

ANNUAL REPORT  
FOR THE WESTERN SNOWY PLOVER  
AT SAN LUIS OBISPO COAST DISTRICT IN 2018

Prepared by

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## INTRODUCTION

This report summarizes the 2018 breeding and non-breeding (winter) 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 District has one of the largest breeding sites throughout the entire WSP range. WSP nesting along the west coast of the United States in California, Oregon, Washington, and Baja Mexico were listed in 1993 as a distinct population segment of the WSP and federally threatened under the Endangered Species Act. Also, in the non-breeding season, the listed WSP Pacific Coast population is joined by the interior WSP.

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, enforcement of CSP regulations, and habitat enhancement through exotic plant eradication.

Recorded monitoring for WSP within the District began in 1987 on the Sandspit and occurred periodically during the breeding season. More consistent monitoring of Villa Creek Beach, Morro Strand, and the Sandspit began in 2001 along with symbolically fencing the nesting habitat at Villa Creek Beach and Morro Strand. Beginning in 2002, San Simeon Creek Beach, Villa Creek Beach, Morro Strand, and the Sandspit were fenced, and most District beaches were monitored one to three times per week. By 2004, the primary breeding beaches were monitored five times per week. Current monitoring occurs five to seven times per week on District beaches with HSSSP beaches monitored approximately once per week.

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 2018 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.

Management activities were conducted under permits from both the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW). USFWS Recovery Permit Number TE-082237-7 was issued to CSP with the District Superintendent as the principal officer. Authorized individuals listed on the permit are Lisa Andreano, Charlotte Bailey, Sylvia Bauer, Vincent Cicero, Jeff Ebner, Woodrow Eggers, Matthew Fresquez, Margaret Harrington, Jodi Isaacs, Seth Ontiveros, Regena Orr, John Sayers, and Michael Walgren. CDFW Scientific Collecting Permit Number SC-13063 was issued to the District with the District Superintendent as the Principal Scientific Investigator. WSP

responsibilities, including training, oversight, adequate supervision, and reporting, were delegated to Regena Orr for the CDFW permit. Individuals working under the Principal 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.

Current WSP management measures, WSP survey results, banded WSP observations, nest and egg numbers, nest fates, nest chronology, and nest distribution are all discussed within this report. Additionally, future management recommendations to enhance WSP survival and reproductive success are discussed.

## METHODS

### Survey Areas

The beaches monitored by the District during the 2018 WSP breeding season are located along 45 miles of coastline in San Luis Obispo County, California (Appendix 1). Nesting was recorded at four different beaches located within four park units. All of these beaches are within the USFWS Recovery Unit Five for the WSP.

In 2016, the District began consulting eBird, a real time, citizen science, online birding program developed by Cornell Lab of Ornithology and National Audubon Society, to determine if WSP were using any previously unknown beaches within the District. Routine, weekly checks of eBird submissions continued in 2018, however, no new WSP beaches were discovered through these observations.

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

The beaches within HSSSP stretch for 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. Monitoring for WSP north of San Simeon Creek Beach began in 2007. Some of these beaches have little public 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 with driftwood and low growing vegetation. Adjoining this is a steep, densely vegetated hill that slopes up to Highway One. The west side of the nesting area is bordered by ocean. In general, the San Carpoforo Creek Beach area is highly dynamic, depending upon both tide and creek levels.

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, primarily sandy beach with cobblestone areas. Early in the season, it is bordered by Arroyo de la Cruz Creek to the north. Later in the season, when the creek no longer flows out to the ocean, it is bordered by the bluffs beyond the creek. The eastern edge of the beach is primarily bordered by a large, flat, sandy area with native vegetation. To the south of the beach is a heavily vegetated area along steeply sloping bluffs, while the ocean borders the beach to the west.

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 running along Highway One, forming the eastern border. The ocean forms the border to the west. Sidney's Lagoon continues to be utilized by elephant seals (*Mirounga angustirostris*) in 2018, thus providing reduced habitat for WSP.

Piedras Blancas (CA-74)

This narrow sandy beach is approximately one-half mile in length. The beach is bordered to the north by bluffs and rocks and to the east by coastal scrub. The beach narrows at a small drainage and becomes dune-backed. The south end of this beach is bordered by rocky outcroppings, while the west is bordered by the ocean. Piedras Blancas also continues to be utilized by elephant seals.

Arroyo Laguna (CA-75)

WSP primarily utilize the north and south ends of this approximately one mile long beach. The northern sandy beach is bordered seasonally to the north by Adobe Creek and to the south by Oak Knoll Creek. To the east of this section of beach is grassland. The southern section is a sandy beach backed by dunes. Tortuga Creek near the southern boundary seasonally flows to the ocean. The ocean forms the western border of Arroyo Laguna. Arroyo Laguna is another beach which continues to be utilized by elephant seals.

San Simeon Creek Beach (CA-77)

This approximately one-quarter mile long beach is bounded by coastal bluffs to the south, the ocean to the west, San Simeon Creek to the north, and a small unnamed tributary to the east. Highway One also 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 one-half mile in length. It is bounded by coastal bluffs to the north and south, Santa Rosa Creek lagoon on to the east, and the ocean to the west.

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, and a large rocky outcropping sits to the west of the creek mouth. A small sandy beach area, referred to as West of Villa Creek, develops later in the breeding season as the creek flow diminishes. This area 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 also occasionally used for nesting. A small sandspit beach borders 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. Backing the beach to the northeast is a mix of driftwood and coastal scrub. The wetland at the south end of the beach seasonally flows out to the ocean in wet years. During the winter of 2017-18, new driftwood was deposited along the main nesting area. The ocean borders Villa Creek Beach to the southwest.

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

Immediately southeast of Villa Creek Beach are two pocket beaches backed by bluffs and bordered on the northwest and southeast by rocky outcroppings. The northern pocket beach is slightly larger than the southern, and both are heavily influenced by tide. These pocket beaches have been used infrequently in past years as nesting sites by WSP.

In addition to Villa Creek Beach, another portion of EBSP, Cayucos Point, has been used infrequently as a WSP nesting site in previous years; however, no nests have been found there since 2008.

Morro Strand State Beach (also known as Atascadero Beach) (CA-80)

Morro Strand State Beach 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, referred to as Old Creek, is approximately one and one-third miles in length. A large portion of Old Creek is narrow and sandy, backed to the east by steep bluffs topped with houses. The main beach is approximately one-quarter mile in length and is backed to the east by two parking lots. Old Creek runs between the two parking lots and bisects the main beach, when it flows out to the ocean. Small areas of coastal salt marsh and riparian vegetation grow near Old Creek, also helping form the border to the east. To the northwest and southeast of the main beach are residential areas, while the ocean forms the border to the west.

Historically, WSP have infrequently wintered at Old Creek but have not been known to nest there. Thus, as with previous years, Old Creek was not monitored during the 2018 breeding season.

The Southern Unit, henceforth referred to as Morro Strand, is the main nesting area at Morro Strand and was monitored during the 2018 breeding season. This beach is approximately two miles long, extending from the area adjacent to the Morro Strand Campground south to the CSP boundary west of Highway 41. WSP habitat at Morro Strand is broken up into four sections separated by nine beach access corridors spread throughout the length of the beach.

The Campground-Hatteras section has corridors located at the campground kiosk, north bathroom, south bathroom, and at Hatteras Street, just south of the campground. The corridor at the southern end of the campground, referred to as Alva Paul, was inaccessible during the 2018 breeding season due to the creek creating a lagoon in the area. Though fenced in previous years, the section from Alva Paul through the campground was not fenced during the 2018 breeding season due to no WSP nesting activity having occurred in the area since 2010.

The Hatteras-Azure section has a row of houses backing the foredunes and access corridors located at Hatteras Street, Easter Street, Sienna Street, and Azure Street. A small beach access parking lot and restroom are at the east end of the Azure Street Corridor.

The Azure-Boardwalk section encompasses the area from the Azure Street Corridor south to the Boardwalk Corridor. This section is broken up into approximately equal halves by a seasonal drainage referred to as North Playa or North Spoils. Bordering this section to the east are coastal dune scrub and coastal dune wetlands backed by the Cloisters housing development.

