums (*Didelphis virginiana*), ten striped skunks (*Mephitis mephitis*), nine red foxes (*Vulpes vulpes*), seven raccoons (*Procyon lotor*), and two domestic cats (*Felis catus*). The cats were transferred to San Luis Obispo County Animal Services.

Hearst San Simeon State Park

The most prevalent among the live predators observed at HSSSP beaches in 2016 were American Crow, ground squirrel, Northern elephant seal (*Mirounga angustirostris*), and various gull species. Of avian predators, two each of American Kestrel (*Falco sparverius*) and Peregrine Falcon (*Falco peregrinus*) were observed, while one each of Northern Harrier (*Circus cyaneus*) and Red-tailed Hawk (*Buteo jamaicensis*) were seen. Of mammalian predators, tracks of coyotes were spotted on six different days during the breeding season, and raccoon tracks were spotted twice.

Villa Creek Beach

Predators destroyed five of the nine nests with known fates this year at Villa Creek Beach. A summary of nest depredations can be found in Table 19. Unknown predators were responsible for four of the depredated nests. Many of the depredated nests were surrounded by driftwood and others by coarse 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 most of the depredations. Among the most probable

predators, striped skunks, raccoons, and gulls were suspected. A gull was the only known predator to take a nest in 2016.

Table 19: Nest Depredations by Predator on Villa Creek Beach in 2016.

Total Nests	10	% Total Fated Nests	% Predated Nests
Depredated Nests	5	56%	
Unknown Predator	4	44%	80%
Gull Species	1	11%	20%
Unknown Fate	1	-	-

Table 20 lists the nest depredations according to predator among beach segments for Villa Creek Beach in 2016.

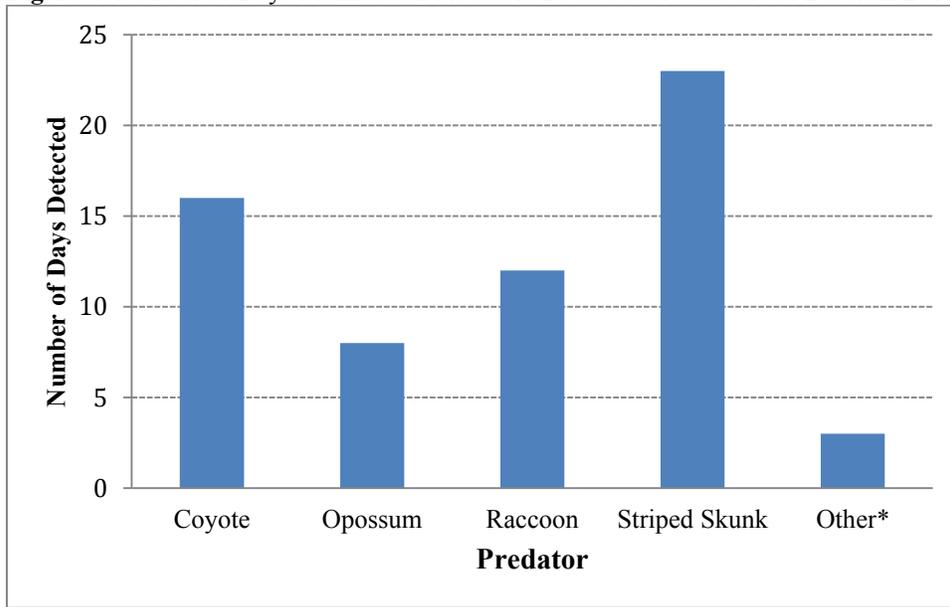
Table 20. Distribution of Nest Depredations by Predator at Villa Creek Beach in 2016.

Area	Gull Species	Unknown Predator	Total Depredated	Total Nests
Back Area	0	0	0	1
West of Villa Creek	0	0	0	0
Main Beach: North	1	1	2	4
Main Beach: Middle	0	3	3	4
Main Beach: South	0	0	0	1
Pocket Beaches	0	0	0	0
Total	1	4	5	10

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 camera was in operation for 18 days. The camera captured no images of predators except for deer mice (*Peromyscus maniculatus*), which were observed on multiple occasions foraging several feet away from the nest bowl. On the 18th day of the operation, the nest failed to an unknown and uncaptured cause.

Figure 4 provides a graphical representation of the number of days mammalian predators were detected on Villa Creek Beach in 2016. Combining sightings of live animals and their signs (i.e. tracks, scat, etc.), the most commonly observed mammals on Villa Creek Beach were striped skunk and coyote. These animals were observed 23 and 16 times, respectively. Raccoons were observed 12 times, while all other mammals were sighted less than ten times during the breeding season.

Figure 4. Number of Days Mammalian Predators Detected on Villa Creek Beach in 2016.



*ground squirrel

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 and padded leg hold traps were used to capture predators. The combined efforts of 566 trap days and nights resulted in the removal of seven raccoons, four ground squirrels, and four Virginia opossums. See “Predator Management” for more information on predator removal methodology.

The only avian predators seen at Villa Creek Beach during the 2016 breeding season were Northern Harrier and Red-tailed Hawk with each seen on two days.

Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: American Crow, American Kestrel, California Gull (*Larus californicus*), Common Raven (*Corvus corax*), domestic dog, Great Egret (*Ardea alba*), Heermann’s Gull (*Larus heermanni*), and Western Gull (*Larus occidentalis*).

Morro Strand

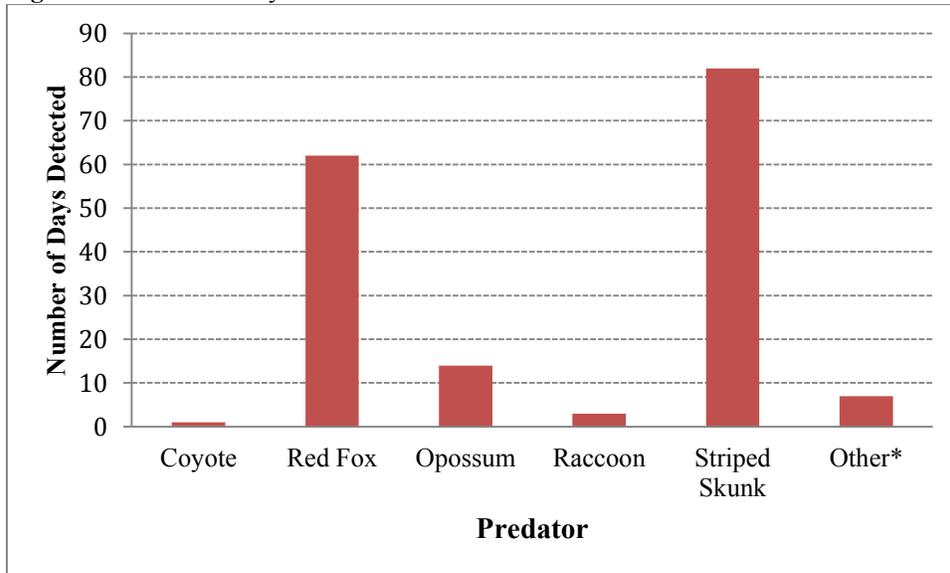
Predators destroyed 10 of the 16 nests this year at Morro Strand. Five of the depredations were committed by American Crow, three by an unknown avian, and two by striped skunk. A summary of nest depredations can be found in Table 21.

Table 21. Nest Depredations by Predator on Morro Strand in 2016.

Total Nests	16		
Depredated Nests	10	% Predated Nests	% Total Nests
American Crow	5	50%	31%
Unknown Avian	3	30%	19%
Striped Skunk	2	20%	13%

Figure 5 provides a graphical representation of the number of days mammalian predators were detected on Morro Strand in 2016. Combining sightings of live animals and their signs (i.e. tracks, scat, etc.), the most commonly observed mammal was striped skunk, which was seen on 82 days during the breeding season. The second most commonly observed predator was red fox, seen 62 times. With the exception of Virginia opossum (14 sightings), all other mammalian predators were observed on less than ten occasions each during the breeding season.

Figure 5. Number of Days Mammalian Predators Detected on Morro Strand in 2016.



*domestic cat, ground squirrel, weasel.

USDA Wildlife Services performed predator removal activities at the campground and between the Azure Street parking lot and the Highway 41 beach access corridor in areas behind the foredunes. In total, the efforts of 826 trap nights resulted in the removal of 21 California ground squirrels, ten striped skunks, nine red foxes, six Virginia opossums, and two feral cats from Morro Strand in 2016. The cats were transferred to San Luis Obispo County Animal Services. See “Predator Management” for further information on predator removal methodology.

American Crows were again observed foraging the entire length of Morro Strand throughout the breeding season in 2016. These corvids were the most detrimental known predator to WSP on Morro Strand in 2016. American Crows were seen on 99 days of the breeding season in murders of up to 22 individuals. Of the depredated nests, American Crows were identified as the predator for a minimum of 50% of nests and was the leading candidate for the depredation of three additional nests. In two nest depredation instances, live American Crows were witnessed near the nest bowl.

Two other avian predators were observed on multiple occasions at Morro Strand during the 2016 breeding season: Peregrine Falcon and Red-tailed Hawk, which were both seen two days each.

Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: American Kestrel, California ground squirrel, California Gull, coyote, deer mouse, domestic cat, domestic dog, Great Blue Heron (*Ardea herodias*), Heermann’s Gull, Red-shouldered Hawk (*Buteo Lineatus*), unidentified rodent, longtail weasel (*Mustela frenata*), and Western Gull.

Sandspit

Predators took 98 of the 238 nests this year on the Sandspit (Table 22). Coyotes were responsible for the majority (93%) of all the nest depredations by consuming 91 nests. The additional seven nest depredations were attributed to one American Crow and six unknown avian predators.

Table 22. Nest Depredations by Predator on the Sandspit in 2016.

Total Nests	238	% Total Fated Nests	% Predated Nests
Depredated Nests	98	41%	100%
Coyote	91	38%	93%
American Crow	1	<1%	1%
Unknown Avian	6	3%	6%
Unknown Fate	1	-	-

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

Table 23. Distribution of Nest Depredations by Predator at the Sandspit in 2016.

Area	Predators			Total Depredated	Total Nests
	Coyote	American Crow	Unknown Avian		
SPB-RM 6	8	0	0	8	16
RM 6-RM 5	19	0	3	22	36
RM 5-RM 4	35	1	2	38	59
RM 4-RM 3	20	0	0	20	40
RM 3-RM 2	8	0	0	8	27
RM 2-RM 1	0	0	0	0	25
RM 1-SST	0	0	1	1	21
SST-HAZ	0	0	0	0	10
South HAZ	1	0	0	1	4
Total	91	1	6	98	238

USDA Wildlife Services 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. Three methods were employed to remove coyotes: padded leg traps, call stands, and spotlighting. The combined efforts of 868 trap nights, 18 trap days, 16 call stands, and 40.5 hours of spotlighting resulted in the removal of 16 coyotes from

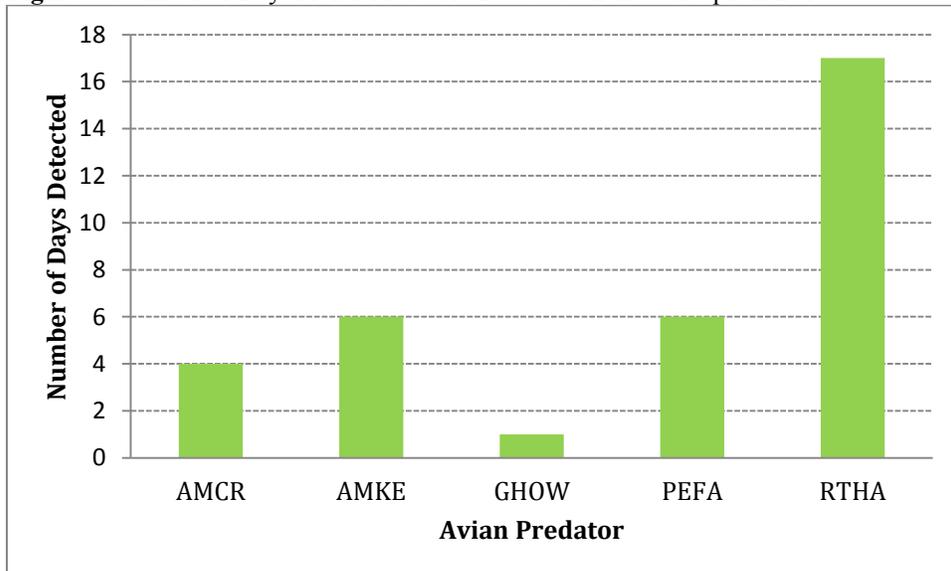
the Sandspit. Thirteen were caught by leg traps, two at call stands, and one by spotlighting. See “Predator Management” for more information on predator removal methodology.

This season, the highest incidence of coyote depredation occurred during the week ending on July 1st, when 29 nests were lost to coyote depredation. Twenty-one of these nests were depredated on the northern half of the Sandspit and the other eight in the southern section. Furthermore, on nearly a daily basis throughout the season, coyote tracks were seen in or near the habitat – sometimes within a few inches of a nest bowl. Overall, coyotes were by far the most prevalent predator on the Sandspit; combined sightings of live animals and their signs (i.e. tracks, scat, etc.) accounted for their presence on 122 days during the monitoring season. The only other mammalian predators observed on the Sandspit during the 2016 breeding season were raccoon and Virginia opossum; they were each observed on three days.

In 2016, monitors sighted individuals or tracks of five species of avian predators on the Sandspit: American Crow, American Kestrel, Great Horned Owl (*Bubo virginianus*), Peregrine Falcon, and Red-tailed Hawk. The majority of avian predators sighted by monitors appeared to be causing no distress to the WSP. However on one occasion, May 26th, a Red-tailed Hawk was observed possibly preying a chick. A monitor witnessed the hawk foraging near the wrack line near a recently hatched nest, as well as, an adult WSP in the distance, which appeared to be performing a broken wing display. The hawk was observed diving to the beach and ascending with something in its talons, but a chick mortality could not be confirmed. Overall, no confirmed avian depredation events were witnessed in 2016 on the Sandspit.

Figure 6 provides a graphical representation of the number of days avian predators were detected on the Sandspit in 2016.

Figure 6. Number of Days Avian Predators Detected on the Sandspit in 2016.



Other predatory species identified by observation or tracks on the Sandspit in 2016 included: Black-crowned Night Heron (*Nycticorax nycticorax*), California Gull, domestic dog, Great Blue Heron, Great Egret, Heermann's Gull, and Western Gull. Of special interest were two sightings of unknown corvids, which were either American Crows or Common Ravens.

Human Activities

Human activity is monitored and recorded on District beaches throughout the breeding season to deter and manage disturbance to WSP breeding activities. Data recorded included dog contacts, dog tracks, foot traffic, trespassing, vandalism, kite use, public contacts, and equestrian beach users.

Dogs are not permitted on any District beach. People seen on beaches with dogs were contacted by monitors, and observations of dog walkers that were unable to be contacted due to distance were also recorded. Rangers would make contacts and issue a citation for uncooperative dog walkers. Unlike dogs, horses are permitted on both Morro Strand and the Sandspit. Data was collected on the number of horses and their position on the beach.

Individual human tracks within the fenced habitat or "foot traffic" was also recorded. People found trespassing within the habitat were recorded as "public contacts." Other public contacts recorded outside of the habitat were commonly beach visitors asking specific questions.

Hearst San Simeon State Park

While visitors were rarely seen when monitoring HSSSP beaches, visitors were most likely to be encountered at Arroyo Laguna, San Simeon Creek Beach, and Santa Rosa Creek Beach.

There were 28 public contacts by WSP monitors at HSSSP beaches involving 53 people. Twenty-six contacts were classified as positive, and two as neutral. WSP monitors answered questions on topics not just related to the WSP and the recovery program but a variety of additional topics.

Five illegal dog walkers were contacted by monitors. Three contacts were made at San Simeon Creek Beach, and two were made at Santa Rosa Creek Beach; all illegal dog walkers that were contacted were compliant once notified of the rules and regulations.

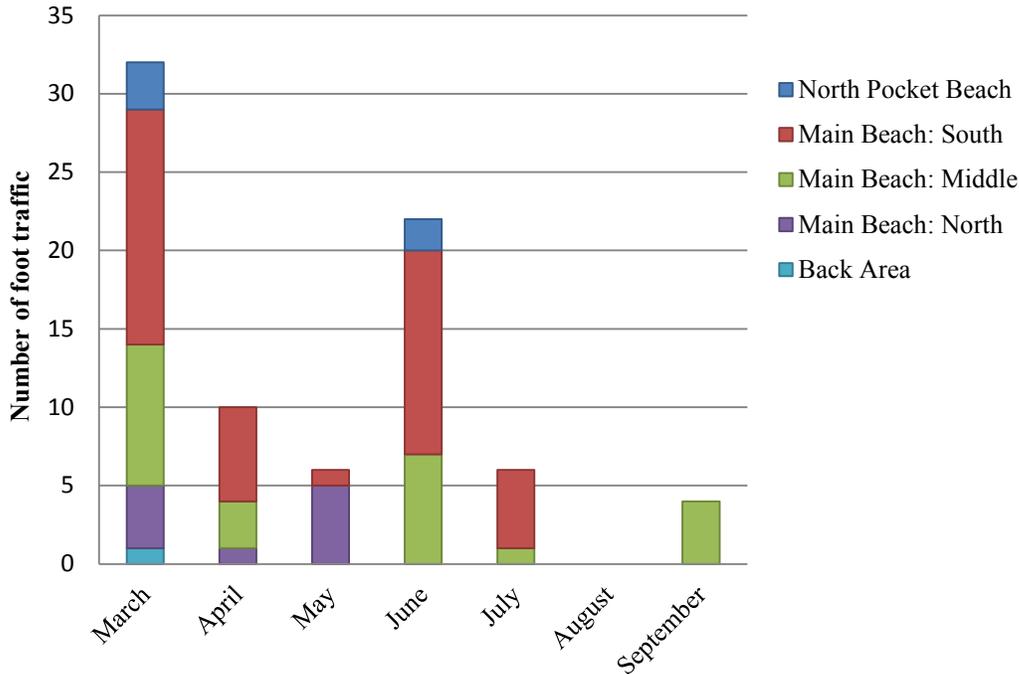
Villa Creek Beach

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 80 documented incidents of human foot traffic inside the habitat (Figure 7), although the actual number of people entering the habitat could have been higher due to

the difficulty of deciphering individual footprints. The greatest amount of foot traffic occurred during the month of March. The largest amount (50% of all foot traffic) was recorded on the south end of the main beach, followed by the middle section the main beach (30%), the north section of the main beach (13%), the north pocket beach (6%), and the back area (1%).

Figure 7. Distribution of Foot Traffic by Month at Villa Creek Beach in 2016.



When seen, trespassers were contacted and informed about the rules and regulations regarding the fenced-off areas and educated about the WSP breeding season. Monitors witnessed seven separate incidents (8 individuals) of trespassing inside the fenced-off areas. Five of the contacts were recorded as positive, one as neutral, and one as negative.

During the negative incident, the trespasser proceeded to ignore the regulations after the monitor notified them. Furthermore, the trespasser was verbally abusive and hostile towards the contacting monitor. The monitor contacted a Ranger, but it is unknown whether contact was made between the Ranger and the trespasser.

Monitors made five contacts in 2016 for illegal dog walking. Due to the distance between the monitor and the perpetrators, two of the contacts were visual; the other three were personal. Two of the personal contacts were recorded as positive and one as neutral. Rangers were not contacted for during any of these incidents. In addition to contacts for illegal dog walking, ten sets of dog tracks were observed on Villa Creek Beach in 2016. Six of these occurred inside the fenced habitat and four occurred outside.

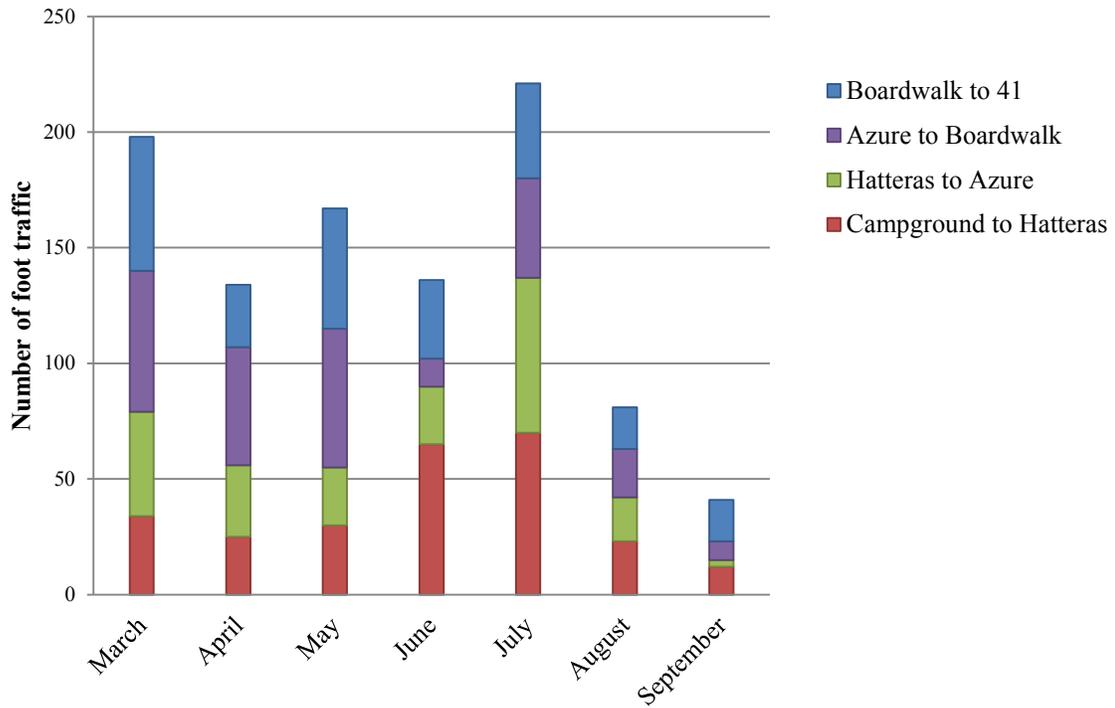
Sixty-two additional public contacts were made throughout the year at Villa Creek Beach. In most instances, the visitor approached the monitor with various questions or comments. All were positive contacts.

Acts of vandalism on Villa Creek Beach were very rare. A WSP interpretive sign was defaced with graffiti at the entrance of the beach and remnants of two fires were discovered within the fenced habitat.

Morro Strand

Morro Strand is easily accessible to local residents and visitors and has a high level of recreational use compared to other District beaches. In 2016, there were a total of 978 documented incidents of human foot traffic inside the fenced habitat. July (221 incidents) had the greatest amount of foot traffic (see Figure 8), followed closely by March (198 incidents). The foot traffic recorded in July was more concentrated in the northern two portions of the beach between the campground and Azure Corridor. In March, more of the recorded foot traffic was concentrated in the southern sections of the beach between the Azure and Highway 41 Corridors.

Figure 8. Distribution of Foot Traffic by Month at Morro Strand in 2016.



During the season, three homeless camps were discovered in the back area of the dunes between Azure and Boardwalk Corridors. Multiple sets of foot traffic, often accompanied by bike tracks, were observed leading from these camps to the beach. Rangers made efforts to clear out these camps within several days of their discovery, and several individuals received citations.

In 2015, a path cutting through a heavily vegetated area and crossing through the fenced habitat between the Easter Street and Sienna Street Corridors was discovered. The path was established near the rear entrance of a couple houses on Beachcomber Street that had been associated with frequent foot traffic and chronic trespassing in past years. The path

was found to be still in use at the beginning of the 2016 breeding season. Efforts were made by CSP staff to block these paths with brushy vegetation. On several occasions during the 2016 season, the path was found with freshly cut vegetation; evidence that the path continued to be used. The path was closed off by monitors multiple times.

In 2016, monitors witnessed 67 individuals trespassing inside the WSP habitat across 33 incidents. Sixteen of the contacts were recorded as neutral, 15 as positive, and two as negative.

A Superintendent's Posted Order was posted at the kiosks stating 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 also placed at each Morro Strand access corridor. WSP monitors observed four kite flying incidents; one person was personally contacted.

A sandwich board with a "No Dogs on Beach" sign was placed at CSP boundaries near the high tide line on Morro Strand. Since the signs are not permanent installations, their condition was checked on a daily basis throughout the season. These signs 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. Another sandwich board sign was added near the entrance to the beach at the Highway 41 Corridor. This sign illustrated with arrows the City/CSP boundary and in which direction dogs on-leash are allowed. Maps were also placed at the kiosks at the north and south ends of Morro Strand which differentiated areas where dogs are and are not allowed.

Despite the posted signs, there were 96 dog contacts involving 154 people and 117 dogs. During these 96 contacts, 44 dogs were observed as being off-leash. Of the contacts, 68 were recorded positive, 25 as neutral, and three as negative. Monitors made personal contact with 75 of these dog walkers; the remaining contacts were visual due to distance from or evasion of the monitor. There were nine instances of positive public contacts during 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. In addition to contacts for illegal dog walkers, 93 sets of dog tracks were observed along the beach (outside the fenced habitat), and 69 sets were recorded within the fenced-off area.

Ninety-six additional public contacts were made throughout the year at Morro Strand. In most instances, the visitor approached the monitor with various questions or comments. Most of the contacts were positive.

Morro Strand was frequently used by equestrians by accessing the beach at the Highway 41 entrance. Between October 2015 and September 2016, monitors counted 112 horses in 34 groups. Equestrians most often rode along the shore slowly in the wet sand; however, two groups of horses were observed galloping, cantering or being ridden at a fast pace. Three groups of horses were observed near the fence line. On one occasion, a

horse was found running loose on the beach until a monitor asked for it to be put on lead. Only one set of hoof prints were found within the habitat in 2016; it appeared a horse had run into the fence line and knocked over a pole in the process.

Morro Strand was monitored on all days around the July 4th holiday. Four CSP employees and two volunteers were on the beach on the 4th of July from approximately 8 am until 9 pm. They answered questions, ensured visitors were following CSP regulations, and monitored WSP activity. The City did not have a fireworks display this year, which led to fewer violations than previous years. Monitors made five dog contacts, three public contacts, and six trespassing contacts. Four acts of vandalism – three sets of sand graffiti and one sand castle inside the habitat – were witnessed on July 4th.

In addition to the acts of vandalism that occurred on July 4th, vandalism was discovered by monitors on 43 separate days this season. The most frequently recorded form of vandalism was bent, missing, or defaced signs with 14 incidents. Additional incidents involved bent or removed poles (10) and cut rope (5). On one occasion, ten poles were pulled out of the ground and left lying flat on the beach. Monitors also observed eight incidents of illegal camping and remains of four fires. Two of the campsites and fire remains were inside the habitat; each was a separate incident.

In 2016, four organized runs involving thousands of participants occurred within Morro Strand during the WSP breeding season. These runs were the “Miracle Miles for Kids,” “Morro Bay Bands on the Run,” “Brian Waterbury Memorial Rock to Pier Fun Run and Rock’n Around the Pier Half Marathon,” and “Morro Bay Invitational” occurring on May 7th, May 28th, July 9th and September 10th, respectively. Races were observed by WSP monitors to ensure compliance with beach regulations, such as the ban on dogs and trespassing inside the fenced-off habitat. Overall, event organizers were successful in communicating beach rules to runners, and there were very few infractions. The highest number of violations occurred during the Morro Bay Invitational, a multi-county high school cross country race, where monitors witnessed several groups of spectators duck under symbolic fencing to make space for oncoming runners or to obtain a better vantage point for the race. CSP has communicated with race officials to encourage moving the date of the race until after the breeding season next year.

Sandspit

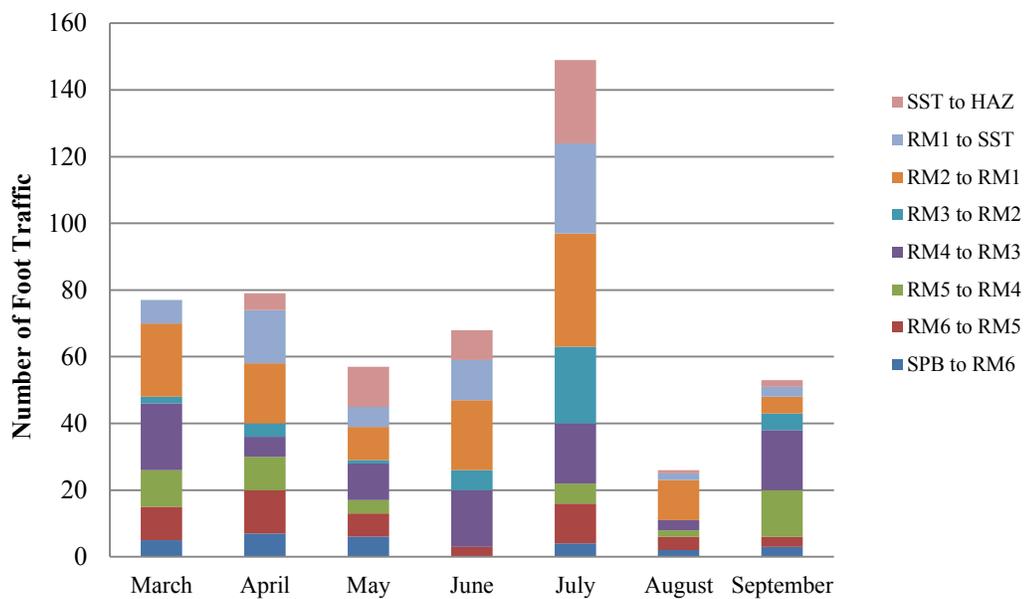
The Sandspit experiences a lower intensity of human activity compared to other District beaches. In 2016, the highest concentration of human activity occurred at the south end of the Sandspit. Equestrians and pedestrians gained access to the beach from the Hazard Reef Trail, American Canyon Trail, Sandspit 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 2016, WSP monitors witnessed three trespass violations involving four violators. All three trespass incidents occurred on the southern half of the Sandspit. When possible, trespassers were contacted by WSP monitors. All but one group of violators were

contacted by WSP monitors and instructed to leave the habitat. The trespassers who were not contacted were too far away from the monitor to be contacted.

Monitors also recorded 509 incidents of foot traffic inside the WSP habitat with 65% 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 two occasions, trespassers walked within a foot of an active nest. July had the greatest amount of foot traffic (Figure 9).

Figure 9. Distribution of Foot Traffic by Month at the Sandspit in 2016.



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 to inform 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 could be seen from most of the kayak launching areas on the mainland, although occasional vandalism of the flags may have impeded visibility. Laminated maps attached to posts were also 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. While monitors had witnessed trespassers crossing through the habitat from the bayside in previous years, none were witnessed in 2016.

Monitors made 25 contacts of illegal dog walkers (33 total dogs) on the Sandspit in 2016. Two dog contacts occurred on the north half of the Sandspit, and 23 occurred on the south half. Monitors were able to personally contact the owner of the dogs on 20

occasions. Of the five instances where dog owners were not contacted, four were due to the distance between dog owner and the monitor. In one incident, a Ranger was requested to contact a dog owner in lieu of the plover monitor, as the dog was known to be aggressive. After contact with the Ranger, this aggressive dog was not seen again on the Sandspit. In addition to contacts for illegal dog walkers, dog tracks were observed 13 times inside the fenced habitat and 29 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. This offender was a paraglider who was flying within 300 feet of the southern end of the WSP habitat. No contact was made before the perpetrator glided out of the restricted area.

One hundred-thirty additional public contacts were made throughout the year. One hundred-nine of the contacts occurred on the southern half of the Sandspit. In most instances, the visitor approached the monitor with various questions or comments. Almost all of the contacts were positive.

Monitors saw 195 horses in 78 groups on Sandspit in 2016. Six were seen on the northern half of the Sandspit, and 189 were seen on the southern half. Unlike in previous years, no horses were witnessed inside the fenced-off habitat, although there were several seen galloping close to the fence line. There was only one instance of a horse seen off-lead; this horse was seen near the habitat following another horse and rider.

Several forms of vandalism occurred on the Sandspit in 2016. These included five incidences of fence poles, sign posts, or flagpoles being removed or knocked over; two incidences where the symbolic fencing rope was deliberately broken or cut; and one incidence of a bent sign. Monitors also observed evidence of five illegal campfires and two illegal campsites. In addition, there were two incidences of sand/rock art built inside the habitat.

On July 4th, two monitors observed the Sandspit for approximately six hours between 2:30 pm and 8:30 pm. The major transgression that occurred on this holiday was the potential take of a WSP nest. When a monitor arrived at 5:15 pm to check the status of the nest, she discovered the area adjacent to the nest bowl was churned up with indiscernible human prints extending in an approximately 15 foot radius around the nest bowl. There were also a few canid tracks within that radius. The sand was very soft in the area, but it appeared that at least some of the human prints were fresh, while the canid tracks were likely older. About 30 feet away, eight sets of foot traffic and fresh domestic dog tracks were noticed within the habitat. There was also a large amount of disturbance just outside the habitat within 40 feet of the nest including a campfire and a removed pole to which a bandana had been attached. A large piece of driftwood and multiple rocks were removed from the habitat, some of which had originally been located within five feet of the nest. The nest bowl was intact, and there was no evidence to indicate it had been damaged; however, none of the three original eggs or any remains could be found within the nest bowl or anywhere in the vicinity. With this evidence, the fate of the nest

was determined to be an unknown fail with the possibility that the cause of failure was depredation.

A couple other instances of illegal activities occurred on this holiday weekend. Monitors contacted two dog walkers and directed them to other area beaches where dogs are permitted. There were no fireworks observed on July 4th, but a group of approximately five beachgoers did set off two rounds of fireworks (likely bottle rockets) a few days later on July 8th. The fireworks were set off outside the WSP habitat, and the group dispersed before a monitor was able to make contact.

CONCLUSIONS

In 2016, 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 was 185 with 75 males, 87 females, and 23 unidentified adults.

Appendix 8 depicts the number of nests found by month on all District beaches. Data is included for the years 2004 through 2016 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. The number of District nests decreased by 45 between 2015 and 2016. However, the number of District nests in 2016 (265) was still above the average number of nests in the District during the previous 12 years (238).

Tables in Appendix 8a provide a summary of nest initiation dates for all District beaches from 2002 through 2016. Nests on District beaches have been initiated as early as March 9th. In 2016, the first nest for the District was found on the Sandspit on March 28th, which is fifteen days later than the District's first 2015 nest. This date is the second latest first nest initiation date in the 18 years monitoring has occurred on the Sandspit. The last chicks fledged on September 7th, about two weeks earlier than last season. The later start and earlier finish contributed to a 2016 nesting season that was significantly shorter than last season (164 vs. 193 days).

Appendix 8d reveals that District beaches had a hatch rate of 38% in 2016. This is the third lowest hatch rate since 2001, and represents an 8% decrease from 2015. Despite the low hatch rate and the substantial decrease in the total number of hatches from 2015, the number of nests hatched across the District (99) was only slightly below the average over the previous 15 years (106).

The graph provided in Appendix 8e gives a clear picture of the nest success variability at District beaches between 2001 and 2016. At Villa Creek Beach, this year saw the lowest number of nests hatched since 2001, continuing a trend of decreasing nest numbers at that

beach since it was opened to the public. At Morro Strand, there was a peak in successful hatches in 2005 followed by very variable years until 2012, after which all years had relatively low nest success. 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 2007. The number of Sandspit hatches in 2016, 94, was above the average of 86 between 2001 and 2015.

Appendix 12 shows that the percentage of District nests that failed due to depredation (43%) in 2016 was the third highest since 2001 and represents an increase of 3% over last year. Although the percentage of nests depredated by coyotes decreased from last year, coyotes still proved a significant challenge to WSP nesting success in 2016. However, the increase in the rate of depredation from 2015 to 2016 was likely due to the increase in the number of nests depredated by avian species (American Crows, gulls, and unknown avian species). In particular, the Sandspit and Morro Strand saw their number of avian species depredations increase by five and six, respectively.