The Boardwalk-Highway 41 section extends from the Boardwalk Corridor to the CSP/City boundary west of Highway 41. Bordering this section to the east is coastal dune scrub backed by Morro Bay High School. A small parking lot for beach access also lies at the east end of the Highway 41 Corridor.

Aside from elevated areas near North Playa and South Spoils that contain coarse rocks, pebbles, and sand, Morro Strand consists primarily of flat sandy beach. This continues on to the City property at the south end. To the east, low foredunes with coastal dune vegetation back the entire length of the beach. The ocean forms the boundary to the west.

### 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 Park/Los Osos. The Sandspit falls under joint jurisdiction of the City and CSP, with a small portion being privately owned. With the exception of 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 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 one-half miles. The majority of the Sandspit south of the City property is 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 dominated by barren sand sheets and provides little suitable habitat for WSP. Thus, as with previous seasons, the bayside of the Sandspit was not monitored in 2018.

The Sandspit has seven rescue markers at roughly half mile intervals. These start with Rescue Marker (RM) 1, located near Army Road in the south, and end at RM 7, located just south of Jetty Beach on City property. When monitoring, the rescue markers and several other markers are used to divide the beach into smaller areas in order to analyze the data collected at smaller scales.

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 (ocean) side. These three corridors, as well as the northern tip of the Sandspit, are accessed by boat, canoe, kayak, stand-up paddleboard, and surfboard.

## **Monitoring**

Monitoring on District beaches in 2018 began March 5<sup>th</sup> and ended September 20<sup>th</sup>. Beaches within HSSSP were monitored approximately once per week from the beginning of March until the end of July. Monitoring was conducted five to seven days per week at Villa Creek Beach, Morro Strand, and the Sandspit. At these beaches, nest searches were conducted three times a week inside the symbolic fencing and two to four times a week outside of the fencing. Weekend monitoring occurred 24 times between April 21<sup>st</sup> and September 15<sup>th</sup>. This monitoring was conducted outside the symbolic fencing and was primarily done in order to have a greater CSP presence on the beaches during the busier summer months. Beginning September 11<sup>th</sup>, monitoring was reduced to two days per week, since there were no more active nests.

All WSP monitors were trained by USFWS authorized individuals. Monitoring was conducted in the morning or early afternoon from approximately 8:00 am to 2:00 pm. Monitors walked the Back Area at Villa Creek Beach and the EBSP coastline south of Villa Creek Beach once a week to check pocket beaches for WSP breeding activity. The Sandspit was monitored by two people to allow for adequate coverage. To accomplish this, the Sandspit was divided into northern and southern sections. This division occurred between RM 3 and RM 4 at a location referred to as Rocky Mounds. The back dune area of the Sandspit was also checked weekly for WSP 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 fates, floating nests found at completed clutch sizes, recording evidence and observations of predator and human activity, recording evidence and observations of chicks and fledglings, and maintaining/repairing signs and symbolic fencing. All data, including a photograph and location map of each nest found, was recorded on a nest card (Appendix 2) and entered into a computer database.

Monitors also conducted population censuses to determine numbers of WSP on District beaches throughout the year. Annual range-wide winter and breeding window surveys have been conducted on District beaches since 2002 and were conducted again in 2018 (Appendices 3 and 4). The primary purpose of these surveys is to obtain minimum estimates of the number of wintering and breeding WSP at current, historic, or potential sites over time. Each year, USFWS designates a specific time window during which these range-wide surveys are to be conducted. For the winter survey, the window falls between December 1<sup>st</sup> and January 31<sup>st</sup>, during a migratory period for WSP when both coastal and inland populations can overlap in distribution and cannot be distinguished visually. Therefore, the winter survey does not represent a count of the Pacific Coast population but a minimum count of coastal and inland birds combined. The annual breeding window survey falls between May 24<sup>th</sup> and June 7<sup>th</sup>, during a non-migratory period for WSP. This narrower time frame minimizes the chance of recounting birds moving between sites, thus yielding a more accurate population estimate of breeding WSP at specific sites.

While monitoring, any observation of a WSP with colored leg bands, as well as the individual's behavior, location, and observation time, was documented. These observations were entered into a computer database and shared via a listserv in order to determine the age and origin of the WSP (Appendices 5 and 6).

In the event that an unhealthy, injured, or dead WSP was observed while monitoring (Appendix 7), the District's "Procedures for handling injured, sick, or dead WSP (including chicks and eggs)" protocol was followed.

#### *Floating Eggs*

To determine the estimated hatch date (EHD) for a nest discovered with a completed clutch, the process of egg "floating" was employed. This process was carried out by a person permitted by USFWS 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. The 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. Floated egg data for 2018 can be found in Appendix 8.

#### *Determining Nest Fate*

During the 2018 breeding season, the District continued following USFWS Recovery Unit Five protocols for determining nest hatch success. As part of this, emphasis has been placed on minimizing the proportion of nests assigned an "unknown fate". In order to accomplish this, an

EHD must be determined for each nest found. For nests with a known clutch completion date, an EHD was calculated by adding 27 days (the average incubation period) from the clutch completion date. For any floated nest, floated egg measurements were compared to stages of expected growth development, with an EHD calculated accordingly.

The modal clutch size for WSP is three eggs, with an expected range of two to four. A scrape was considered a nest if it contained at least one egg. Single or “dropped” eggs that were not found in a recognizable scrape were not considered to be a potential nest. A nest containing two or more eggs and with an indication of incubating activity (presence of incubating WSP, WSP tracks, nest lining, adult WSP nearby, etc.) was considered active.

There are three possible nest fates as outlined by Recovery Unit Five:

- a) Hatch- Pips/chicks in the nest or indirect evidence suggesting hatch.
- b) Fail- Direct evidence of loss, depredation, 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, and 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. To calculate the hatch rate, the total number of hatching fate nests are divided by the total number of nests with known fates.

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 depredation, abandonment, tide, wind, take, or from an unknown cause.

Nests were confirmed to “Fail” by wildlife depredation when avian or mammalian tracks were found at the nest bowl and all of the eggs in the nest were gone, or if eggshell pieces or fluid were 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 over a week. 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 were confirmed to “Fail” by take when human, domestic dog, or horse tracks, or any other evidence of human activity, were found at the nest bowl and were directly responsible for the eggs failing to hatch. Nests were confirmed to “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” was assigned to the nest if there was ambiguous support for either “Hatch” or “Fail”. This fate was assigned 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 with no clear evidence as to the cause of its disappearance. An “Unknown Fate” could

also be assigned 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 to be assigned confidently. 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. HSSSP beaches with symbolic fencing in 2018 were San Carpoforo Creek Beach, Arroyo Laguna, and San Simeon Creek Beach. In addition, Sidney’s Lagoon has a permanent fence surrounding the beach area prohibiting public access for the protection of elephant seals.

Fencing consisted of metal eye-posts strung with polypropylene rope. Signs were placed at regular intervals along the entire 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. In 2017, the Morro Bay National Estuary Program purchased 200 new high quality WSP “Do Not Enter” signs for the Sandspit, which were installed in 2018.

All beaches had corridors at the main access points, which allowed for continued public recreation. The corridors at Morro Strand and the Sandspit had yellow signs which allowed these access points to be clearly seen from a distance. Signs directing people to access corridors were also placed at regular intervals along the back fence sections at these beaches. Regulatory signs were posted at CSP beach access corridors stating that dogs were prohibited, and “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.

Maps displaying the visitor’s 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. Maps designating the corridor entrances were also given to the local kayak concessions in an attempt to direct kayakers to the appropriate places to cross over the Sandspit.

Symbolic fences were removed during the last week of September from the main WSP breeding beaches. Fencing was removed from San Carpoforo Creek Beach and Arroyo Laguna on July 12<sup>th</sup> and Simeon Creek Beach on July 17<sup>th</sup>.

### ***Habitat Enhancement***

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

In early 2018, District staff continued maintenance level work targeting invasive New Zealand spinach (*Tetragonia tetragonioides*), sea rocket (*Cakile maritima*), and tumbleweed (*Salsola tragus*) at Villa Creek Beach. Efforts to eradicate non-native ice plant (*Carpobrotus edulis*) and European beach grass (*Ammophila arenaria*) in the Morro Strand foredunes were completed in 2016, but efforts continue at a maintenance level to maintain the restored area.

In June 2012, an ice plant control project was initiated in the Morro Dunes Natural Preserve within MDO. The ice plant grows throughout the Sandspit, covering open sandy areas that have potential to be WSP breeding habitat. An additional \$280,000 was acquired for the restoration of effort and will fund the project through the end of 2019. Between October 2018 and February 2019, a previously untreated area of approximately 300 acres of ice plant between Army Road and RM 5 is being treated with herbicide. Treatments occur during this time to avoid working during the WSP breeding season. Back dunes treatments continue year round. It is expected that an increase in open, sandy areas will result from this project, thus providing more potential WSP nesting habitat. Also as part of this project, a California Conservation Corps crew scattered rice straw and installed rice straw waddles and bales on the unvegetated back dunes to help stabilize the dunes and prevent sand movement.

#### Morro Bay Dredge Project

Approximately every five years, Morro Bay harbor undergoes a deep dredging to keep the harbor operational and safely navigable. Previous dredging operations have occurred during the winter months, which allows for the dredge spoils to be deposited on Morro Strand. The spoils in turn create additional quality nesting habitat for WSP.

In February 2017, dredge operations began in Morro Bay harbor. The dredge outflow pipe was routed through the harbor entrance and into the ocean to deposit outfall at an offshore disposal site. On April 8, 2017, a high surf event caused 6,000 feet of the dredge outflow pipe to break loose, 3,400 feet of which washed onto both City and CSP Sandspit property. Initial attempts to remove the pipe were unsuccessful, so the dredge pipe stayed on the beach throughout the 2017 WSP breeding season before removal was attempted again on November 2, 2017. Removal of sections of the dredge pipe from the beach continued until November 6<sup>th</sup> when the remaining pipe was too buried to be removed from the beach. An additional attempt to remove pipe took place on January 29, 2018. One 40 foot piece of pipe was removed. During all removal efforts, a WSP monitor was onsite. No additional pipe was unburied by tides or found during the 2018 season.

#### Predator Management

Monitors recorded the presence of potential predators through either direct observation or by tracks. Due to no available funding, predator removal activity did not occur during the 2018 breeding season. Predator control is highly important to the long term success of the WSP. Natural depredation has been exacerbated through unintentional human encouragement of larger populations of native predators. Also, urbanization has depleted native predator habitat bringing increased pressure into the few undeveloped areas that are left with some predators such as Corvids and striped skunks (*Mephitis mephitis*) being attracted by the presence of human activities, e.g., litter.

In past years, the District has used ten foot by ten foot single nest exclosures in an attempt to enhance hatch rate success at Morro Strand, a beach that typically has high rates of nest depredation. Since 2014, exclosures have only been used on rare occasion when all nests are failing to predators. Exclosures are often ineffective in promoting hatching success due to high rates of abandonment. The abandonments were suspected to be due to the depredation of adult WSP. Exclosures were not used during the 2018 breeding season.

### Enforcement

Throughout the WSP breeding season, monitors maintained positive working relationships with CSP Rangers. Rangers also occasionally attended the weekly WSP meetings to discuss enforcement issues, management, and upcoming events. Rangers, WSP monitors, and other CSP staff also attended bi-weekly safety meetings where each group shares information on safety issues relevant to the wellbeing of CSP employees.

Ranger patrols encompass a broad area, including beaches harboring WSP habitat and nesting activity. While on beach patrol, Ranger vehicle activity was restricted to the wet sand area with a speed of less than ten miles per hour.

While WSP monitors were in the field, they routinely encountered visitors in violation of CSP regulations, some of which represented either immediate or long-term threats to WSP. When necessary, monitors called Rangers for help in enforcing regulations. Violations for which Rangers were often contacted include dogs on the beach, trespassing, camping, vandalism, and kite flying. Occasionally, those follow-up contacts with Rangers resulted in the offender receiving a citation.

District beaches typically see an increase in visitation and violations over the weekend of July 4<sup>th</sup>. As in past years, WSP monitors again assisted Rangers with the enforcement of regulations on July 4<sup>th</sup>. The results of this effort, as well as any other incidents in which Rangers were notified, can be found in the Human Activities section.

### Public Education and Outreach

Public education is an important aspect of the WSP program and allows CSP to raise awareness of the species and its protection. During the 2018 season, outreach activities continued at District beaches in an effort to improve visitor awareness and education.

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). As part of an ongoing effort to educate park visitors, four WSP interpretive panels continued to provide information at Villa Creek Beach, Morro Strand (Azure Street and Highway 41 Corridors), and MDO.

The 2018 season also marked the thirteenth consecutive year of the District displaying children’s art signs along the symbolic fencing. This MCAS sponsored project involved several beach landowners, as well as children from the community who contributed artwork around a theme of WSP protection.

On June 23<sup>rd</sup>, two WSP monitors and two volunteers 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 50 visitors to the booth, most of whom were children.

On September 15<sup>th</sup>, two WSP monitors gave presentations on WSP to volunteers participating in the annual Coastal Cleanup Day at the Sandspit. The intent behind these presentations was to educate volunteers on the conservation status and general biology, life cycle, and behavior of the WSP. Monitors also discussed nesting activity at the Sandspit and stressed the importance of volunteers limiting their clean-up activities to outside of the fenced habitat.

Other WSP related outreach activities included one talk to the Environmental Center of San Luis Obispo (ECOSLO) prior to them picking up trash on the Sandspit, two WSP walks conducted during the Morro Bay Winter Bird Festival, two shore walks, and one article in the Morro Bay National Estuary Program blog. In addition to these activities, WSP were among the topics discussed by Morro Bay Museum of Natural History docents at the museum information desk and during their Nature Center programs and walks.

Outreach also occurs through regular contact between WSP monitors and the public on District beaches. Members of the public often approach monitors with questions about WSP activity and other beach related subjects. 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 involvement 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 (non-breeding) and breeding window surveys. These efforts facilitate consistent WSP management methodologies and reporting throughout the range.

### Training

All WSP monitors were trained by USFWS authorized individuals both in the field and in a classroom setting. This training lasted over a period of several weeks and consisted of instruction regarding the biology and behavior of WSP, rules and regulations concerning WSP, and WSP monitoring protocols. WSP monitors also gave four talks to other CSP employees and docents with the goal of educating them on the WSP program.

### Volunteer Efforts

Volunteers are an integral part of the District's WSP program. In 2018, four volunteers contributed 242 hours of service through WSP monitoring, outreach, and fencing (Table 1).

**Table 1:** Volunteer Hours and Activities in 2018.

Volunteer Activities	Hours
WSP Monitoring	225.5
Outreach	3
Fencing	13.5
Total	242

In addition to these efforts, volunteers and WSP monitors worked together to remove approximately 82 pounds of trash and 22 pounds of recyclable materials from the Sandspit and 455 pounds of trash from Morro Strand during Coastal Cleanup Day on September 15<sup>th</sup>. ECOSLO held two additional beach cleanups on District beaches in 2018. CSP staff and volunteers also removed trash from the beaches and cleaned up homeless camps when the symbolic WSP fence was installed and removed.

## RESULTS

### Wintering WSP

To monitor wintering populations on District beaches, censuses were conducted from October 2017 through February 2018 (Table 2 and Appendix 9).

**Table 2:** Summary of Winter Census Results from District Beaches in 2018.

Location	# of Winter Censuses	Low Count	High Count	Average <sup>1</sup>
<i>San Carpofo Creek Beach</i>	14	0	44	24
<i>Point Sierra Nevada</i>	13	0	1	<1
<i>Arroyo de la Cruz</i>	10	0	15	2
<i>Sidney's Lagoon</i>	8	0	19	7
<i>Piedras Blancas</i>	3	0	0	0
<i>Arroyo Laguna</i>	13	0	101	38
<i>San Simeon Creek Beach</i>	15	27	158	73
<i>Santa Rosa Creek Beach</i>	12	0	121	27
<b>Hearst San Simeon State Park</b>	21 <sup>2</sup>	1 <sup>3</sup>	275 <sup>3</sup>	109 <sup>3</sup>
<b>Villa Creek Beach</b>	17	0	43	17
<i>Morro Strand North (Old Creek)</i>	11	0	0	0
<i>Morro Strand South</i>	17	1	209	125
<b>Morro Strand<sup>4</sup></b>	17	1	209	125
<b>Sandspit<sup>5</sup></b>	14	0	130	73

1. Averages are rounded up
2. Total number of days censuses were conducted in HSSSP
3. Data obtained from HSSSP cumulative total
4. Average does not include Old Creek
5. Data does not include City property

District beaches have historically provided high quality wintering habitat for WSP. The beaches in HSSSP continue to be more popular with wintering WSP than with breeding season activity. The highest winter count across all District beaches was on October 17<sup>th</sup> with 572 WSP observed. Several other days during the winter had counts in the four hundreds.