Appendix 13 provides a summary of nesting activity on District beaches from 2001 through 2016. By combining data from all 16 years, it is apparent that the Sandspit has been, in terms of nesting success, the most productive of the District beaches. The Sandspit has historically hatched 51% of 2,785 nests. Next in productivity is Villa Creek Beach (37% of 500 nests), which has been more productive than Morro Strand (32% of 392 nests). HSSSP has had very few nests historically but has been productive (69% of 33 nests) within its small sample size.

Examination of nest failures (Appendix 13) reveals that WSP at all District beaches are vulnerable to the same threats. However, it is notable that at Villa Creek Beach nest loss due to depredation (45%) is substantially higher than the District average of 31%. Morro Strand has a rate of nest abandonment (18%) well 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. The District average for nests failing to unknown causes is 2%.

There were 17 confirmed fledges on District beaches in 2016. However, the actual number of fledges is likely much higher. As has been the case in years past, the absence of leg banding practices on District beaches posed a significant challenge in the tracking of chicks from hatch to fledge. Due to the fact that there are relatively few nests at Villa Creek Beach and Morro Strand, the likelihood of observing fledglings at those locations was much greater than on the Sandspit.

Funding for the 2016 WSP season was provided by CSP Natural Resources Maintenance funding, Environmental Enhancement funds administered by CDFW's Office of Spill Prevention and Response, MDO mitigation funds, and District Home Base funding. Approximately \$136,000 was spent on the WSP program this season. This amount included a full time predator control specialist and an agreement with the CCC for fence installation but did not include the WSP Coordinator's time.

Future Management

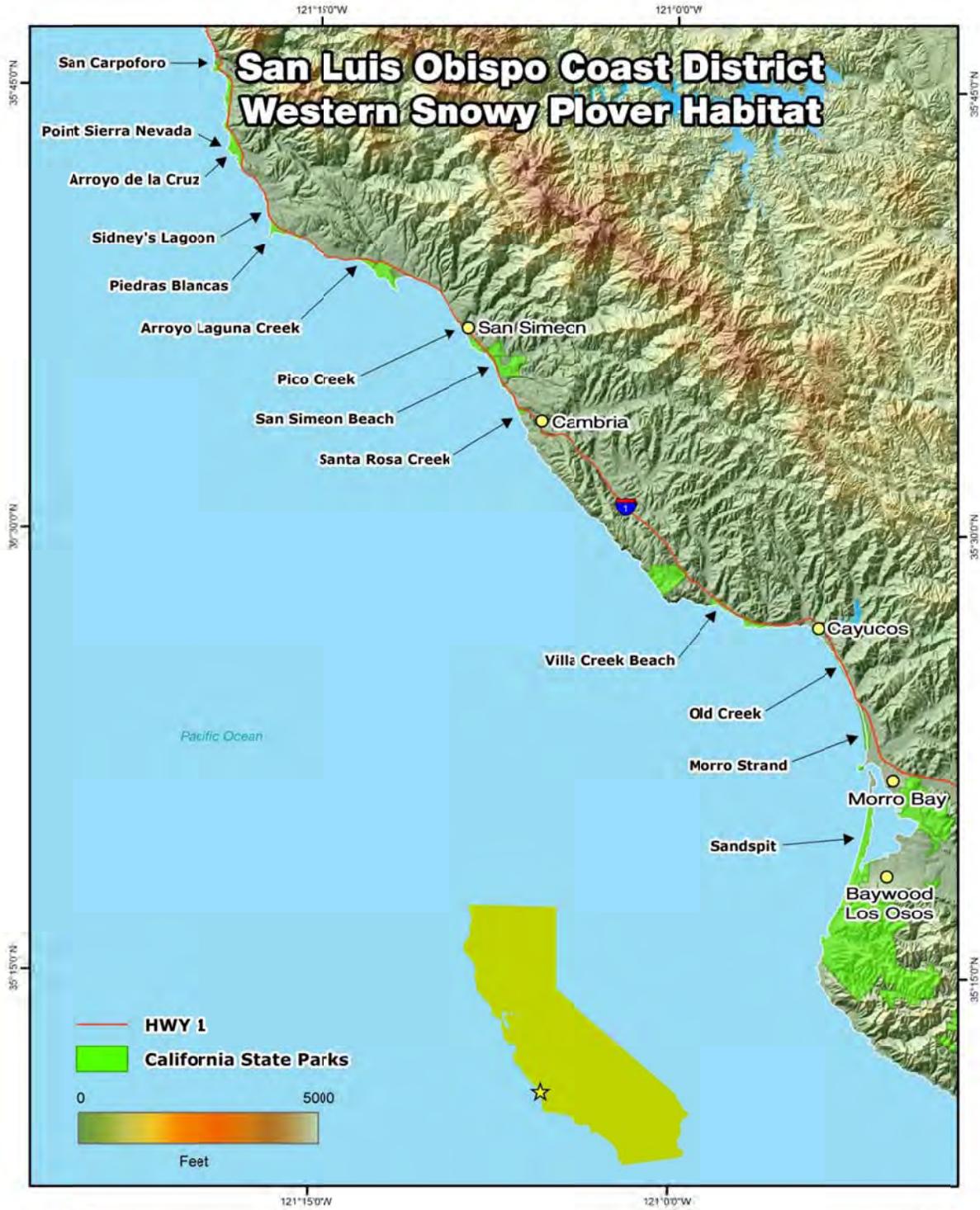
One of the priority goals of the District is to increase the population of breeding WSP and provide long term protection of this species and its habitat year round. In order to maintain and improve nest success for future years, it is important to maintain and improve the management of the WSP program. The 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.

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.

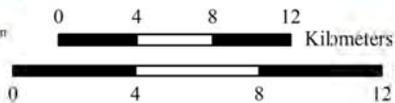
11. Continue to visit other WSP areas to learn about how other programs are managed and monitored.
12. Continue enforcement of CSP regulations throughout the year. Continue daily vehicle patrols by CSP Ranger staff to enforce rules and regulations affecting WSP habitat (i.e., dogs on beach, illegal fires, 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.
13. Establish a communication system through which concerned beachgoers can report illegal activities to Rangers (such as dog walking, fireworks, etc.) that are a threat to WSP.
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 with outreach programs, such as the educational booth at Morro Rock and the Junior Ranger Program, to educate 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 4th 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. Provide training to monitors on how to operate wildlife cameras near WSP nests with minimal disturbance to WSP.

Appendix 1 – Site Maps



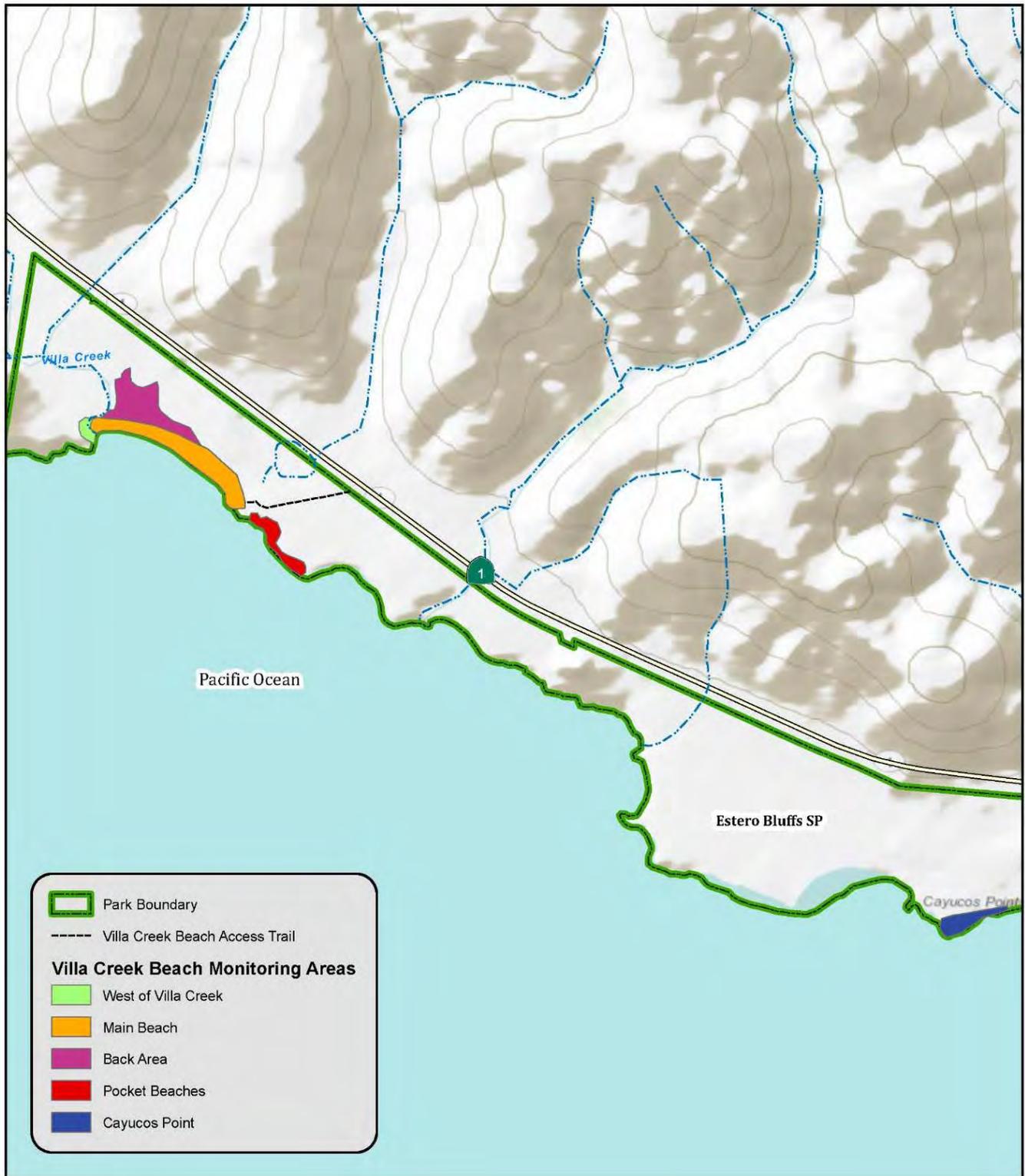
CA Department of Parks & Recreation
San Luis Obispo Coast District
Created by Jeff Ebner
September 10, 2014



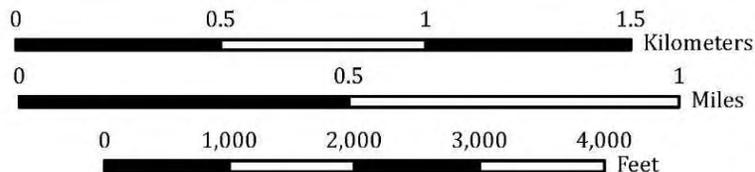
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Universal Transverse Mercator Projection
NAD 1983 UTM Zone 10N



Esteros Bluffs State Park



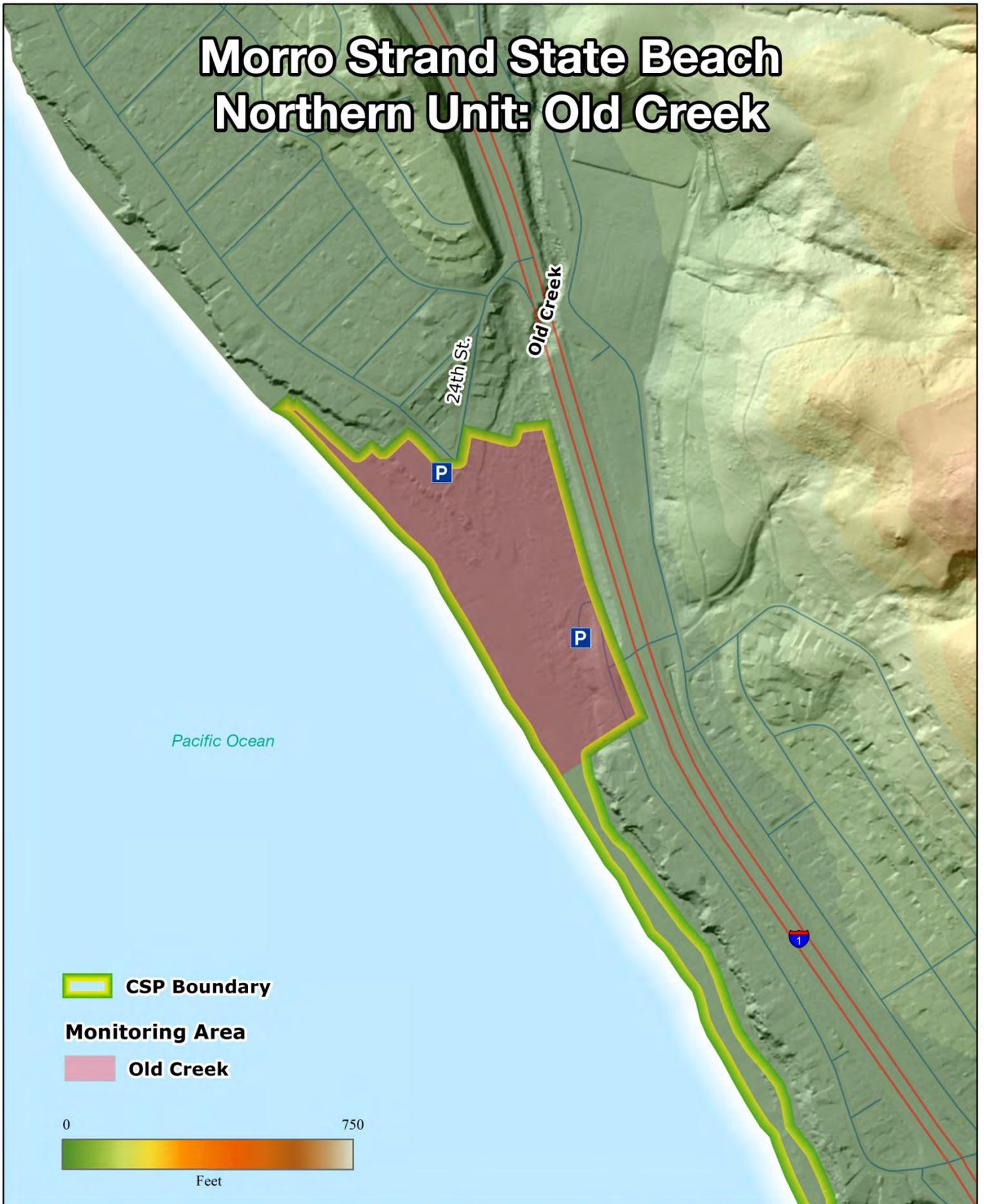
Jeff Ebner
September 1, 2012



1 : 18,000



Morro Strand State Beach Northern Unit: Old Creek



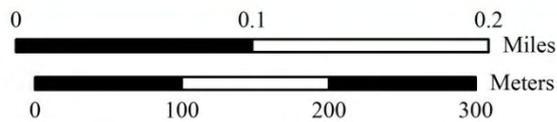
 **CSP Boundary**

Monitoring Area

 **Old Creek**



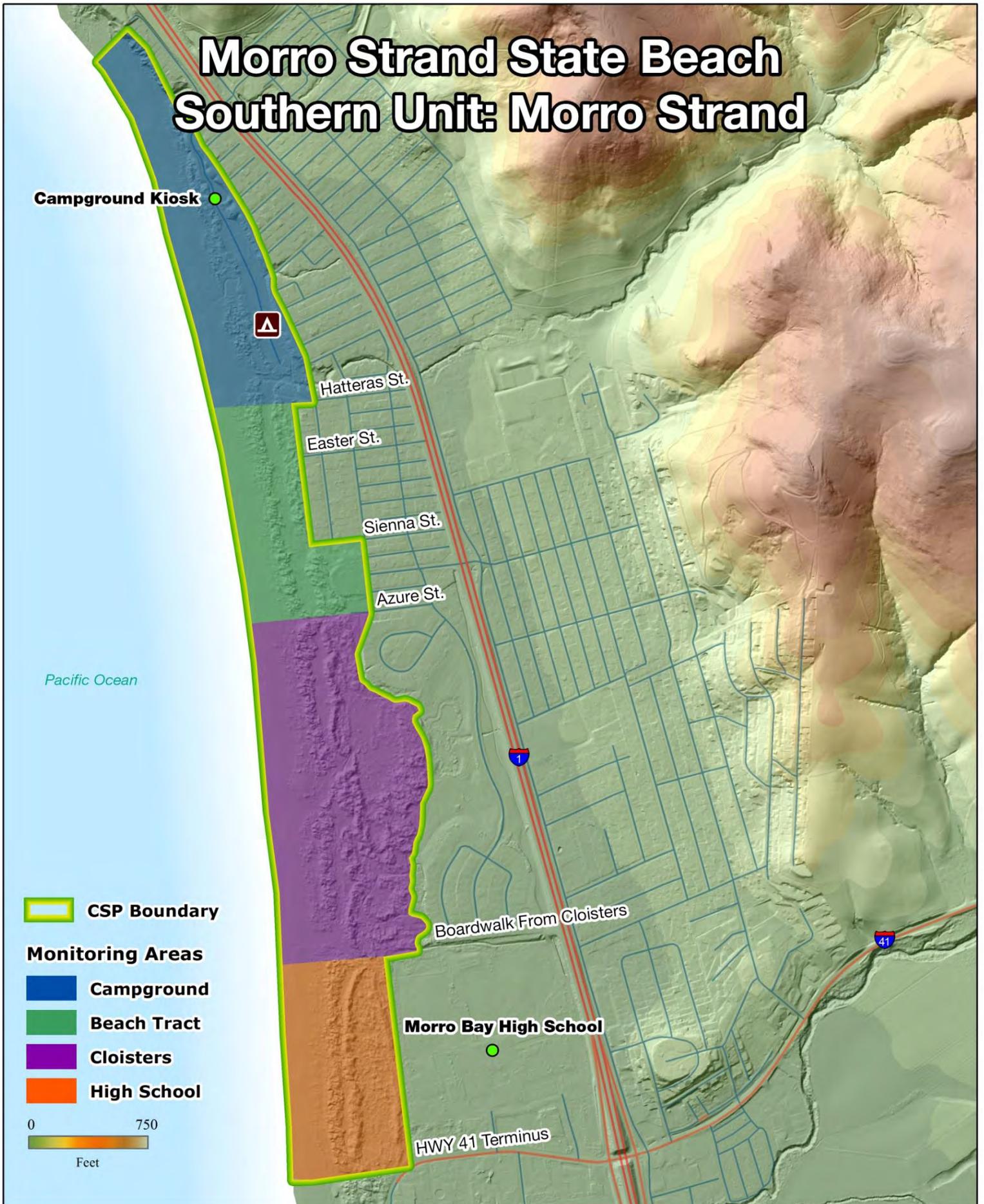
1 : 5,000
State Plane Coordinate System
NAD 1983 California Zone V