One of the winter censuses, conducted on January 23<sup>rd</sup>, was part of the annual range-wide winter window survey for the U.S. Pacific Coast. Overall, a minimum of 153 WSP were observed across all District beaches during the 2018 winter window survey (Appendix 3).

### Breeding Population Surveys

The breeding season WSP population on District beaches was monitored by conducting monthly censuses between March and September (Appendix 9). The USFWS Recovery Plan for WSP defines the breeding bird management potential (BBMP) for WSP beaches; however, Santa Rosa Creek Beach and Old Creek do not have defined potentials. One of the May censuses (conducted on May 22<sup>nd</sup>) was part of the annual range-wide breeding window survey (Table 3 and Appendix 4). The District utilizes the annual range-wide breeding window survey to determine the minimum number of WSP breeding adults on its beaches.

**Table 3:** Breeding Window Survey Results on District Beaches in 2018.

<b>Location</b>	<b>Male</b>	<b>Female</b>	<b>Unknown</b>	<b>Juvenile</b>	<b>Chick</b>	<b>Total<sup>1</sup></b>	<b>BBMP</b>
<i>San Carpoforo Creek Beach</i>	0	0	0	0	0	0	10
<i>Point Sierra Nevada</i>	-	-	-	-	-	-	-
<i>Arroyo de la Cruz</i>	-	-	-	-	-	-	-
<i>Sidney's Lagoon</i>	0	0	0	0	0	0	-
<i>Piedras Blancas</i>	-	-	-	-	-	-	-
<i>Arroyo Laguna</i>	1	1	0	0	0	2	6
<i>San Simeon Creek Beach</i>	0	0	0	0	0	0	-
<i>Santa Rosa Creek Beach</i>	0	0	0	0	0	0	-
<b>Hearst San Simeon State Park</b>	1	1	0	0	0	2	16
<b>Villa Creek Beach</b>	5	4	0	0	1	9	25
<i>Morro Strand North (Old Creek)</i>		-	-	-	-	-	-
<i>Morro Strand South</i>	2	2	0	0	0	4	36
<b>Morro Strand</b>	2	2	0	0	0	4	36
<b>Sandspit<sup>2</sup></b>	63	55	7	0	8	125	82
<b>District</b>	71	62	7	0	9	140	159

1. Total does not include juveniles or chicks

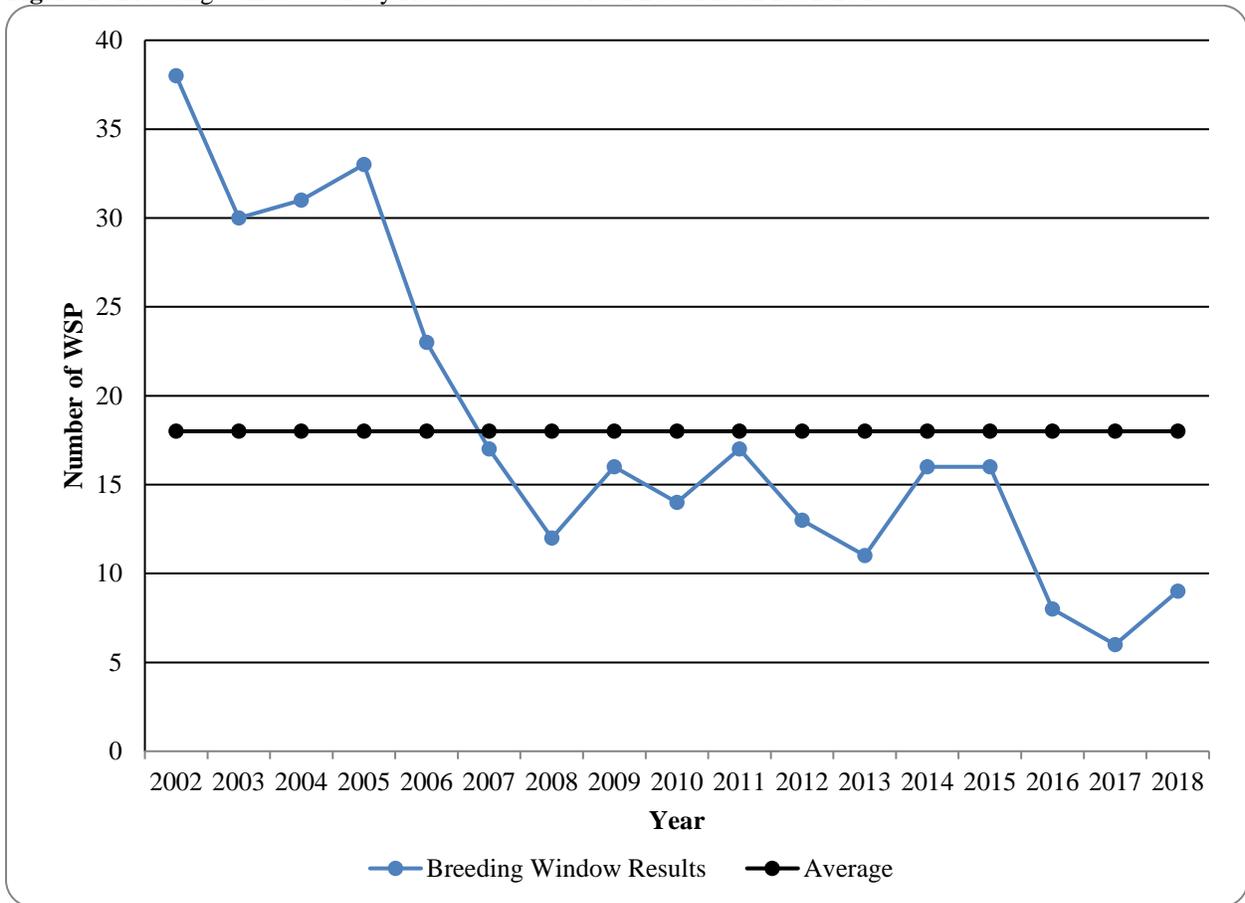
2. Data does not include City property

Results from the breeding population window surveys show that the breeding season WSP population has changed over time across all District beaches (Appendix 4).

The breeding WSP population on HSSSP beaches has historically been low and remains so. HSSSP has only reached its BBMP of 16 one time in the past 17 years. The average has been five breeding adults.

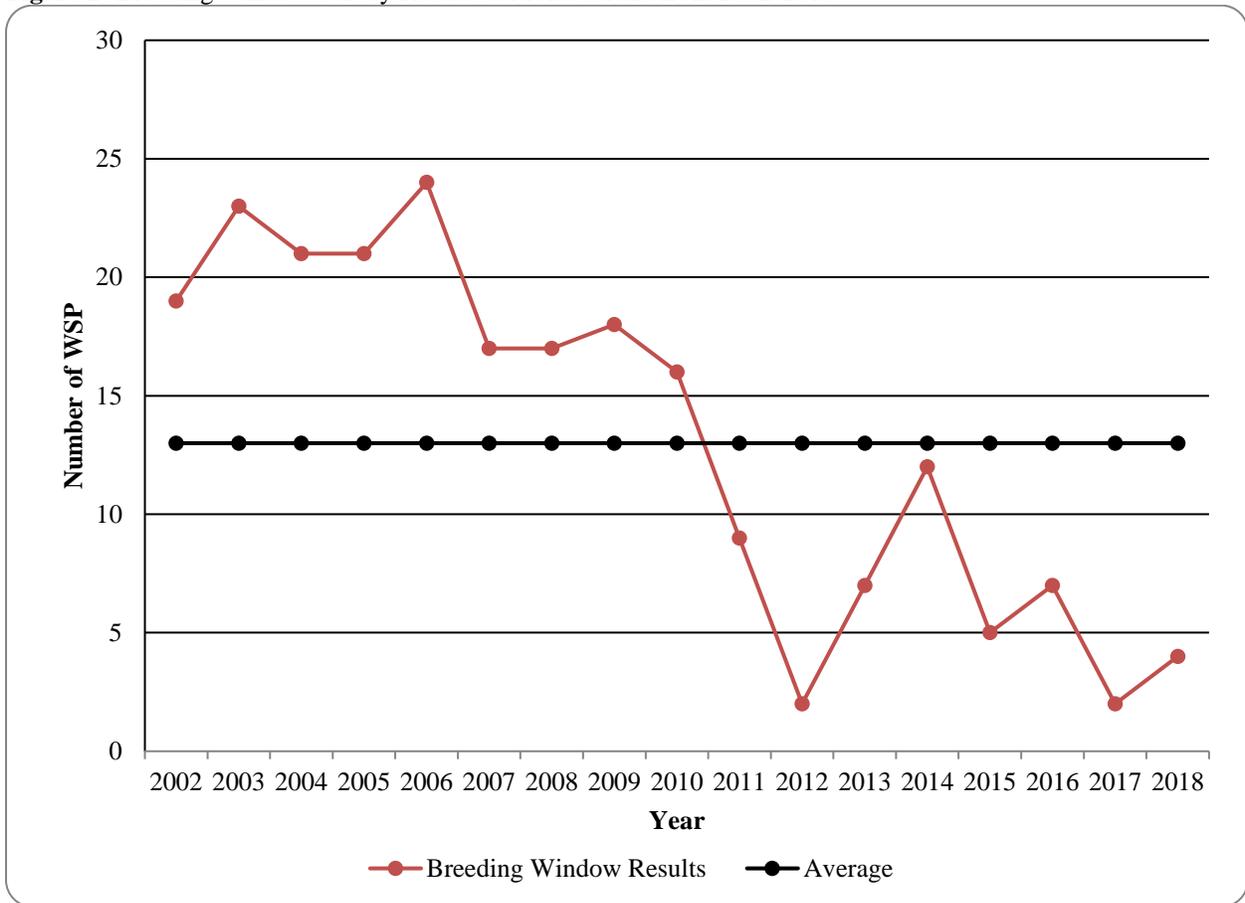
Villa Creek Beach has seen a steady decline since 2002, the year after monitoring began and the beach was first made publicly accessible (Figure 1). Villa Creek Beach breeding adult numbers have been below the Recovery Plan BBMP of 25 since 2006.

**Figure 1: Breeding Window Survey Results at Villa Creek Beach from 2002-2018**



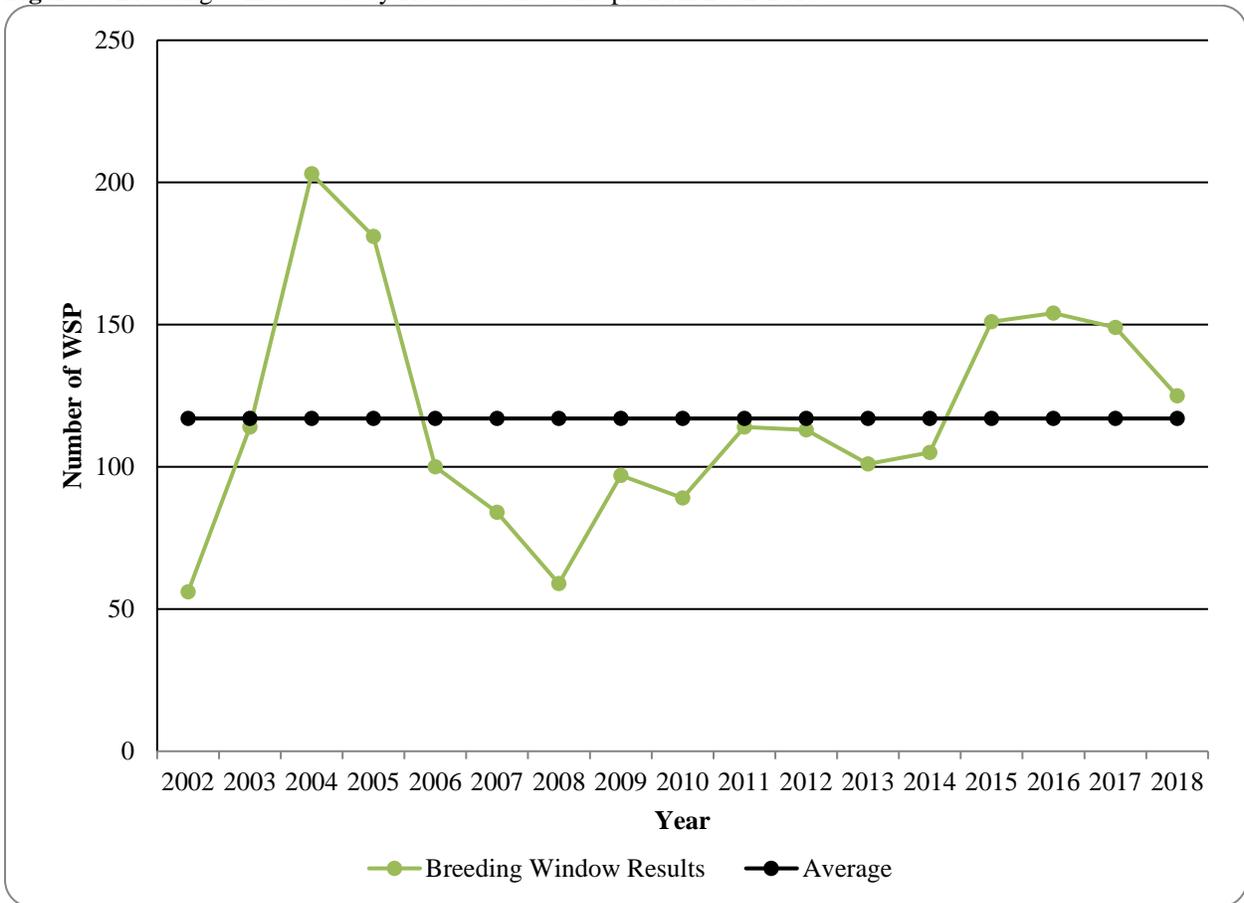
In the Recovery Plan, Atascadero Beach includes both CSP and City property with a BBMP of 40. Morro Strand comprises 90% of Atascadero Beach, which is 36 of the 40 breeding adults. Morro Strand has seen an steep decline in breeding WSP since 2002 (Figure 2). Even at its peak in 2006 (with 24 breeding adults), Morro Strand breeding adult numbers have never reached its BBMP of 36. It is also highly unlikely Morro Strand will ever reach its potential.