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



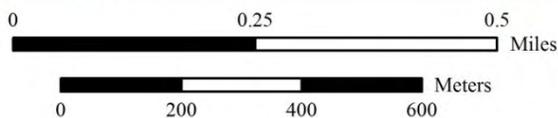
Boardwalk From Cloisters

Morro Bay High School

HWY 41 Terminus



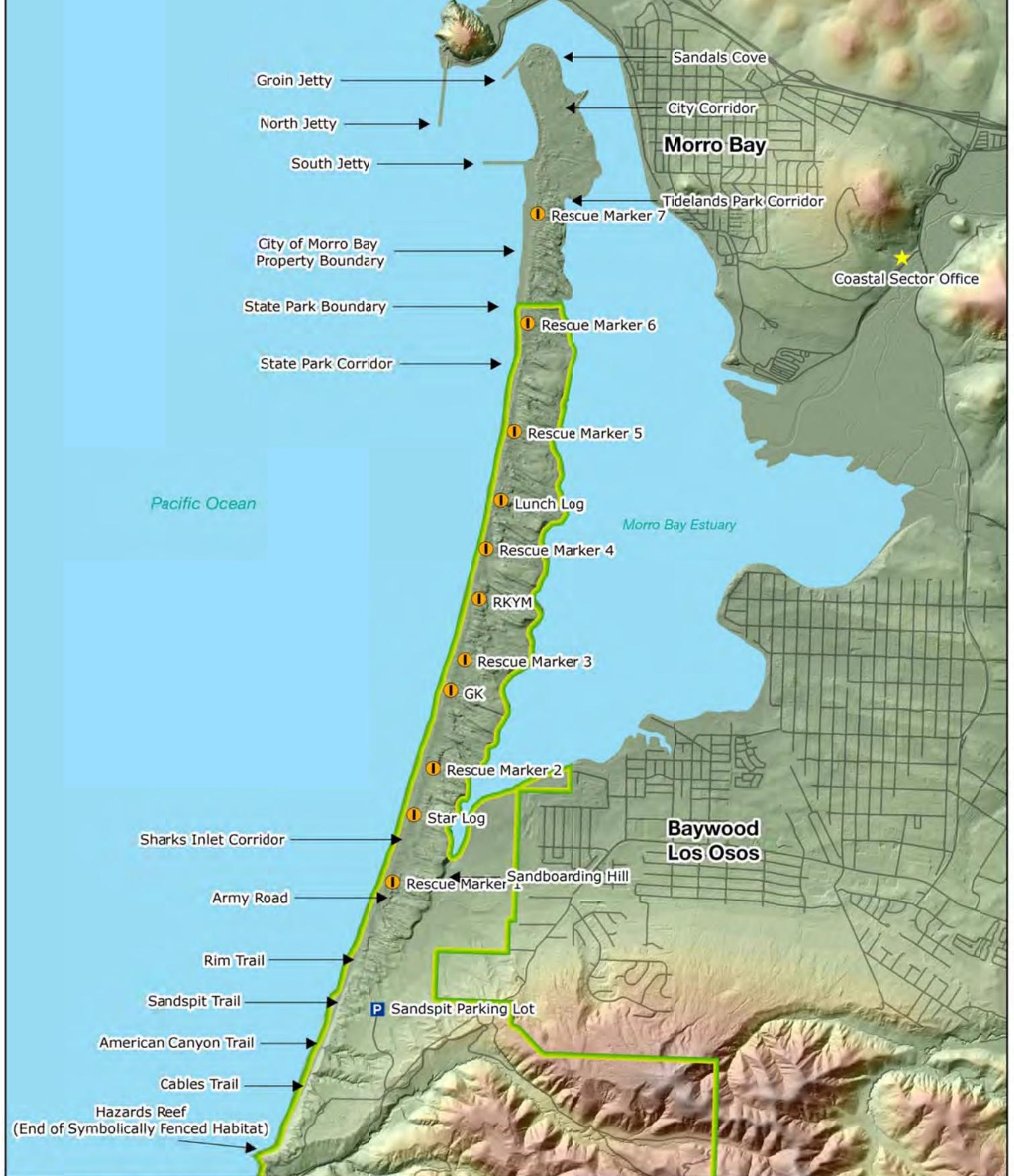
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State Plane Coordinate System
NAD 1983 California Zone V



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 SSS018 on the south half of the Sandspit between Rescue Marker Three and Rocky Mounds.

Hatch.

RM3 - RkYm

SSS018



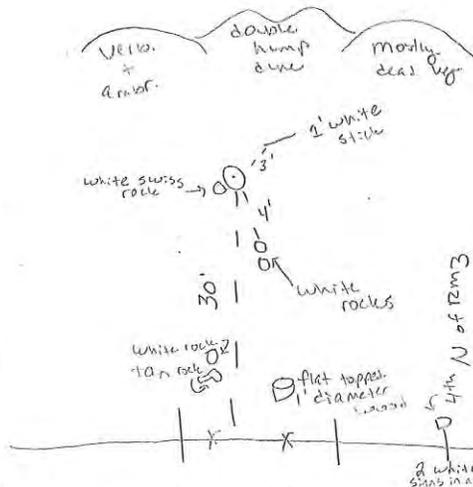
4-26 1E, active 4/27 1E 4/28 1E, active, BNB 4/29 2E, BNB	SSS018 4-26-16.jpg 5/2 3E, B01 5/3 B0N 5/4 3E 5/5 B0N 5/6 B01, 3E	5/9 3E 5/10 B0N, 3E 5/11 3E 5/12 B01 5/13 B0N, 3E	5/16 3E, active 5/17 3E, BNB 5/18 3E, active 5/19 B01 5/20 B01, 3E	5/23 B01, 3E 5/24 B01 5/25 3E, BNB, BWD 5/26 B01 5/27 3E	SSS018view 4-26-14.jpg 5/30 NB empty, 3 pips found in NB, BNB, BWD - Hatch confirmed 5/28
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RM3 - RkYm

SSS018

Hatch

Nest Map



Nest #: SSS018
Date Found: 4-26-16
Number of Eggs When Found: 1
Number of Eggs in Completed Clutch: 3
Float Data: N/A
Dates of Subsequent Eggs: 4/29, 5/1
Predicted Hatching Date: 5/28
Date Eggs Last Observed: 5/27
Date Nest First Observed Empty: 5/30
Fate -- Hatch or Fail: Hatch
Cause of Failure: N/A
Evidence of Failure: N/A
Evidence of Hatch: Pips in NB
Date of Hatch: 5/28
Number of Eggs Hatched: 3
Colored Band Combinations: N/A
Lat/Long: 10 S 693883 3911320
Exclosure Date: N/A
Exclosure Builders: N/A

E = egg; BNB = Bird nearby; BON = Bird on nest; BWD = Broken wing display; NB = nest bowl

Appendix 3 – WSP Population Census Data on District Beaches October 2015-September 2016

Date	Hearst San Simeon State Park	Point Arroyo								Date	Villa Creek Beach	M	F	Unknown	Juvenile	Chick	Old Creek	Morro Strand	M	F	Unknown	Juvenile	Chick	Sandspit	M	F	Unknown	Juvenile	Chick
		San Carpofooro	Sierra Nevada	de la Cruz	Sidney's Lagoon	Piedras Blancas	Arroyo Laguna	San Simeon Creek	Santa Rosa Creek																				
10/06/15	78	0	0	-	-	0	65	13	0	10/06/15	39			39		0	46			46			255			255			
10/14/15	129	5	-	-	-	0	110	14	0	10/13/15	34			34		0	114			114			160			160			
10/20/15	173	0	0	-	-	0	161	12	-	10/20/15	30			30		0	93			93			160			160			
10/27/15	187	0	0	0	-	0	170	17	-	10/27/15	41			41		0	43			43			86			86			
11/03/15	172	0	-	-	-	-	145	27	-	11/03/15	32			32		1	137			137			131			131			
11/10/15	156	0	1	-	0	0	127	28	-	11/10/15	27			27		0	149			149			91			91			
11/17/15	164	0	-	0	0	-	107	57	-	11/17/15	25			25		-	117			117			135			135			
11/19/15	42	-	-	-	-	-	-	42	-	12/01/15	58			58		-	113			113			107			107			
12/15/15	180	0	0	-	0	0	76	104	-	12/08/15	73			73		-	170			170			115			115			
01/21/16*	193	0	0	0	0	-	0	193	0	12/15/15	31			31		0	150			150			-			-			
02/11/16	195	-	-	-	-	-	-	195	-	01/07/16	-					-	212			212			-			-			
02/18/16	136	-	-	-	-	0	0	136	-	01/20/16*	0					0	5			5			123			123			
03/17/16	1	-	-	1	-	-	-	-	-	01/21/16	0					-	-					-			-				
04/26/16	11	1	0	0	0	0	10	0	0	01/25/16	102			102		-	6			6			-			-			
05/18/16*	16	3	-	-	0	-	7	6	0	02/02/16	12			12		-	3			3			-			-			
05/23/16	2	0	-	-	-	-	2	0	-	02/16/16	4			4		0	19			19			42			42			
05/31/16	0	0	0	-	-	-	0	0	-	03/05/16	-					10	-					-			-				
06/06/16	0	0	-	0	-	-	0	0	-	03/22/16	25	13	6	6		-	6	3	3			159	47	57	55				
06/15/16	0	0	-	-	-	-	0	0	0	04/12/16	7	3	4			-	4	4				167	74	78	15				
06/22/16	0	0	0	-	0	-	0	0	-	05/09/16	-					-	10	5	5			-			-				
06/29/16	0	0	-	-	-	-	0	0	-	05/10/16	6	3	2	1		-	10	6	2	2		131	69	55	7	2			
07/06/16	0	0	-	-	-	-	0	0	-	05/17/16*	8	4	4			-	7	5	2			154	66	81	7	1	1		
07/13/16	1	0	-	0	-	-	1	0	-	06/28/16	7	3	4			-	4	3	1		2	170	76	75	19	7	5		
07/27/16	30	-	-	-	-	-	21	9	-	07/19/16	6	2	4			-	8	1	4	2	1	172	48	21	89	14	1		
08/24/16	45	9	6	-	0	-	30	0	-	08/23/16	21			21		-	95			95		186	4	6	167	9			
09/13/16	92	22	0	0	-	0	70	0	-	09/20/16	30		1	27	2	-	120		2	114	4	115	6	4	103	2			
09/22/16	81	-	0	-	-	-	81	0	0																				

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

- Indicates survey not conducted, while "0" indicates no WSP observed

= Indicates the change from winter surveys to breeding season surveys

Appendix 4 -- Banded WSP with Known Origins Observed on District Beaches October 2015 - February 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
A:G/W	J	10/13/15	10/13/15	1	VAFB, '15	Sandspit	
AB:GO	U	10/6/15	2/28/16	8	Salinas NWR, '11	Arroyo Laguna, San Simeon	
AN:NG	J	10/14/15	10/14/15	1	VAFB, '15	San Carpoforo	
AN:WW	J	10/14/15	2/11/16	8	VAFB, '15	Arroyo Laguna, San Simeon	
AN:YY	J	10/14/15	2/11/16	9	VAFB, '15	Arroyo Laguna, San Simeon	
AP:RB	U	10/6/15	12/8/15	6	Monterey Bay Aquarium, '14	Sandspit	
AR:YG	F	10/6/15	1/7/16	3	Salinas SB, '13	Morro Strand, Sandspit	
AW:WO	J	11/3/15	11/10/15	2	Zmudowski SB, '15	San Carpoforo, Arroyo Laguna	
B/A/B:G	J	10/6/15	12/15/15	7	Oregon, '15	Morro Strand, Sandspit	
B:OR	F	10/6/15	1/25/16	7	VAFB, '13	Villa Creek, Morro Strand	formerly NB:OR
BA:BR	M	11/3/15	11/3/15	1	Salinas SB, '13	Arroyo Laguna	
bA:WY	F	10/13/15	1/7/16	9	Moss Landing Salt Ponds, '14	Morro Strand	banded as an adult
BB:AB	J	10/14/15	2/11/16	10	ODSVRA, '15	San Carpoforo, Arroyo Laguna, San Simeon, Morro Strand	
BB:AW	J	11/3/15	2/25/16	11	ODSVRA, '15	Arroyo Laguna, San Simeon, Morro Strand, Sandspit	
BB:OY	U	1/20/16	1/20/16	1	ODSVRA, '15	Sandspit	
bY:RB	M	10/6/15	1/20/16	2	Marina SB, '15	Sandspit	banded as an adult
GA:AR	J	10/6/15	11/17/15	6	ODSVRA, '15	Sandspit	
GA:OY	J	10/6/15	10/13/15	2	ODSVRA, '15	Sandspit	
GA:RW	U	10/6/15	12/2/15	5	ODSVRA, '14 or '15	Arroyo Laguna, Morro Strand, Sandspit	
GA:VR	F	10/6/15	12/8/15	2	ODSVRA, '09	Sandspit	
GA:VW	J	11/10/15	11/11/15	2	ODSVRA, '15	Arroyo Laguna	
GG:AG	F	10/14/15	2/11/16	8	ODSVRA, '13 or '14	Arroyo Laguna, San Simeon	
GG:AY	U	10/27/15	12/15/15	5	ODSVRA, '13	Arroyo Laguna	
GG:OG	M	10/6/15	11/17/15	5	ODSVRA, '14	Sandspit	
GG:PB	F	10/14/15	2/11/16	7	ODSVRA, '12	Arroyo Laguna, San Simeon	
GG:WB	F	11/10/15	2/16/16	5	ODSVRA, '13	Morro Strand, Sandspit	
GO:GB	J	10/6/15	1/29/16	9	Fort Ord Dunes SP, '15	Arroyo Laguna, San Simeon, Morro Strand, Sandspit	
KA:GR	J	10/3/15	2/28/16	12	Eden Landing, San Francisco Bay, '15	Arroyo Laguna, San Simeon, Morro Strand	
LY:OO	U	1/8/16	2/18/16	6	Zmudowski SB, '15	San Simeon	
NO:BY	F	10/13/15	1/29/16	11	VAFB, '13	Arroyo Laguna, San Simeon, Morro Strand, Sandspit	
NO:NR	J	10/3/15	2/18/16	6	VAFB, '15	Arroyo Laguna, San Simeon, Sandspit	
NO:PB	F	10/6/15	2/18/16	13	VAFB, '14	Arroyo Laguna, San Simeon, Villa Creek	
NR:GG	J	11/3/15	12/8/15	3	VAFB, '15	Sandspit	
NR:OY	J	10/6/15	11/17/15	4	VAFB, '15	Arroyo Laguna, Sandspit	
NW:BW	J	10/27/15	2/16/16	6	VAFB, '15	Arroyo Laguna, Morro Strand	
NY:AG	J	11/17/15	12/1/15	2	VAFB, '15	Sandspit	
NY:RY	F	10/6/15	1/25/16	12	VAFB, '14	Villa Creek, Morro Strand, Sandspit	
NY:WW	J	12/8/15	2/18/16	4	VAFB, '15	San Simeon, Morro Strand	
NY:WY	J	10/27/15	1/7/16	3	VAFB, '15	Arroyo Laguna, Villa Creek, Morro Strand	
O:AB	F	10/6/15	10/27/15	2	VAFB, '12	Sandspit	formerly NO:AB
OA:WW	U	1/21/16	1/30/16	2	Salinas NWR, '12	San Simeon	