**Figure 2: Breeding Window Survey Results at Morro Strand from 2002-2018**



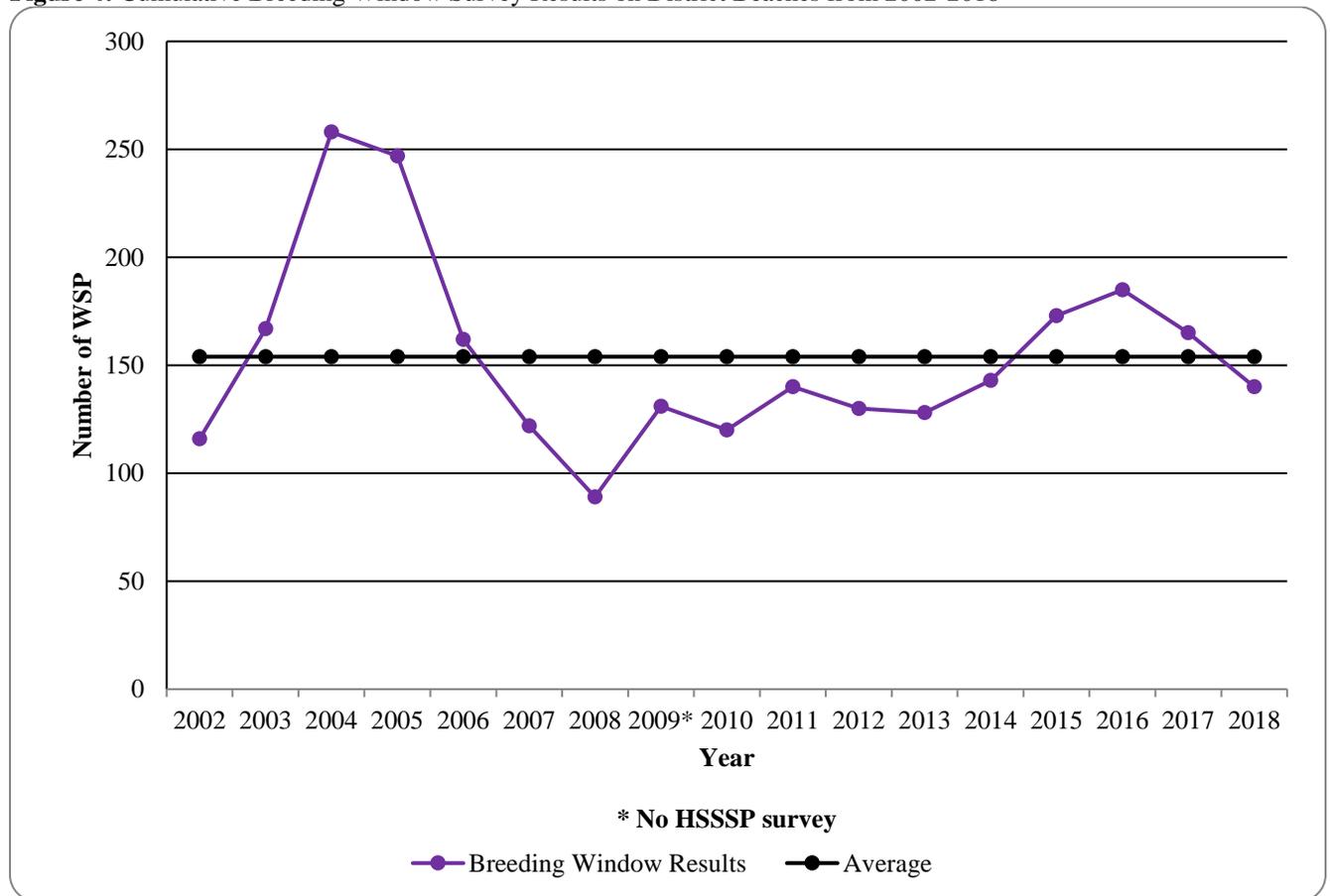
In contrast to the population declines at Villa Creek Beach and Morro Strand, the Sandspit has seen a general increase in its breeding WSP population since 2008 (Figure 3). The Recovery Plan BBMP of 110 for the Sandspit includes both CSP and City property. The CSP portion is 75% of the Sandspit, which is 82 of the 110 breeding adults. In 2018, the population had a notable decrease but still remained above the average number of WSP (117) for the Sandspit. The Sandspit breeding adult numbers have been above the BBMP of 82 in all years in the past 16 except for one. The Sandspit is very important in helping to meet the range-wide recovery goals for the WSP.

**Figure 3: Breeding Window Survey Results at the Sandspit from 2002-2018**



Cumulative breeding window survey results for all District beaches largely mirror the trends of the Sandspit, since this beach accounts for the vast majority of breeding WSP in the District (Figure 4). Districtwide breeding window survey results from 2018 show an overall slight decrease in breeding WSP compared to recent years. This number (140) is below the Districtwide average from the previous 17 years (154).

**Figure 4:** Cumulative Breeding Window Survey Results on District Beaches from 2002-2018



### Banded WSP

Although banding is not currently performed in the District, banded WSP from other locations were often observed on District beaches. Band color combinations, time, and WSP activity were recorded in the field. Banding origin was determined in the office. The survey results were then entered into a standardized data template and sent to a Google group listserv, which was distributed to everyone banding WSP in California, Oregon, and Washington.

This was the third year that banded WSP sightings from eBird were included in the District’s banded bird database. From October 2017 through September 2018, banded WSP with confirmed band combinations were observed on 1,518 occasions across District beaches. Additional banded WSP were sighted, but the band combinations with their histories were not received prior to the writing of this report. From these 1,518 sightings, 124 unique band combinations were observed. Seventy-five unique combinations were sighted over the winter season (October 2017 through February 2018), and 97 were seen during the breeding season (March through September 2018). Forty-eight of the 123 banded WSP were seen during both the winter and breeding seasons. The banding locations of WSP observed on District beaches during the 2018 season are located in Table 4.

**Table 4:** Banding Locations of WSP Observed on District Beaches October 2017-September 2018.

<b>Banding Location</b>	<b># of WSP</b>
Oceano Dunes State Vehicular Recreation Area (ODSVRA)	45
Vandenberg Air Force Base (VAFB)	27
Fort Ord Dunes State Park (SP)	15
Oregon	11
Salinas River SB (State Beach)	7
Marina State Beach (SB) (Includes South Marina Dunes)	4
Salinas River National Wildlife Refuge (NWR)	4
Pajaro Spit	3
Monterey SB	2
San Francisco Bay	2
Coronado Naval Air Station, Sea World, San Diego	1
Moss Landing Salt Ponds	1
Pajaro Dunes	1
Point Reyes National Seashore (NS)	1
Zmudowski SB	1

Seventeen of the banded WSP seen between March 1<sup>st</sup> and September 30<sup>th</sup> were confirmed breeders on District beaches (12% of the District's adult breeding population). An additional eight of the banded WSP had the potential to breed on District beaches. These banded WSP plus the confirmed banded adult breeders (25) accounted for 18% of the District's adult breeding population. The percentages were found by taking the number of banded WSP with breeding potential and dividing by the District total of WSP during the breeding window survey.

Fifty-six banded fledges were recorded on District beaches. The banding locations of WSP fledges observed on District beaches between October 2017 and September 2018 are located in Table 5.

**Table 5:** Banding Locations of WSP Fledges Observed on District Beaches October 2017-September 2018.

<b>Banding Location</b>	<b># of WSP Fledges</b>
ODSVRA	23
VAFB	10
Oregon	8
Fort Ord Dunes SP	6
Salinas River SB	6
Marina SB & South Marina Dunes	2
Monterey SB	1

Banded WSP were observed frequently on District beaches between October 2017 and September 2018. The most frequently observed were ow:wr (102 sightings), gg:og (83 sightings), vv:or (66 sightings), v:w (65 sightings), wa:ga (64 sightings), oa:ya (64 sightings), and u:or (61 sightings, previously nb:or and b:or). Three of these WSP fledged from ODSVRA, two fledged from Pajaro Spit, one fledged from VAFB, and one from Fort Ord Dunes SP.

See Appendices 5 and 6 for a list of the band combinations observed and their histories.

### Hearst San Simeon State Park

#### San Carpoforo Creek Beach

Seven WSP with unique band combinations were sighted at San Carpoforo Creek Beach. Three were seen only during the winter season, one only during the breeding season, and three were seen during both the winter season and the breeding season. The three most frequently banded WSP observed at San Carpoforo Creek Beach during both the winter and breeding season were Bo:bb (12 sightings), Rw:br (11 sightings), and ga:pb (9 sightings).

Bo:bb, banded as an adult male at Fort Ord Dunes SP in 2017, was recorded with the only nest on San Carpoforo Creek Beach this season, which was depredated by coyote (*Canis latrans*). This was also the only recorded nest throughout HSSSP for the 2018 breeding season.

Rw:br was banded as an adult male at Zmudowski SB in 2009. Rw:br is possibly the oldest WSP in the District. His exact age is unknown, since he was banded as an adult. He has nested successfully on San Carpoforo Creek Beach in years prior.

The WSP ga:pb was banded at ODSVRA in either 2016 or 2017 (the band combination was used in two consecutive years). This means that ga:pb could have been a juvenile but cannot be confirmed. One additional banded juvenile from ODSVRA was seen at San Carpoforo Creek Beach.

#### Point Sierra Nevada

One unique band combination was seen at Point Sierra Nevada between October 2017 and September 2018. Banded WSP vg:ry was seen once in the breeding season as a female, having fledged from ODSVRA in 2017.

#### Arroyo Laguna

A total of 18 WSP with unique band combinations were observed at Arroyo Laguna. Six of these individuals were seen only during the winter season, four only during the breeding season, and eight during both seasons.

The most frequently observed banded WSP seen at Arroyo Laguna during the 2018 season were pv:aw (13 sightings), ga:ry (12 sightings), and wy:ga (10 sightings). Both pv:aw and ga:ry fledged from ODSVRA in 2017 and wy:ga from Pajaro Dunes in 2014.

A total of five juveniles were seen on Arroyo Laguna between October 2017 and September 2018. These include two juveniles from Oregon, and one from each of ODSVRA, Salinas River SB, and VAFB.

### San Simeon Creek Beach

A total of 28 unique band combinations were seen on San Simeon Creek Beach. Twenty-three of these individuals were seen only during the winter season, and five were seen during both seasons.

The most frequently observed banded WSP seen at San Simeon Creek Beach was an:yy (14 sightings), a female that fledged from VAFB in 2015.

Six banded juveniles were recorded at San Simeon Creek Beach between October 2017 and September 2018. Four fledged from ODSVRA, and two fledged from VAFB.

### Santa Rosa Creek Beach

A total of 15 unique band combinations were observed on Santa Rosa Creek Beach. Six of these band combos were only observed in the winter, five only in the summer, and four during both periods.

The most frequently observed WSP at Santa Rosa Creek Beach was no:wb (4 sightings), a fledge from VAFB in 2016.

The age of one possible banded juvenile from ODSVRA could not be confirmed due to band combinations being used in two consecutive years.

### Other Hearst San Simeon State Park Beaches

Arroyo de la Cruz, Piedras Blancas, and Sidney's Lagoon were all monitored during the 2018 season but had no banded WSP present.

### Villa Creek Beach

A total of 17 unique band combinations were observed on Villa Creek Beach. Two of these 17 banded WSP were seen only during the winter season, 13 only during the breeding season, and two during both seasons.

The most frequently observed banded WSP during the 2018 season on Villa Creek Beach was ow:wr (99 sightings). A female who fledged from Fort Ord Dunes SP in 2015, ow:wr, was the only banded WSP on Villa Creek Beach to have a nest that both successfully hatched all three eggs and had three fledges. She had three additional nests on Villa Creek Beach during the 2018 season, one of which hatched and produced one fledge with the other two failing to coyote and unknown predator.

The second most frequently observed banded WSP was rr:vy (38 sightings), a 2016 female that fledged from ODSVRA.

One of our oldest WSP is v:w, a male who fledged from ODSVRA in 2008. He was the only other banded WSP to have a nest on Villa Creek Beach this year. His nest ended up failing due to abandonment after two eggs were depredated by an unknown predator. Two days after v:w's eggs were depredated, he was seen at Morro Strand and initiated a new nest within a week.

Between October 2017 and September 2018, a total of nine banded juveniles were seen at Villa Creek Beach. Five fledged from ODSVRA, and one fledged from each of Fort Ord Dunes SP, Monterey SB, Oregon, and Salinas River SB.

### Morro Strand

A total of 59 unique band combinations were observed at Morro Strand. Fourteen of these WSP were seen only during the winter months, 31 were seen only during the breeding season, and 14 were seen during both seasons.

The most frequently observed banded WSP at Morro Strand during the 2018 season was vv:or (63 sightings). An adult male, vv:or fledged from ODSVRA in 2015 and had one successful nest at Morro Strand this year which resulted in two fledges. He was also potentially with another nest at Morro Strand that failed to American Crow (*Corvus brachyrhynchos*) depredation.

The second most frequently observed banded WSP at Morro Strand was v:w (52 sightings). He fledged from ODSVRA as pv:pw in 2008 and is one of the oldest known WSP in the District. He has successfully nested at Morro Strand every year except one since 2009. During the 2018 breeding season, he nested three times at Morro Strand after his nest failed at Villa Creek Beach. Two of the nests on Morro Strand failed to red fox (*Vulpes fulva*) and one resulted in an unknown fate. He was confirmed as paired with a banded female (u:or, previously known as nb:or) for one nest that failed to red fox.

A female who fledged from VAFB in 2013, u:or (previously nb:or and b:or), was seen 36 times at Morro Strand during the 2018 season. As previously stated, u:or was paired with v:w for one nest at Morro Strand that failed to red fox. Prior to her nest at Morro Strand, u:or had one potential nest that failed and one nest that hatched on the Sandspit.

A female who fledged from Moss Landing Salt Ponds in 2014, Ba:wy, was seen 26 times at Morro Strand this season. During the 2018 season, Ba:wy had one nest at Morro Strand that failed due to American Crow depredation. Prior to her nest at Morro Strand, she may have been associated with a nest on the City property of the Sandspit that hatched.

Between October 2017 and September 2018, a total of 30 banded juveniles were observed at Morro Strand. Thirteen of these juveniles fledged from ODSVRA, seven from VAFB, four from Fort Ord Dunes SP, two each from Oregon and Salinas River SB, and one each from Marina SB and Salinas River NWR. One additional juvenile from ODSVRA may have been recorded, but this is unconfirmed due to the band combination being used in two consecutive years.

### Sandspit

A total of 58 unique band combinations were observed on the Sandspit this year. Fourteen were seen only during the winter months, 25 were seen only during the breeding season, and 19 were seen during both seasons.

The most frequently observed banded individual at the Sandspit during the 2018 season was gg:og (83 sightings). A 2014 fledge from ODSVRA, gg:og was seen exclusively on the Sandspit

this season. He successfully hatched one nest and had one nest with an unknown fate this season. His hatched nest produced one fledge.

The next most frequently observed banded WSP on the Sandspit this season was wa:ga (64 sightings). A fledge from Pajaro Spit in 2014, wa:ga is a male that successfully hatched two nests on the Sandspit with potentially two fledges.

A fledge from Pajaro Spit in 2014, oa:ya (63 sightings) is a male that successfully hatched one nest, had one nest with an unknown fate, and had one nest that was depredated by coyote on the Sandspit this season. Two of his chicks successfully fledged. He was paired with no:wb for his nest that failed to coyote.

A fledge from Fort Ord Dunes SP in 2015, rb:bg, a male, was seen 56 times and successfully hatched two nests on the Sandspit this year. One of his chicks successfully fledged.

A 2014 Marina SB fledge, ay:aa, a male, was seen 40 times on the Sandspit and had one successful nest. He may have also been associated with another nest that hatched on the Sandspit.

The 2013 VAFB female, u:or, had two nests on the Sandspit prior to nesting at Morro Strand. One of her nests on the Sandspit hatched; the other failed to an unknown avian predator.

Other banded WSP that had nests on the Sandspit include nr:rr, from VAFB in 2017, and gg:pb, from ODSVRA in 2012, which each successfully hatched one nest. One other banded WSP, nr:gg from VAFB in 2015, had one nest with an unknown fate on the Sandspit.

Twenty banded juveniles were observed on the Sandspit between October 2017 and September 2018. These juveniles included nine from ODSVRA, three from Fort Ord Dunes SP, three from VAFB, two from Oregon, two from Salinas River SB, and one from Marina SB.

### **Injured/Dead WSP**

Throughout the year, monitors recorded injured or dead WSP seen on the beach and notified the WSP Coordinator. Depending upon each situation, intervention may or may not have taken place. One banded female WSP, one banded male WSP, two unbanded male WSP, and three unbanded WSP of unknown sex were observed injured during the 2018 season. One adult WSP and one juvenile WSP were found dead. See Appendix 7 for a summary of the injured WSP on District beaches from October 2017 through September 2018.

#### *Hearst San Simeon State Park*

Two injured WSP and one WSP with tar on its bands were observed in HSSSP during the 2018 season.

Banded female WSP an:yy was first observed with a possible left leg injury at San Simeon Creek Beach on October 11, 2017 and was observed an additional eight times at San Simeon Creek

Beach. This WSP was also observed at Arroyo Laguna once and Santa Rosa Creek Beach twice. The injury did not appear to hinder foraging or movement. VAFB reported that an:yy was a suspected but unconfirmed VAFB breeder and was reported as seen with the left leg injury earlier in the season, but since the injury did not appear to be band related, no action was taken. This female was banded at VAFB in 2015 and has wintered each year since then at HSSSP.

One unbanded adult WSP of unknown sex was seen with an injury to its left leg at San Carpoforo Creek Beach on November 7, 2017. The injury did not hinder movement, so no action was taken to capture it.

Banded male adult, Rw:br, was observed with tar on its white band on August 28<sup>th</sup> at San Carpoforo Creek Beach. The tar did not appear to be on the leg, nor did it hinder the bird, so no action was taken. Rw:br was banded as an adult at Zmudowski SB in 2009 and has been observed on HSSSP beaches since then.