Appendix 4 -- Banded WSP with Known Origins Observed on District Beaches October 2015 - February 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
OA:YA	M	10/6/15	2/29/16	7	Pajaro Spit '14	Sandspit	
OL:B	U	12/15/15	1/21/16	2	Salinas SB, '09	San Simeon	Formerly OL:BP
oO:BY	F	12/1/15	12/1/15	1	Monterey Bay, '11	Sandspit	banded as an adult
OW:WR	J	10/6/15	2/2/16	19	Fort Ord Dunes SP, '15	Villa Creek	
P:G/Y	J	11/3/15	2/20/16	5	VAFB, '15	Morro Strand	
P:Y/G	M	10/6/15	12/15/15	3	VAFB, '12	Sandspit	
PG:BW	M	10/6/15	1/20/16	5	ODSVRA, '14	Sandspit	
PG:OB	F	10/6/15	1/7/16	4	ODSVRA, '14	Morro Strand, Sandspit	
PG:OW	J	11/3/15	1/14/16	4	ODSVRA, '15	Arroyo Laguna, San Simeon	
PG:WG	J	10/6/15	1/8/16	7	ODSVRA, '15	San Simeon, Sandspit	
PG:YY	U	1/20/16	1/20/16	1	ODSVRA, '15	San Simeon	
PV:AB	U	10/6/15	1/25/16	10	ODSVRA, '14 or '15	Villa Creek, Morro Strand, Sandspit	
PV:AR	J	10/6/15	10/13/15	2	ODSVRA, '15	Morro Strand, Sandspit	
PV:BY	J	11/4/15	11/4/15	1	ODSVRA, '15	Morro Strand	
PV:GG	U	1/7/16	1/7/16	1	ODSVRA, '14 or '15	Morro Strand	
PV:PB	J	10/6/15	12/15/15	4	ODSVRA, '15	San Simeon, Sandspit	
PV:RY	J	10/20/15	2/11/16	7	ODSVRA, '15	Arroyo Laguna, San Simeon	
PV:WR	U	1/7/16	2/18/16	4	ODSVRA, '15	San Simeon, Morro Strand	
PV:YW	J	10/27/15	10/27/15	1	ODSVRA, '15	Arroyo Laguna	
R/W/R:G	J	12/15/15	12/15/15	1	Oregon, '15	San Simeon	
RA:AO	J	10/6/15	10/6/15	1	Pajaro Spit, '15	Arroyo Laguna	
RA:GY	F	10/20/15	2/18/16	9	Salinas NWR, '14	Arroyo Laguna, San Simeon	
RA:WR	J	10/20/15	1/7/16	12	Moss Landing SB, '15	Morro Strand	
RB:BG	J	10/13/15	11/17/15	4	Fort Ord Dunes SP, '15	Morro Strand, Sandspit	
RG:YB	M	10/6/15	1/21/16	13	Oregon, '11	Morro Strand, Sandspit	
RO:BO	J	10/14/15	1/8/16	6	Salinas NWR, '15	Arroyo Laguna, San Simeon, Morro Strand	
RR:WW	M	10/6/15	1/20/16	6	ODSVRA, '10	Morro Strand, Sandspit	
rW:BR	M	10/20/15	1/29/16	6	Zmudowski SB, '09	Arroyo Laguna, San Simeon	banded as an adult
S:RR	F	10/13/15	2/16/16	6	VAFB, '12	Sandspit	NS:RR missing N
V:W	M	10/13/15	1/20/16	8	ODSVRA, '08	Morro Strand, Sandspit	Formerly PV:W
VV:GW	J	10/20/15	2/11/16	7	ODSVRA, '15	Arroyo Laguna, San Simeon, Morro Strand	
VV:RG	J	10/20/15	10/20/15	1	ODSVRA, '15	Morro Strand	
VV:RY	J	11/10/15	12/15/15	3	ODSVRA, '15	Arroyo Laguna, San Simeon	
VV:WB	M	11/3/15	12/15/15	5	ODSVRA, '14	Morro Strand	
VV:YR	U	10/6/15	2/11/16	9	ODSVRA, '14	Arroyo Laguna, San Simeon	
W/B:G	J	10/6/15	10/13/15	2	Oregon, '15	Sandspit	
W/O:G	J	10/20/15	1/21/16	4	Oregon, '15	Arroyo Laguna, San Simeon, Morro Strand, Sandspit	
W/R:G	J	10/14/15	10/14/15	1	Oregon, '15	Arroyo Laguna	
W:OB	U	10/3/15	2/11/16	7	VAFB, '13	Arroyo Laguna, San Simeon	Formerly NW:OB
WA:GA	M	10/6/15	12/8/15	5	Pajaro Spit, '14	Sandspit	
WA:R	U	10/6/15	12/15/15	7	Oregon, '12	San Simeon	

Appendix 4 -- Banded WSP with Known Origins Observed on District Beaches October 2015 - February 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
WG:GG	M	10/13/15	11/17/15	4	Moss Landing Salt Ponds, '14	Sandspit	
WN:YR	J	10/14/15	10/14/15	1	San Francisco Bay NWR, '15	Arroyo Laguna	
WO:RB	J	11/10/15	2/18/16	8	Marina SB, '15	San Simeon, Morro Strand	
WR:AR	J	10/14/15	2/25/16	10	Pajaro Spit, '15	San Simeon	
WV:YS	M	10/6/15	10/20/15	2	Centerville Beach, '14	Morro Strand	Formerly WV:YY
WY:GA	F	10/6/15	2/18/16	10	Pajaro Dunes, '14	Arroyo Laguna, San Simeon	
Y:Y/G	F	10/6/15	12/8/15	6	VAFB, '13	Morro Strand, Sandspit	
YA:OY	F	10/6/15	10/13/15	2	Salinas SB, '10	Sandspit	
YO:GB	J	12/15/15	12/15/15	1	Marina SB, '15	San Simeon	
YO:OY	F	11/14/15	11/14/15	1	Fort Ord Dunes SP, '12	Sandspit	
YR:OW	M	10/6/15	1/7/16	6	Marina SB, '13	Morro Strand, Sandspit	
yR:WG	M	10/20/15	2/18/16	6	Monterey SB, '15	San Simeon, Sandspit	banded as an adult

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
A:G/W	U	9/22/16	9/22/16	1	VAFB, '15	Morro Strand	
AA:LL	J	8/20/16	9/22/16	2	Salinas NWR, '16	Arroyo Laguna, Villa Creek	
AB:GO	U	7/18/16	9/25/16	2	Salinas NWR, '11	Arroyo Laguna, Sandspit	
AN:BY	J	7/25/16	9/1/16	5	VAFB, '16	Villa Creek, Morro Strand, Sandspit	
AN:GB	M	5/10/16	8/2/16	24	VAFB, '15	Sandspit	
AN:PG	J	8/1/16	8/3/16	2	VAFB, '16	Morro Strand, Sandspit	
AN:WW	U	8/8/16	8/31/16	3	VAFB, '15	Sandspit	
AN:YY	U	3/3/16	4/7/16	3	VAFB, '15	San Simeon	
AP:RB	F	3/16/16	3/16/16	1	Monterey Bay Aquarium, '14	Sandspit	
AW:GL	J	7/28/16	8/9/16	2	Fort Ord Dunes SP '16	Sandspit	
AW:RA	F	3/25/16	3/25/16	1	Salinas NWR, '14	Sandspit	
AW:WB	F	3/9/16	5/24/16	4	Marina SB, '14	Villa Creek, Morro Strand, Sandspit	
AY:AA	M	3/16/16	9/20/16	36	Marina SB, '14	Sandspit	hatched one nest successfully; possibly lost two nests to coyote depredation
AY:BL	J	9/15/16	9/22/16	3	Fort Ord Dunes SP, '16	Morro Strand, Sandspit	
AY:OL	J	7/21/16	8/3/16	2	Fort Ord Dunes SP, '16	Sandspit	
B/A/B:G	F	3/8/16	9/22/16	8	Oregon, '15	Morro Strand, Sandspit	
B:OR	F	3/9/16	9/22/16	28	VAFB, '13	Villa Creek, Morro Strand, Sandspit	formerly NB:OR; possibly hatched one nest successfully; possibly lost one nest due to abandonment
bA:WY	F	8/22/16	8/22/16	1	Moss Landing Salt Ponds, '14	Sandspit	banded as an adult
BA:YW	U	7/25/16	7/25/16	1	Zmudowski SB or Fort Ord Dunes SP, '15	Sandspit	
BB:AW	U	3/3/16	7/20/16	5	ODSVRA, '15	Arroyo Laguna, San Simeon, Sandspit	
BB:GB	M	4/25/16	9/22/16	46	ODSVRA, '15	Sandspit	hatched one nest successfully with two confirmed fledges; lost two nests to coyote depredation
BB:GR	U	8/23/16	9/15/16	3	ODSVRA, '15	Sandspit	
BB:OB	J	8/23/16	9/22/16	3	ODSVRA, '16	Sandspit	
BB:OW	J	7/27/16	7/31/16	2	ODSVRA, '16	Arroyo Laguna	
BB:RR	J	7/14/16	7/20/16	2	ODSVRA, '16	Sandspit	
BB:VY	J	8/29/16	9/22/16	4	ODSVRA, '16	Morro Strand, Sandspit	
BG:YL	J	7/25/16	7/26/16	2	Marina SB, '16	Sandspit	
BW:GR	U	3/30/16	3/30/16	1	Fort Ord Dunes SP '13	Sandspit	
bY:RB	M	8/23/16	9/8/16	4	Marina SB, '15	Sandspit	banded as an adult
G:G/Y/G	J	9/13/16	9/22/16	3	VAFB, '16	Morro Strand, Sandspit	
GA:BY	J	9/5/16	9/13/16	3	ODSVRA, '16	Arroyo Laguna	
GA:WR	J	7/18/16	7/25/16	2	ODSVRA, '16	Sandspit	
GA:WW	J	9/6/16	9/6/2016	1	ODSVRA, '16	Sandspit	
GG:AB	F	7/22/16	7/22/16	1	ODSVRA, '15	Sandspit	
GG:AG	F	3/4/16	9/13/16	7	ODSVRA, '13 or '14	Arroyo Laguna, San Simeon	

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
GG:AW	U	3/10/16	3/10/16	1	ODSVRA, '13	San Simeon	
GG:OG	M	3/15/16	9/22/16	52	ODSVRA, '14	Sandspit	hatched two nests successfully; possibly lost one nest to tide
GG:PB	F	3/16/16	9/25/16	47	ODSVRA, '12	Arroyo Laguna, Sandspit	hatched two nests successfully; lost one nest due to abandonment
GG:WB	M	3/16/16	9/22/16	18	ODSVRA, '13	Sandspit	hatched one nest successfully
GO:GB	U	8/1/16	9/25/16	7	Fort Ord Dunes SP, '15	Arroyo Laguna, Morro Strand, Sandspit	
GW:WG	U	9/13/16	9/22/16	3	Oregon, '10	Morro Strand	
KK:PY	U	8/23/16	8/23/16	1	San Francisco Bay NWR, '15	Morro Strand	
L:Y/G	J	9/22/16	9/22/16	1	VAFB, '16	Sandspit	
LL:AA	J	8/20/16	8/20/16	1	Monterey Bay, '16	Villa Creek	
LO:RY	J	9/4/16	9/6/16	2	Salinas NWR, '16	Arroyo Laguna, Morro Strand	
LO:YW	J	8/26/16	8/26/16	1	Zmudowski SB, '16	Sandspit	
LW:AB	J	7/28/16	7/28/16	1	Fort Ord Dunes SP, '16	Sandspit	
LW:AW	J	8/17/16	8/24/16	3	Salinas SB, '16	San Carpoforo, Villa Creek	
LW:OO	M	9/13/16	9/13/16	1	Pajaro Spit, '15	Sandspit	
NB:BW	J	8/29/16	9/15/16	3	VAFB, '16	Morro Strand	
NB:YR	F	5/16/16	6/27/16	13	VAFB, '15	Sandspit	lost one nest due to tide
NO:BY	U	7/21/16	9/20/16	5	VAFB, '13	Arroyo Laguna	
NO:OR	J	8/29/16	9/29/16	5	VAFB, '16	Villa Creek, Morro Strand	
NO:PB	F	3/10/16	3/10/16	1	VAFB, '14	San Simeon	
NO:WB	J	9/6/16	9/23/16	4	VAFB, '16	Arroyo Laguna, Morro Strand	
NR:GG	M	3/8/16	9/20/16	41	VAFB, '15	Sandspit	hatched one nest successfully; possibly lost two nests to coyote depredation
NW:BW	U	3/8/16	3/8/16	1	VAFB, '15	Sandspit	
NW:GB	J	8/29/16	9/22/16	4	VAFB, '16	Sandspit	
NW:YW	F	4/14/16	4/14/16	1	VAFB, '15	Sandspit	
NY:RY	F	3/10/16	9/20/16	35	VAFB, '14	Toro Creek, Morro Strand, Sandspit	lost two nests to coyote depredation and one nest to American Crow depredation; also had one nest with an unknown fate on private property (Toro Creek) near Morro Strand
NY:WB	J	9/20/16	9/20/16	1	VAFB, '16	Morro Strand	
NY:YY	F	6/13/16	6/13/16	1	VAFB, '12	Sandspit	
O:AB	F	9/23/16	9/23/16	1	VAFB, '12	Arroyo Laguna	formerly NO:AB
OA:YA	M	3/8/16	9/20/16	41	Pajaro Spit '14	Sandspit	hatched one nest successfully
OO:GL	J	8/31/16	8/31/16	1	Salinas NWR, '16	Morro Strand	
OO:RL	J	7/22/16	7/22/16	1	Fort Ord Dunes SP, '16	Sandspit	
OW:WR	F	3/9/16	9/22/16	56	Fort Ord Dunes SP, '15	Villa Creek	lost one nest to depredation by an unknown predator

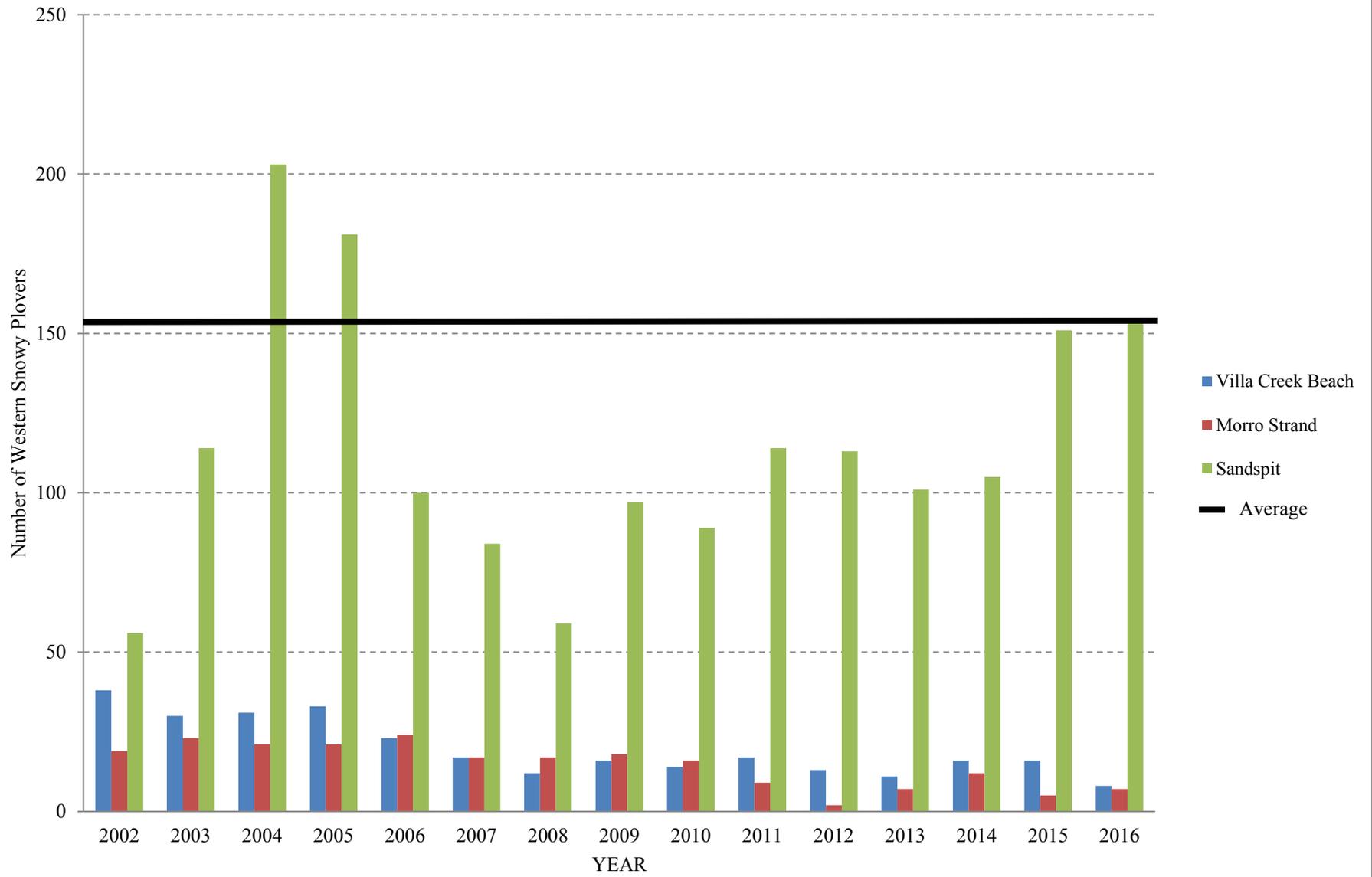
Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
oY:BR	M	8/1/16	9/20/16	8	Fort Ord Dunes SP, '16	Sandspit	banded as an adult
OY:RL	J	8/9/16	9/20/16	5	Fort Ord Dunes SP, '16	Morro Strand, Sandspit	
P:G/Y	U	3/10/16	3/18/16	2	VAFB, '15	Morro Strand	
P:Y/G	M	3/23/16	9/20/16	32	VAFB, '12	Sandspit	hatched one nest successfully; possibly lost one nest to an unknown cause
PG:BG	J	7/19/16	8/20/16	3	ODSVRA, '16	Villa Creek, Sandspit	
PG:BW	M	3/16/16	9/22/16	50	ODSVRA, '14	Sandspit	hatched one nest successfully
PG:OB	F	3/22/16	9/22/16	32	ODSVRA, '14	Sandspit	hatched one nest successfully; possibly hatched another nest successfully
PG:OG	M	7/31/16	8/4/16	2	ODSVRA, '15	Morro Strand	
PG:YB	U	9/1/16	9/1/16	1	ODSVRA, '15	Sandspit	
PG:YY	M	4/8/16	4/18/16	2	ODSVRA, '15	Sandspit	
PV:--	F	3/18/16	4/4/16	3	ODSVRA, '14 or '15	Villa Creek, Sandspit	formerly PV:GG; released from Pacific Wildlife Care onto Villa Creek
PV:BY	M	3/29/16	3/29/16	1	ODSVRA, '15	Sandspit	
PV:PB	F	4/12/16	9/20/16	28	ODSVRA, '15	Sandspit	hatched one nest successfully; possibly lost one nest due to abandonment and another nest to tide
PV:RY	F	5/3/16	9/23/16	29	ODSVRA, '15	Arroyo Laguna, Villa Creek, Morro Strand, Sandspit	hatched one nest successfully while paired with VV:OR
PV:WR	U	3/3/16	6/20/16	2	ODSVRA, '15	San Simeon, Sandspit	
RA:GY	F	5/17/16	9/22/16	17	Salinas NWR, '14	Morro Strand, Sandspit	
RA:LL	J	9/15/16	9/15/16	1	Fort Ord Dunes SP, '16	Morro Strand	
RA:WR	F	3/9/16	3/22/16	2	Moss Landing SB, '15	Morro Strand, Sandspit	
RB:BG	F	3/22/16	8/10/16	37	Fort Ord Dunes SP, '15	Sandspit	hatched one nest successfully; possibly lost one nest to tide and one nest to coyote depredation
RB:OL	J	8/23/16	9/22/16	5	Marina SB, '16	Morro Strand	
RG:YB	M	8/23/16	9/22/16	4	Oregon, '11	Morro Strand	
RO:BO	U	9/23/16	9/23/16	1	Salinas NWR, '15	Arroyo Laguna	
RO:OL	J	9/2/16	9/2/16	1	Fort Ord Dunes SP, '16	Sandspit	
RR:AB	J	7/21/16	8/18/16	5	ODSVRA, '16	Morro Strand, Sandspit	
RR:BB	J	8/8/16	9/20/16	4	ODSVRA, '16	Morro Strand, Sandspit	
RR:BG	J	9/15/16	9/15/16	1	ODSVRA, '16	Morro Strand	
RR:VG	J	9/22/16	9/22/16	1	ODSVRA, '16	Morro Strand	
RR:VY	J	9/20/16	9/22/16	2	ODSVRA, '16	Morro Strand, Sandspit	
RR:WW	M	3/8/16	9/15/16	47	ODSVRA, '10	Sandspit	lost one nest to coyote depredation; possibly lost one other nest to coyote depredation and another to wind

Appendix 5 - Banded WSP With Known Origins Observed on District Beaches March - September 2016

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
S:RR	F	3/22/16	9/22/16	43	VAFB, '12	Sandspit	formerly NS:RR; hatched two nests successfully; possibly lost one nest to coyote depredation
sK:K/A K/L	M	6/7/16	7/14/16	5	Sea World, San Diego, '15	Morro Strand, Sandspit	
V:W	M	3/21/16	8/29/16	25	ODSVRA, '08	Morro Strand, Sandspit	formerly PV:W; hatched two nests successfully with four confirmed fledges
VG:VY	U	9/20/16	9/20/16	1	ODSVRA, '15	Morro Strand	
VV:GW	M	3/10/16	9/13/16	5	ODSVRA, '15	Arroyo Laguna, San Simeon	
VV:OR	M	4/26/16	7/14/16	25	ODSVRA, '15	Morro Strand, Sandspit	hatched one nest successfully with one confirmed fledge while paired with PV:RY
VV:RY	U	9/20/16	9/20/16	1	ODSVRA, '15 or '16	Sandspit	
W/O:G	U	8/26/16	9/23/16	3	Oregon, '15	Arroyo Laguna	
W:OB	U	7/27/16	9/23/16	5	VAFB, '13	Arroyo Laguna	formerly NW:OB
WA:GA	M	3/8/16	9/20/16	49	Pajaro Spit, '14	Sandspit	hatched one nest successfully; possibly lost two nests to coyote depredation
WA:LL	J	9/15/16	9/15/16	1	Moss Landing SB, '16	Morro Strand	
WB:GB	F	4/21/16	4/21/16	1	Pajaro Spit, '15	Morro Strand	
WB:WY	J	8/23/16	9/1/16	2	Pajaro Spit, '16	Morro Strand	
WG:OL	J	9/22/16	9/22/16	1	Sunset SB, '16	Morro Strand	
WG:WY	U	8/19/16	8/23/16	2	Pajaro Spit, '15	Morro Strand	
WO:AB	U	4/7/16	4/7/16	1	Pajaro Spit, '13	San Simeon	
WO:RB	U	3/10/16	3/10/16	1	Marina SB, '15	San Simeon	
WR:WL	J	8/19/16	8/23/16	2	Salinas SB, '16	Morro Strand	
WV:YS	M	3/22/16	5/19/16	8	Centerville Beach, '14	Sandspit	formerly WV:YY
WY:GA	F	3/4/16	9/22/16	10	Pajaro Dunes, '14	Arroyo Laguna, San Simeon, Sandspit	possibly lost one nest to coyote depredation

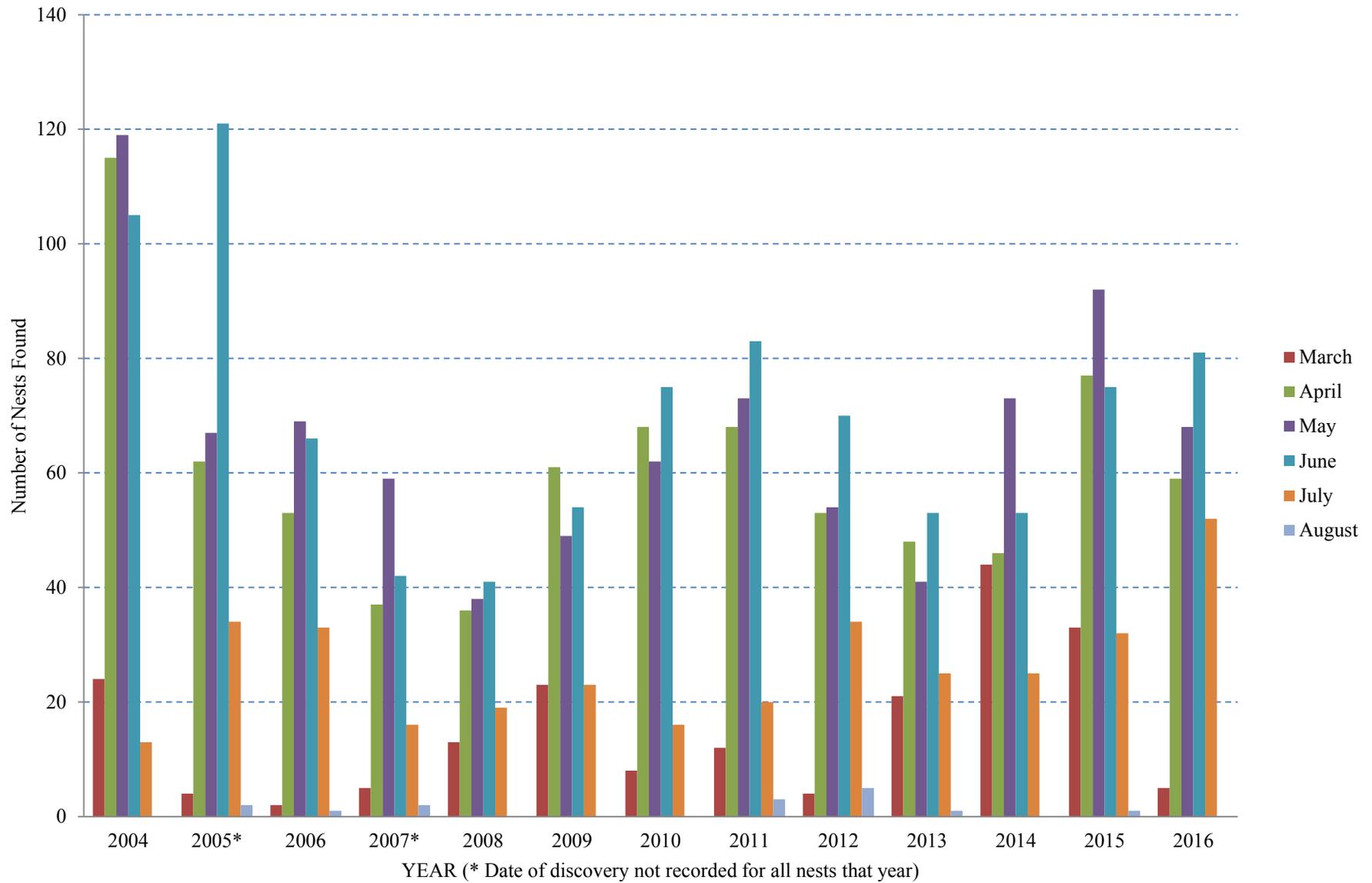
Appendix 6 - Breeding Window Survey Census 2002 - 2016



Appendix 7 – Injured WSP on District Beaches October 2015-September 2016

Date	Location	Sex	Age	Band Combo	Nest	Description of Injury	Actions taken	Comments
01/07/16	Morro Strand	M	Adult	YR:OW		Foraged exclusively on right leg	None	Appeared to be successfully foraging. Observer unsure whether WSP was injured or simply behaving peculiarly.
01/20/16	Sandspit	U	Adult			Held right leg back with foot dangling; never placed foot on ground	None	Flew fine
03/18/16	Villa Creek Beach	F	Adult	PV:--		Recently treated for a constriction wound on the right leg	Updated USFWS and ODSVRA	PV:-- was captured at ODSVRA on 3/9/16 due to a constriction wound to the right leg caused by a tightly wrapped hair. Pacific Wildlife Care in Morro Bay treated PV:-- until 3/18/16 when it was released on Villa Creek Beach.
03/28/16	Sandspit	F	Adult	PV:--		Recently treated for a constriction wound on the right leg	Updated USFWS and ODSVRA	Appeared to be behaving normally and recovering successfully. Later observed on 4/4/16 on the Sandspit and also seen on the City of Morro Bay property on 3/22/16.
07/02/16	Morro Strand	U	Chick		MS13	Black mark along flank - potentially tar	None	Chick was observed with black mark on flank on five separate occasions beginning 7/2/16. Mark remained on WSP after fledging on 7/12/16.

Appendix 8 – Number of Nests Found by Month on District Beaches 2004-2016



Appendix 8a -- Nest Initiation and Last Hatch Dates Summary for District Beaches

Hearst San Simeon State Park		
Year	First Nest Initiation	Last Nest Hatched
2016	11-May *	-
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*

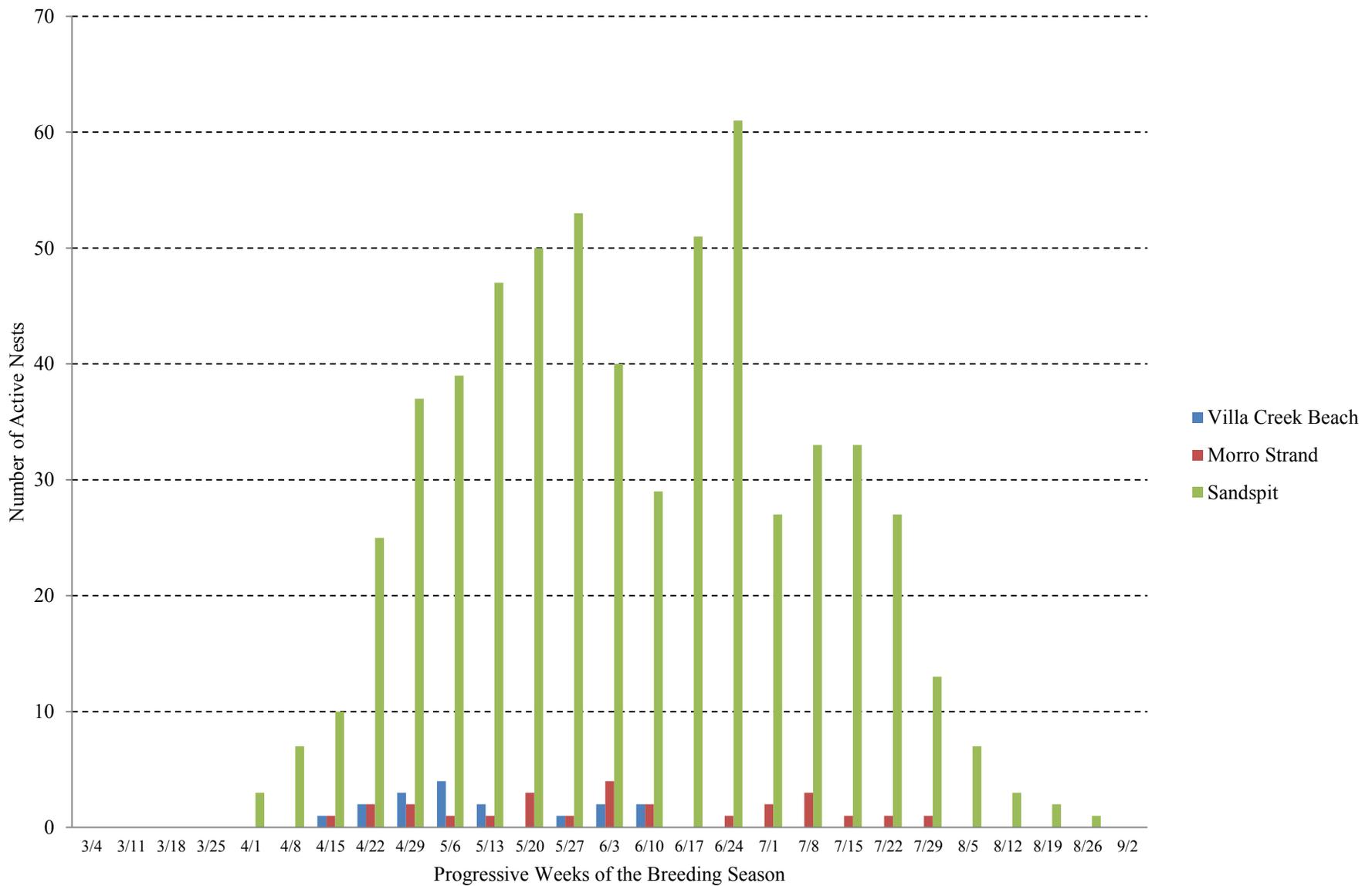
Villa Creek Beach		
Year	First Nest Initiation	Last Nest Hatched
2016	13-Apr	14-Jul*
2015	25-Mar	22-Jul
2014	21-Mar	21-Jul*
2013	5-Apr	22-Jun
2012	9-Apr	14-Aug
2011	5-Apr	29-Jul
2010	31-Mar*	28-Jul
2009	9-Mar	29-Jun
2008	17-Mar	5-Aug
2007	9-Mar	1-Aug
2006	24-Mar	26-Jul
2005	30-Mar	22-Jul
2004	18-Mar	6-Aug
2003	21-Mar	31-Jul
2002	27-Mar	28-Aug
2001	28-Mar	30-Jul

Morro Strand		
Year	First Nest Initiation	Last Nest Hatched
2016	11-Apr	3-Aug
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

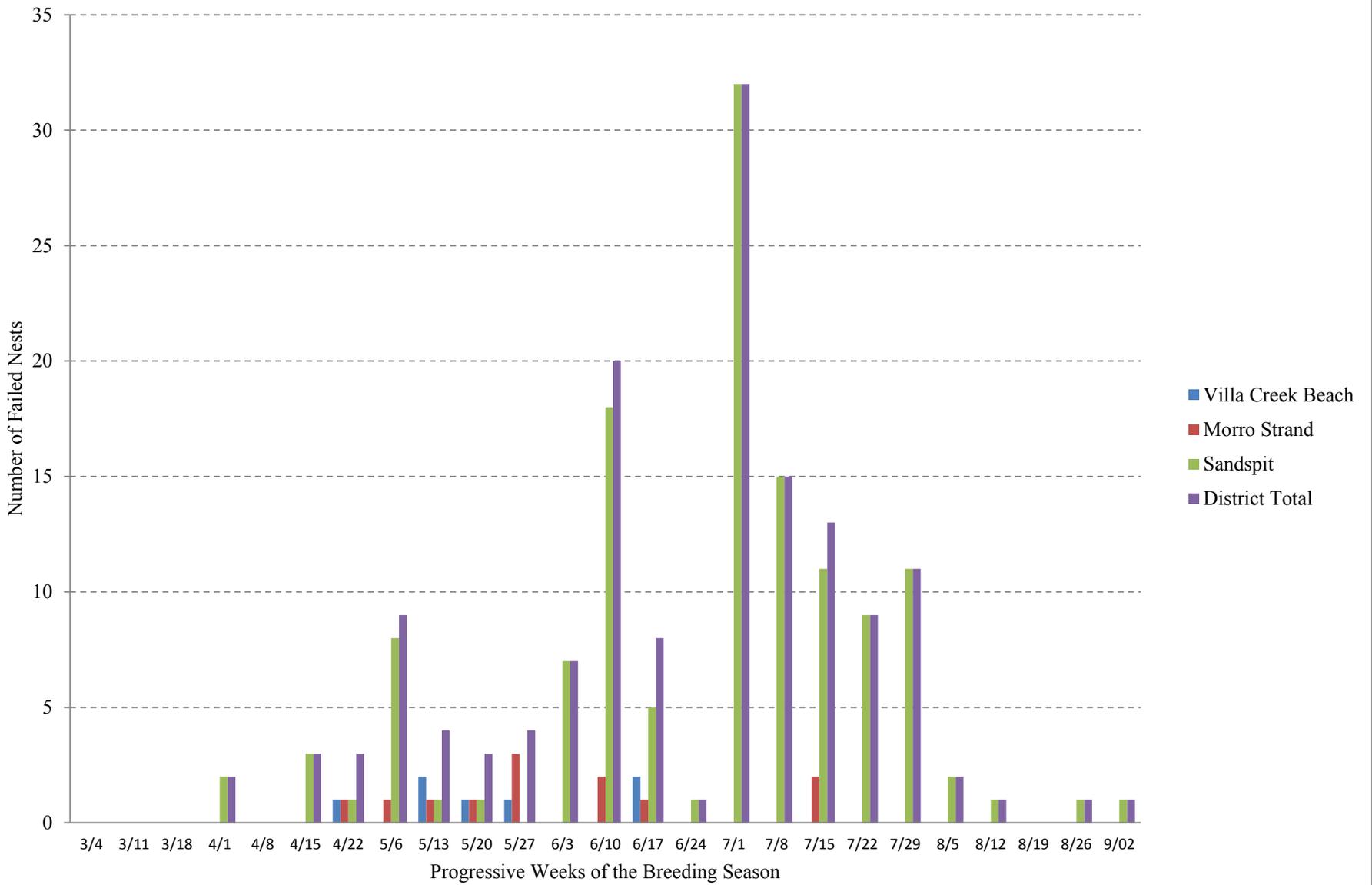
Sandspit		
Year	First Nest Initiation	Last Nest Hatched
2016	28-Mar	13-Aug
2015	13-Mar	24-Aug
2014	12-Mar	18-Aug
2013	21-Mar	12-Aug
2012	14-Mar	18-Aug
2011	15-Mar	23-Aug
2010	19-Mar	8-Aug
2009	9-Mar	17-Aug
2008	18-Mar	18-Aug
2007	21-Mar	20-Aug
2006	7-Apr	15-Aug
2005	24-Mar	17-Aug
2004	15-Mar	5-Aug
2003	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 8b – Number of Active Nests Through Progressive Weeks of the 2016 Breeding Season



Appendix 8c – Number of Failed Nests Through Progressive Weeks of the 2016 Breeding Season



Appendix 8d – Summary of Nest Fates at District Beaches 2001-2016

	2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004*		2003*		2002*		2001*	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
Hearst San Simeon State Park																																
Total # of nests	1		1		0		0		3		0		0		2		2		6		11		5		0		1		1		NA	
# nests hatched	0		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		0		1	50%	0		0		0		0		0		1	100%	0		0	
Failed wind	0		0		0		0		0		0		0		1	50%	0		0		0		0		0		0		0		0	
Failed aband.	0		0		0		0		2	67%	0		0		0		0		0		0		0		0		0		0		0	
Failed tide	0		0		0		0		0		0		0		0		0		1	17%	0		0		0		0		0		0	
Failed human	0		0		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		0		0	
Failed unk.	0		0		0		0		0		0		0		0		0		0		4	36%	0		0		0		0		0	
Unk. Fate	1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Villa Creek Beach																																
Total # of nests	10		24		23		20		31		21		26		38		16		30		40		37		66		35		44		39	
# nests hatched	2	22%	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	5	56%	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		0		2	9%	0		0		0		1	4%	1	3%	0		1	4%	0		0		0		0		0		0	
Failed aband.	2	22%	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		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		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		0		1	2%	0	
Failed unk.	0		0		0		0		0		0		0		0		0		0		0		0		5	8%	4	11%	3	7%	1	3%
Unk. Fate	1		1		0		1		0		1		0		2		2		2		1		0		0		0		0		0	

Note: Percentage calculations exclude nests with unknown fates.

* 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 8d – Summary of Nest Fates at District Beaches 2001-2016

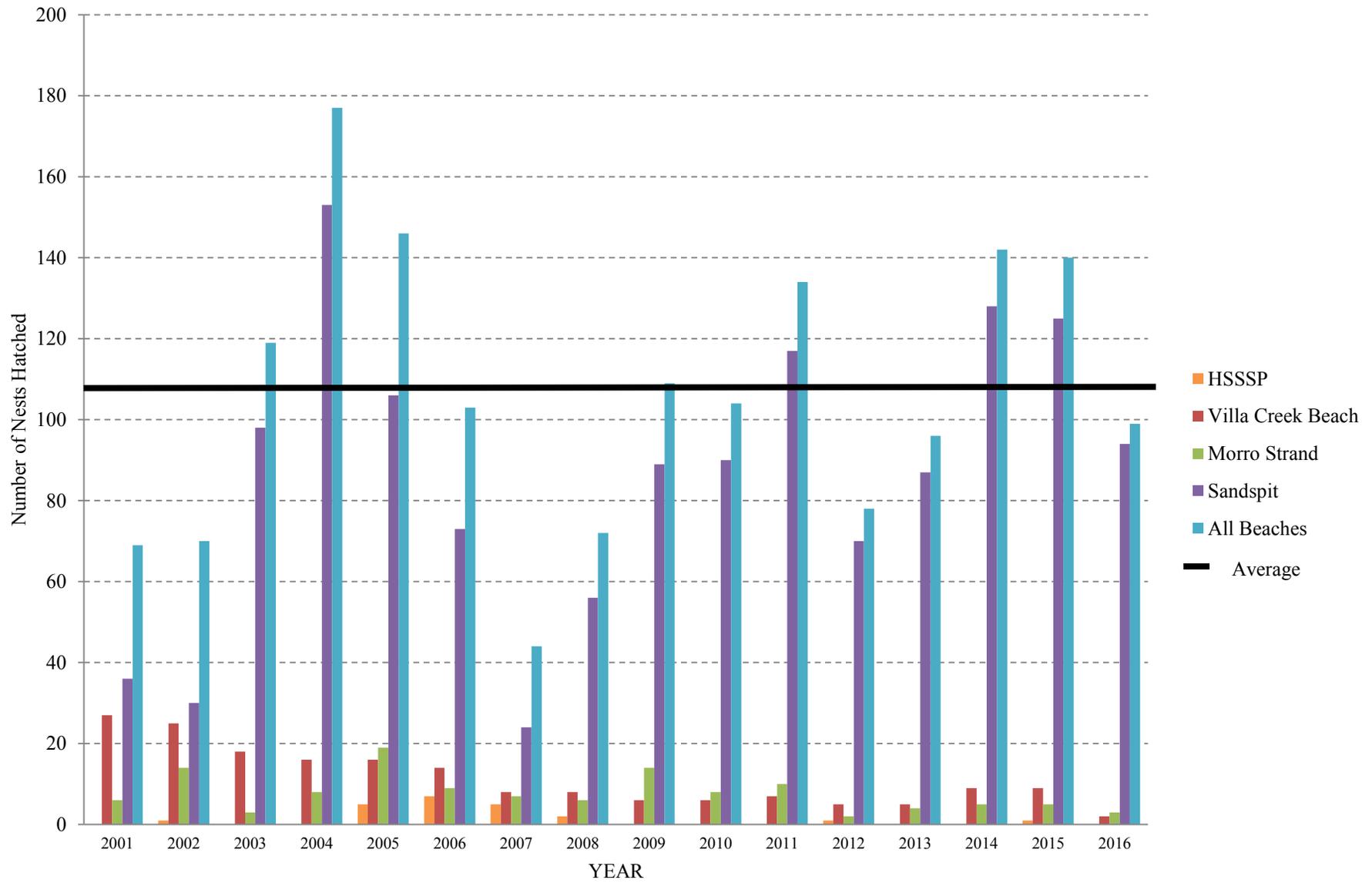
	2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004*		2003*		2002*		2001*		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
Morro Strand																																	
Total # of nests	16		13		17		12		12		25		24		26		33		19		34		27		38		45		37		14		
# nests hatched	3	19%	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	10	63%	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		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.	2	13%	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	0		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		0		1	3%	0		1	3%	0		0		0		
Failed other	0		1	8%	0		0		0		0		0		0		0		0		0		0		2	5%	0		0		0		
Failed unk.	1	6%	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		0		1		0		0		0		1		0		2		0		1		0		0		0		0		0		
Sandspit																																	
Total # of nests	238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109		
# nests hatched	94	40%	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	98	41%	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	6	3%	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.	21	8%	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	15	6%	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		0		1	0%	0		0		0		0		0		0		0		0		2	3%	4	4%	
Failed other	1	0%	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		
Failed unk.	2	1%	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	1		6		7		3		5		3		2		2		1		0		5		7		0		12	8%	34	31%	2	2%	
Total # of Nests- ALL BEACHES	265		310		241		189		220		259		229		210		147		164		226		294		376		227		191		162		
# Nests Hatched- ALL BEACHES	99	38%	140	46%	142	61%	96	52%	78	36%	134	53%	104	46%	109	53%	72	51%	44	27%	103	47%	146	51%	177	47%	119	55%	70	45%	71	44%	

Note: Percentage calculations exclude nests with unknown fates.

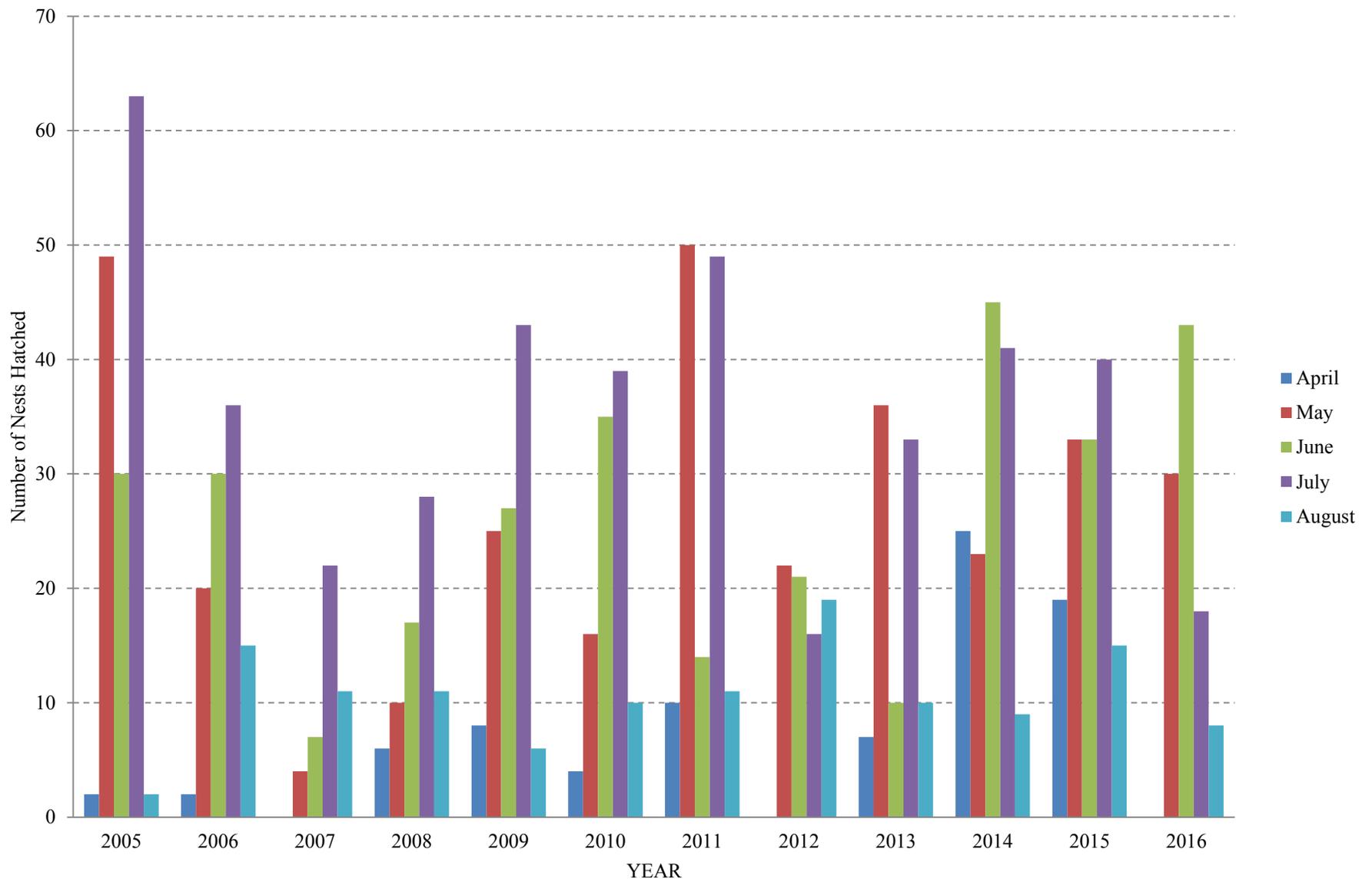
* Numbers for 2001-02 include Sandspit City property. HSSSP was not monitored in 2001 and 2002-04 numbers only include San Simeon Beach

**Includes take by equestrians

Appendix 8e – Total Nests Hatched on District Beaches 2001-2016



Appendix 8f – Nests Hatched per Month on District Beaches 2005-2016



Appendix 9 -- 2016 Salvaged WSP Eggs

Nest #	Date Collected	Nest Initiation	Clutch Size	UTM	Nest Fate	Cause of Failure	Fate Date	# of Eggs	Collected By	Embrvonic Stage
Villa Creek Beach										
VC01	04/27/16	04/13/16	1	10S 684406 3925941	Fail	Abandoned	04/26/16	1	R Orr	No evidence of fertilization
VC07	06/16/16	05/23/16	1	10S 684228 3926013	Fail	Abandoned	06/16/16	1	R Orr	No evidence of fertilization
VC10	07/21/16	Unknown	2	10 S 684295 3926088	Hatch	N/A	07/15/16	1	R Orr	No evidence of fertilization
VCDE01	05/26/16	05/16/16	N/A	10 S 684394 3925946	Dropped Egg	N/A	N/A	1	R Orr	No evidence of fertilization
Morro Stand State Beach										
MS03	05/09/16	04/22/16	3	10 S 693891 3918390	Fail	Abandoned	05/03/16	3	R Orr	No evidence of fertilization
MS11	06/16/16	05/30/16	1	10S 693954 3918016	Fail	Abandoned	06/16/16	1	R Orr	No evidence of fertilization
MS16	08/11/16	07/16/16	3	10 S 693893 3918442	Hatch	N/A	08/03/16	1	R Orr	3 weeks
MSDE04	08/03/16	07/24/16	N/A	10 S 693889 3918425	Dropped Egg	N/A	N/A	1	R Orr	No evidence of fertilization
Sandspit										
North										
NSS001	05/05/16	03/28/16	1	10 S 694275 3914171	Fail	Abandoned	03/29/16	1	R Orr	No evidence of fertilization
NSS013	05/05/16	04/18/16	3	10 S 694176 3912975	Fail	Abandoned	04/25/16	3	R Orr	No evidence of fertilization
NSS014	05/11/16	04/22/16	2	10 S 694014 3911980	Fail	Abandoned	04/26/16	2	R Orr	No evidence of fertilization
NSS016	06/01/16	04/25/16	3	10 S 694056 3912251	Hatch	N/A	05/24/16	1	J Ebner	No evidence of fertilization
NSS019	05/05/16	04/27/16	3	10 S 694271 3914042	Fail	Abandoned	04/28/16	3	R Orr	No evidence of fertilization
NSS020	05/05/16	04/27/16	1	10 S 694077 3912417	Fail	Abandoned	04/27/16	1	R Orr	Egg not processed
NSS021	06/09/16	04/27/16	3	10 S 694013 3911971	Hatch	N/A	06/01/16	1	R Orr	No evidence of fertilization
NSS023	05/11/16	04/27/16	1	10 S 693940 3911618	Fail	Wind	04/28/16	1	R Orr	No evidence of fertilization
NSS024	06/23/16	04/28/16	1	10 S 694146 3912779	Fail	Other	05/28/16	1	W Eggers*	3 weeks
NSS027	05/23/16	05/02/16	3	10 S 694197 3912828	Hatch	N/A	05/15/16	1	J Ebner	No evidence of fertilization
NSS055	06/23/16	05/27/16	3	10 S 694018 3912144	Hatch	N/A	06/13/16	1	W Eggers*	3 weeks
NSS060	06/23/16	06/08/16	3	10 S 694191 3913172	Hatch	N/A	06/13/16	1	W Eggers*	2 weeks
NSS066	06/23/16	06/10/16	1	10 S 694222 3913369	Fail	Abandoned	06/10/16	1	W Eggers*	No evidence of fertilization
NSS070	07/19/16	06/13/16	3	10 S 694235 3913839	Fail	Tide	07/02/16	2	W Eggers*	No evidence of fertilization
NSS071	07/19/16	06/13/16	3	10 S 694213 3913639	Fail	Tide	07/02/16	1	W Eggers*	2 weeks
NSS083	07/19/16	06/15/16	3	10 S 694016 3912108	Fail	Tide	07/02/16	2	W Eggers*	2 weeks
NSS087	07/19/16	06/16/16	1	10 S 694119 3912013	Fail	Abandoned	06/22/16	1	W Eggers*	No evidence of fertilization
NSS088	07/19/16	06/17/16	3	10 S 694090 3912587	Fail	Tide	07/02/16	2	W Eggers*	2 weeks & No evidence of fertilization
NSS089	06/23/16	06/17/16	2	10 S 694205 3913227	Fail	Tide	06/17/16	2	W Eggers*	No evidence of fertilization
NSS105	08/10/16	07/04/16	2	10 S 694077 3912504	Hatch	N/A	08/01/16	1	R Orr	No evidence of fertilization
NSS125	07/19/16	07/11/16	2	10 S 694123 3912828	Fail	Tide	07/17/16	2	W Eggers*	No evidence of fertilization
NSS135	08/31/16	07/20/16	2	10 S 694180 3913156	Fail	Abandoned	08/10/16	2	R Orr	No evidence of fertilization
NSSDE01	05/05/16	04/15/16	N/A	10 S 694278 3913936	Dropped Egg	N/A	N/A	1	R Orr	No evidence of fertilization
NSSDE02	06/01/16	05/23/16	N/A	10 S 694058 3912302	Dropped Egg	N/A	N/A	1	J Ebner	No evidence of fertilization
NSSDE03	06/09/16	06/08/16	N/A	10 S 694037 3912252	Dropped Egg	N/A	N/A	1	R Orr	No evidence of fertilization
NSSDE04	07/19/16	07/13/16	N/A	10 S 694276 3914304	Dropped Egg	N/A	N/A	1	W Eggers*	<1 week

Appendix 9 -- 2016 Salvaged WSP Eggs

Nest #	Date Collected	Nest Initiation	Clutch Size	UTM	Nest Fate	Cause of Failure	Fate Date	# of Eggs	Collected By	Embryonic Stage
South										
SSS005	05/23/16	04/13/16	3	10 S 693912 3911424	Hatch	N/A	05/16/16	1	J Ebner	1 week
SSS009	06/01/16	04/18/16	3	10 S 693292 3909084	Hatch	N/A	05/21/16	1	J Ebner	1 week
SSS010	06/01/16	04/18/16	3	10 S 693518 3909799	Hatch	N/A	05/21/16	1	J Ebner	No evidence of fertilization
SSS011	06/01/16	04/18/16	3	10 S 693913 3911459	Hatch	N/A	05/20/16	1	J Ebner	No evidence of fertilization
SSS012	05/09/16	04/09/16	1	10 S 693711 3910635	Fail	Abandoned	04/22/16	1	J Ebner	No evidence of fertilization
SSS015	06/10/16	04/22/16	4	10 S 693022 3908241	Hatch	N/A	06/01/16	2	R Orr	No evidence of fertilization
SSS016	05/09/16	04/22/16	1	10 S 693508 3909687	Fail	Wind	04/25/16	1	J Ebner	No evidence of fertilization
SSS017	06/01/16	04/22/16	3	10 S 693956 3911540	Hatch	N/A	05/27/16	1	J Ebner	No evidence of fertilization
SSS023	06/10/16	04/27/16	3	10 S 693747 3910742	Hatch	N/A	05/30/16	1	R Orr	No evidence of fertilization
SSS024	06/01/16	04/27/16	3	10 S 693859 3911237	Hatch	N/A	05/26/16	1	J Ebner	3 weeks
SSS025	05/09/16	04/28/16	2	10 S 693617 3909865	Fail	Abandoned	04/28/16	2	J Ebner	No evidence of fertilization
SSS028	05/09/16	04/29/16	1	10 S 693770 3910828	Fail	Abandoned	05/04/16	1	J Ebner	No evidence of fertilization
SSS029	05/11/16	04/29/16	2	10 S 693843 3911149	Fail	Abandoned	04/29/16	2	R Orr	No evidence of fertilization
SSS038	05/11/16	04/29/16	1	10 S 693345 3909275	Fail	Abandoned	05/04/16	1	R Orr	No evidence of fertilization
SSS043	08/10/16	05/13/16	3	10 S 693590 3910056	Hatch	N/A	06/13/16	2	R Orr	No evidence of fertilization
SSS044	06/10/16	05/17/16	1	10 S 693381 3909358	Fail	Abandoned	05/17/16	1	R Orr	3 weeks
SSS046	06/23/16	05/08/16	2	10 S 693661 3910449	Fail	Abandoned	06/09/16	2	R Orr	No evidence of fertilization
SSS050	06/15/16	05/25/16	3	10 S 693672 3910531	Fail	Tide	06/06/16	1	R Orr	3 weeks
SSS053	07/11/16	05/30/16	3	10 S 693277 3909072	Hatch	N/A	06/27/16	1	J Ebner	<1 week
SSS057	07/11/16	06/15/16	3	10 S 693133 3908582	Hatch	N/A	07/05/16	1	J Ebner	No evidence of fertilization
SSS060	06/23/16	06/03/16	3	10 S 693466 3909624	Fail	Abandoned	06/14/16	3	R Orr	No evidence of fertilization
SSS067	06/23/16	06/09/16	1	10 S 693727 3910657	Fail	Abandoned	06/15/16	1	R Orr	No evidence of fertilization
SSS073	06/23/16	06/15/16	1	10 S 693326 3909187	Fail	Abandoned	06/16/16	1	R Orr	No evidence of fertilization
SSS080	07/20/16	06/22/16	3	10 S 693022 3908251	Hatch	N/A	07/18/16	1	R Orr	No evidence of fertilization
SSS099	08/31/16	07/18/16	2	10 S 693771 3910829	Hatch	N/A	08/13/16	1	R Orr	No evidence of fertilization
SSSDE01	05/09/16	04/15/16	N/A	10 S 693672 3910437	Dropped Egg	N/A	N/A	1	J Ebner	No evidence of fertilization
SSSDE02	09/20/16	09/08/16	N/A	10 S 693753 3910801	Dropped Egg	N/A	N/A	1	R Orr	No evidence of fertilization
SSSDE03	05/09/16	04/29/16	N/A	10 S 693798 3910927	Dropped Egg	N/A	N/A	1	J Ebner	No evidence of fertilization

* Eggs collected under supervision of either Jeff Ebner or Regina Orr

Appendix 10 – 2016 Nest Location Maps



Estero Bluffs State Park

Villa Creek Beach

San Luis Obispo County, CA



Western Snowy Plover *Charadrius nivosus nivosus*

2016 Nest Fates

- H Hatch
- U Unknown
- Predator Fail**
- G Gull Species
- UP Unknown Predator
- Other Fail**
- A Abandoned

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

NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
September 2016



Morro Strand State Beach

San Luis Obispo County, CA

Western Snowy Plover *Charadrius nivosus nivosus*

2016 Nest Fates

- H Hatch
- Predator Fail**
- AC American Crow
- SS Striped Skunk
- Av Unknown Avian
- Other Fail**
- A Abandoned
- UF Unknown Fail



PACIFIC

OCEAN

NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
September 2016

Hatteras
Corridor

Easter
Corridor

Sienna
Corridor

Azure
Corridor

Boardwalk
Corridor



H

H

A

AC

AC Av

AC

Av

SS

H

UF

AC

A

AC

AC

SS

AC Av

AC

Av

SS

H

UF



Montaña de Oro State Park Sandspit

San Luis Obispo County, CA



Western Snowy Plover
Charadrius nivosus nivosus

2016 Nest Fates

- Hatch
- Fail
- Unknown

PACIFIC
OCEAN

MORRO
BAY

State Park Boundary

RM6

RM5

RM4

Rocky Mounds

RM3

RM2

Montaña
de
Oro
State
Park

RM1

Rim Trail

Sandspit Trail

American Canyon Trail

Cables Trail

NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
September 2016



Appendix 11 – 2016 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
Sandspit										
North										
NSS024	8 mm	05/11/16	12	05/23/16			Other	06/16/16	36	J Sayers*
NSS027	15 mm, 18 mm, 18 mm	05/11/16	5	05/16/16	4	05/15/16				J Sayers*
NSS036	14 mm, 14 mm, 15 mm	05/11/16	9	05/20/16	8	05/19/16				J Sayers*
NSS038	10°, 10°, 10°	05/17/16	26	06/12/16			Coyote	06/06/16	20	J Sayers*
NSS039	0°, 5°, 5°	05/17/16	27	06/13/16			Coyote	06/09/16	23	J Sayers*
NSS040	10 mm, 11 mm, 12 mm	05/23/16	12	06/04/16	10	06/02/16				J Sayers*
NSS041	60°, 60°, 10 mm	05/23/16	23	06/15/16			Coyote	06/03/16	11	J Sayers*
NSS043	8 mm, 9 mm, 9 mm	05/23/16	13	06/05/16	11	06/03/16				J Sayers*
NSS044	90°, 90°, 10 mm	05/23/16	17	06/09/16	14	06/06/16				J Sayers*
NSS045	90°, 90°, 10 mm	05/23/16	17	06/09/16			Coyote	06/06/16	14	J Sayers*
NSS048	85°, 85°, 11 mm	05/23/16	17	06/09/16			Coyote	06/06/16	14	J Sayers*
NSS049	85°, 90°, 90°	06/01/16	17	06/18/16	17	06/18/16				J Isaacs*
NSS052	90°, 90°, 90°	06/01/16	17	06/18/16			Coyote	06/06/16	5	J Isaacs*
NSS062	10 mm, 12 mm, 12 mm	06/23/16	11	07/04/16	12	07/05/16				W Eggers*
NSS071	90°, 90°, 90°	06/23/16	17	07/10/16			Tide	07/02/16	9	W Eggers*
NSS082	90°, 90°, 90°	06/23/16	17	07/10/16			Coyote	06/29/16	6	W Eggers*
NSS086	85°, 90°, 90°	06/23/16	17	07/10/16			Coyote	06/29/16	6	W Eggers*
NSS088	60°, 80°, 85°	06/23/16	20	07/13/16			Tide	07/02/16	9	W Eggers*
NSS090	85°, 90°, 90°	06/23/16	17	07/10/16			Coyote	06/27/16	4	J Ebner
NSS093	13 mm, 15 mm, 15 mm	06/23/16	8	07/01/16	4	06/27/16				W Eggers*
NSS096	60°, 70°, 85°	06/23/16	20	07/13/16			Coyote	06/28/16	5	W Eggers*
NSS098	0°, 10°, 20°	06/23/16	26	07/19/16			Coyote	06/27/16	4	W Eggers*
NSS104	10 mm, 12 mm, 12 mm	07/19/16	10	07/29/16			Coyote	07/25/16	6	W Eggers*
NSS105	90°	07/19/16	17	08/05/16	13	08/01/16				W Eggers*
NSS113	90°, 90°, 8 mm	07/19/16	16	08/04/16			Coyote	07/25/16	6	W Eggers*
NSS134	30°, 45°, 60°	07/19/16	22	08/10/16	22	08/10/16				W Eggers*
NSS136	90°, 90°, 2 mm	07/22/16	16	08/07/16			Coyote	07/25/16	3	J Ebner
NSS138	9 mm, 10 mm, 10 mm	08/10/16	11	08/22/16			Coyote	08/28/16	18	R Orr

Appendix 11 – 2016 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
South										
SSS019	13 mm, 15 mm	05/11/16	10	05/21/16	8	05/19/16				J Sayers*
SSS039	85°, 90°, 90°	05/17/16	17	06/03/16	16	06/02/16				J Sayers*
SSS040	45°, 45°, 60°	05/17/16	23	06/09/16	21	06/07/16				J Sayers*
SSS045	10 mm, 10 mm, 14 mm	05/17/16	12	05/29/16	10	05/27/16				J Sayers*
SSS050	10 mm, 10 mm, 12 mm	06/01/16	9	06/10/16			Tide	06/06/16	5	J Isaacs*
SSS051	90°, 90°, 7 mm	06/01/16	16	06/17/16			Tide	06/03/16	2	J Isaacs*
SSS056	30°, 40°, 60°	06/01/16	21	06/22/16	25	06/26/16				J Isaacs*
SSS057	70°, 85°, 90°	06/15/16	17	07/02/16	20	07/05/16				J Isaacs*
SSS058	12 mm, 13 mm, 13 mm	06/23/16	9	07/02/16	5	06/28/16				M Harrington*
SSS059	90°, 5 mm, 5 mm	06/15/16	14	06/29/16	14	06/29/16				J Isaacs*
SSS060	90°, 4 mm, 7 mm	06/15/16	16	07/01/16			Abandoned prior to floating	06/15/16	0	J Isaacs*
SSS062	6 mm, 9 mm	06/15/16	13	06/28/16	15	06/30/16				J Isaacs*
SSS064	10 mm, 11 mm, 12 mm	06/23/16	10	07/03/16			Coyote	06/29/16	6	M Harrington*
SSS066	5 mm, 7 mm, 10 mm	06/15/16	13	06/28/16	12	06/27/16				J Isaacs*
SSS070	10°, 45°, 5 mm	06/15/16	23	07/08/16	24	07/09/16				J Isaacs*
SSS072	8 mm, 8 mm, 9 mm	06/23/16	13	07/06/16	11	07/04/16				M Harrington*
SSS074	8 mm, 12 mm, 12 mm	06/15/16	8	06/23/16	13	06/28/16				J Isaacs*
SSS078	50°, 70°, 70°	06/15/16	20	07/13/16			Coyote	06/29/16	6	M Harrington*
SSS080	30°, 45°, 70°	06/23/16	23	07/16/16	24	07/17/16				R Orr
SSS082	75°, 80°, 90°	06/23/16	20	07/13/16			Coyote	06/29/16	6	M Harrington*
SSS083	80°, 85°, 90°	06/27/16	18	07/15/16			Unknown Fail	07/04/16	7	R Orr
SSS085	8 mm, 9 mm, 9 mm	06/27/16	15	07/12/16	11	07/08/16				R Orr
SSS086	10 mm, 12 mm, 13 mm	07/18/16	11	07/29/16	7	07/25/16				R Orr
SSS090	30°, 45°, 60°	07/11/16	23	08/03/16	21	08/01/16				J Ebner
SSS091	90°, 6 mm, 10 mm	07/11/16	15	07/26/16	16	07/27/16				J Ebner
SSS096	80°, 90°, 9 mm	07/18/16	16	08/03/16			Unknown Fate	08/05/16		R Orr
SSS097	45°, 60°, 70°	07/18/16	21	08/08/16			Coyote	08/08/16	21	R Orr
SSS098	60°, 80°	07/20/16	21	08/10/16	23	08/12/16				R Orr
SSS099	90°, 5 mm	07/22/16	17	08/08/16	22	08/13/16				R Orr

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

NSS = North Sandspit, SSS = South Sandspit

*Nests floated under supervision of Jeff Ebner or Regena Orr

Appendix 12 - Summary of WSP Nest Depredations on District Beaches 2001-2016

	2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004		2003		2002		2001	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Hearst San Simeon State Park*																																
Total # of nests	1		1		0		0		3		0		0		2		2		6		11		5		0		1		1		N/A	
Total Depredated:	0		0		0		0		0		0		0		1		0		0		0		0		0		1		0			
Coyote	0		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		0			
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	0		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		0			
Gull Species	0		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		0			
Unk. Avian	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unk. Predator	0		0		0		0		0		0		0		1	100%	0		0		0		0		0		0		0			
Other	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Villa Creek Beach																																
Total # of nests	10		24		23		20		31		21		26		38		16		30		40		37		66		35		44		39	
Total Depredated:	5		10		10		13		24		10		13		25		3		16		21		14		29		13		8		6	
Coyote	0		0		1	10%	1	8%	0		0		3	23%	0		0		3	19%	0		0		1	3%	6	46%	0		1	17%
Red Fox	0		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		0	
Unk. Canid	0		0		0		0		0		0		0		0		0		0		0		0		0		0		2	25%	0	
Striped Skunk	0		2	20%	2	20%	4	31%	1	4%	0		0		2	8%	1	33%	0		0		6	43%	7	24%	0		1	13%	0	
American Crow	0		0		0		0		0		0		0		0		0		0		0		0		1	3%	0		0		0	
Raccoon	0		1	10%	0		0		0		0		1	8%	2	8%	0		0		0		0		0		0		2	25%	0	
Gull Species	1	20%	2	20%	1	10%	0		6	25%	0		2	15%	4	16%	2	67%	3	19%	7	33%	2	14%	2	7%	0		2	25%	2	33%
Ground Squirrel	0		0		0		0		2	8%	0		0		0		0		2	13%	0		0		0		0		0		0	
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		2	15%	0		3	50%
Unk. Avian	0		0		0		0		1	4%	0		0		0		0		0		0		0		0		0		0		0	
Unk. Predator	4	80%	5	50%	6	60%	8	62%	14	58%	10	100%	7	54%	17	68%	0		8	50%	14	67%	0		18	62%	4	31%	1	13%	0	
Other	0		0		0		0		0		0		0		0		0		0		6	43%	0		1	8%	0		0		0	

Appendix 12 - Summary of WSP Nest Depredations on District Beaches 2001-2016

	2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004		2003		2002		2001	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
Morro Strand																																
Total # of nests	16		13		17		12		12		25		24		26		33		19		34		27		38		45		37		14	
Total Depredated:	10		5		3		3		6		9		6		6		8		5		2		3		14		33		8		4	
Coyote	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Red Fox	0		2	40%	0		2	67%	0		0		0		0		2	25%	0		1	50%	2	67%	0		3	9%	1	13%	3	75%
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Striped Skunk	2	20%	0		0		0		0		0		0		0		0		0		0		0		0		0		0	75%	0	
American Crow	5	50%	1	20%	0		1	33%	5	83%	4	44%	3	50%	5	83%	3	38%	2	40%	1	50%	0		11	85%	30	91%	6		0	
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	25%
Gull Species	0		0		0		0		0		0		0		0		0		0		0		0		1	8%	0		1	13%	0	
Unk. Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Unk. Avian	3	30%	1	20%	0		0		0		0		0		0		1	13%	0		0		0		0		0		0		0	
Unk. Predator	0		1	20%	3	100%	0		1	17%	5	36%	3	50%	1	17%	2	25%	3	60%	0		1	33%	1	8%	0		0		0	
Other	0		0		0		0		0		0		0		0		0		0		0		0		1	8%	0		0		0	
Sandspit																																
Total # of nests	238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109	
Total Depredated:	98		108		24		30		74		51		35		23		20		59		46		69		48		9		29		50	
Coyote	91	93%	106	98%	17	71%	6	20%	16	21%	10	20%	27	77%	22	96%	17	85%	9	15%	33	72%	28	41%	13	27%	0		0		0	
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	2%
Dom. Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	2%
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		0		30	63%	7	78%	27	93%	43	86%
American Crow	1	1%	0		1	4%	1	3%	0		15	30%	0		1	4%	0		0		0		5	7%	0		0		0		0	
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Gull Species	0		0		0		0		11	15%	0		0		0		0		0		0		10	14%	0		0		0		0	
Unk. Mammal	0		0		0	0%	0		0		0		0		0		0		0		0		0		1	2%	0		1	3%	2	4%
Unk. Avian	6	6%	2	2%	3	13%	22	73%	24	32%	5	10%	2	6%	0		0		45	76%	6	13%	11	16%	0		1	11%	0		0	
Unk. Predator	0		0		3	13%	1	3%	23	31%	20	39%	6	17%	0		3	15%	5	8%	7	15%	15	22%	2	4%	1	11%	0		3	6%
Other	0		0		0		0		0		1	2%	0		0		0		0		0		0		1	2%	0		1	3%	0	
Total # of Nests- ALL BEACHES	265		310		241		189		220		259		229		210		147		164		226		294		376		227		191		162	
# Nests Depredated- ALL BEACHES	113	43%	123	40%	37	15%	46	24%	104	47%	70	27%	54	24%	55	26%	31	21%	80	49%	69	31%	86	29%	91	24%	56	25%	45	24%	60	37%

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

Appendix 13 -- Cumulative Number of WSP Nests and Fates from 2001-2016

		Number of Nests	Nests Hatched	Failed predator	Failed wind	Failed abandoned	Failed tide	Failed human***	Failed other	Failed unknown	Unk. Fate
Hearst San Simeon State Park*	Total	33	22	2	1	2	1	0	0	4	1
	Percent		69%	6%	3%	6%	3%	0%	0%	13%	
Villa Creek Beach	Total	500	181	220	4	33	30	7	1	13	11
	Percent		37%	45%	1%	7%	6%	1%	0%	3%	
Morro Strand	Total	392	123	125	24	70	21	2	3	19	5
	Percent		32%	32%	6%	18%	5%	1%	1%	5%	
Sandspit*	Total	2785	1379	770	113	180	191	7	1	51	89
	Percent		51%	29%	4%	6%	7%	0%	0%	2%	
All Beaches	Total	3710	1705	1117	142	285	243	16	5	87	106
	Percent		47%	31%	4%	8%	7%	0%	0%	2%	

Notes:

1. No data was collected in 2001
 2. Numbers for 2001-02 include City property
 3. Percentages calculations exclude nests with unknown fates
- *** Includes take by equestrians