#### Villa Creek Beach

No injured or dead WSP were observed on Villa Creek Beach during the 2018 season.

#### Morro Strand

One injured WSP and one dead WSP were observed on Morro Strand during the 2018 season.

On August 21<sup>st</sup>, an adult male WSP without bands was observed hopping on its left leg with its right foot dangling and possibly swollen. The WSP appeared to be moving around without difficulty, so no action was taken to capture it. Most likely, this same WSP was seen again on September 5<sup>th</sup> in the same condition.

Also on August 21<sup>st</sup>, a juvenile WSP was found dead with a missing head and the body scavenged. The WSP was predated by an unknown predator. The WSP was documented with photos and a GPS coordinate and the wings and tail with legs attached were collected. The carcass was collected for deposition at Santa Barbara Museum of Natural History (SBMNH).

#### Sandspit

Between October 2017 and September 2018, two injured WSP, one WSP with tar on it, and one dead WSP were observed on the Sandspit.

One injured unbanded WSP was observed on October 17, 2017 with a possible injury to its right leg or foot. The foot was held off the ground with no obvious cause of injury. This WSP appeared to be moving and foraging without much difficulty.

One injured WSP was observed on April 17<sup>th</sup>. This unbanded adult male WSP was observed with matted feathers on the left side auricular and clumping sand on the bill. There did not appear to be any injury to the eye. No action was taken to capture it.

One unbanded adult WSP was observed on May 31<sup>st</sup> with tar on the right wing. The WSP was moving and foraging okay, so no action was taken.

One dead banded WSP was found on August 2<sup>nd</sup>. This adult female WSP was banded as ab:go and found in the tide line outside of the symbolically fenced habitat between Shark’s Inlet Corridor and Star Log during routine monitoring. No cause of death was apparent, but the carcass was found in an advanced state of decomposition. USFWS was notified, and the incident was documented with photographs and a GPS point. The carcass was collected and sent to CDFW Marine Wildlife and Veterinary Care and Research Center for radiography. No fractures were found. The carcass was deposited at California Academy of Sciences in San Francisco with USFWS approval. This WSP was last seen alive on the Sandspit on July 19<sup>th</sup> and was banded in 2011 at Salinas River NWR and wintered on District beaches since 2011.

### Nest and Egg Numbers

There were 203 nests with 552 eggs found on District beaches in 2018 (Table 6). The average clutch size was 2.72.

**Table 6:** Number of Nests Found by Year at District Beaches 2004-2018.

Location	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
HSSSP	5	11	6	2	2	0	0	3	0	0	1	1	2	1
Villa Creek Beach	37	40	30	16	38	26	21	31	20	23	24	10	14	21
Morro Strand	27	34	19	33	26	24	25	12	12	17	13	16	16	12
Sandspit	225	141	109	96	144	179	213	174	157	201	272	238	226	169
<b>Total</b>	<b>294</b>	<b>226</b>	<b>164</b>	<b>147</b>	<b>210</b>	<b>229</b>	<b>259</b>	<b>220</b>	<b>189</b>	<b>241</b>	<b>310</b>	<b>265</b>	<b>258</b>	<b>203</b>

Appendix 10 depicts the number of nests found by month on all District beaches from 2004 through 2018. In 2018, the month with the greatest number of nests found was June (67), followed by April (60), May (47), July (34), and August (2).

Tables in Appendix 10a provide a summary of nest initiation and last hatch dates for all District beaches from 2002 through 2018. The first nest in 2018 was initiated on April 2<sup>nd</sup>, and the last hatch was on August 21<sup>st</sup>. The length of the 2018 breeding season for the entire District was 170 days, as calculated from the date of the first calculated nest initiation to the date of the last known fledge.

Appendix 10b includes a graphic representation of the number of active nests during each week of the breeding season for all District beaches. The 2018 season began slowly, with nesting activity beginning the first week of April and doubling the second week. The number of active nests peaked during the week ending on May 11<sup>th</sup>, followed by a decrease in number of nests until the week of June 1<sup>st</sup>. Nest numbers reached a second, smaller peak during the week of June 22<sup>nd</sup>, followed by a small decrease and plateau until the week ending July 13<sup>th</sup>, after which active nests declined until the end of the breeding season. During the peak active nesting period (May through July), the weekly average of total active nests throughout all beaches was 50. The peak period for nesting in the District occurred during the week of May 11<sup>th</sup> with 60 active nests; 53 of these nests were on the Sandspit.

A total of 102 nests failed on all District beaches in 2018. Appendix 10c depicts the timing of nest failures on District beaches during each week of the breeding season. Compared to other weeks of the breeding season, a high rate of nest failure occurred during the week ending on July 20<sup>th</sup>, when 12 nests were lost. Losses were also high during the weeks ending on May 25<sup>th</sup> and July 27<sup>th</sup>, with ten nests lost each week

In addition to the 102 failed nests on District beaches in 2018, 94 nests hatched (for a hatch rate of 48%), and seven nests had unknown fates. Appendix 10d shows nest fates for all District beaches from 2001 through 2018, while Appendix 10e provides a graph depicting the number of nests hatched each year from 2001 through 2018 on all District beaches. The average number of nests hatched for all beaches since 2004 is 107. Appendix 10f provides a graph depicting the number of nests hatched by month each year from 2005 through 2018 on all District beaches. May saw the highest number of hatches in 2018 with 34 nests hatching across the District. The average number of nests hatched per month in 2018 was 18.8 (number of hatches divided by all months in breeding season).

During the 2018 breeding season, dead WSP, abandoned, tide washed, dropped, or unhatched eggs were collected on District beaches for SBMNH as authorized by the Ventura Fish and Wildlife Office (Appendix 11). The embryonic development of 52 eggs was analyzed. Forty-one eggs had no evidence of fertilization (14% -- 41 out of 304 analyzed and hatched eggs), six eggs had one week or less of development, one egg had two weeks of development, and four eggs had three weeks of development.

#### Hearst San Simeon State Park

The eight beaches comprising HSSSP showed varying levels of nesting activity throughout the 2018 breeding season. Two beaches, Arroyo de la Cruz and Piedras Blancas, hosted neither WSP nor breeding activity at any point during the breeding season. WSP were observed at three beaches (Point Sierra Nevada, Santa Rosa Creek Beach, and Sidney's Lagoon) during the very beginning or end of the breeding season, but neither scrapes nor nests were found. Breeding activity was observed at the following three beaches: San Carpoforo Creek Beach, Arroyo Laguna, and San Simeon Creek Beach, but nesting was only confirmed at San Carpoforo Creek Beach.

#### San Carpoforo Creek Beach

Adult WSP were observed on five censuses at San Carpoforo Creek Beach during the breeding season. WSP were seen in March, April, May, August, and September. One nest was found on April 10<sup>th</sup>, with a calculated initiation date of April 8<sup>th</sup>, but failed to a coyote April 25<sup>th</sup>. See Appendix 12 for a nest location map.

#### Arroyo Laguna

Adult WSP were seen on six censuses (March, April, May, August, and September) at Arroyo Laguna during the breeding season. Scrapes were found and symbolically fenced, but no nests were initiated on CSP property.

San Simeon Creek Beach

The area utilized for breeding in previous years was symbolically fenced in 2018. Adult WSP were spotted on four censuses throughout the breeding season, but only possible scrapes were found.

Villa Creek Beach

A total of 21 nests were found at Villa Creek Beach during the 2018 breeding season (Table 7). Six nests were found each month in April, May, and June. The first nest was discovered on April 4<sup>th</sup>, with a calculated initiation date of April 3<sup>rd</sup>, and the last nest was initiated on July 11<sup>th</sup>. The first nest hatched on May 18<sup>th</sup>, and the last nest hatched on August 10<sup>th</sup>. The week with the greatest number of active nests on Villa Creek Beach (7) ended on May 4<sup>th</sup>.

**Table 7:** Number of Nests Found by Month at Villa Creek Beach 2004-2018.

Month	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
March	2	2	3	2	7	0	0	0	0	2	2	0	0	0
April	14	10	7	4	13	5	7	5	4	6	6	4	3	6
May	9	15	12	3	8	7	6	10	5	9	11	4	4	6
June	12	8	5	5	7	13	4	10	5	4	5	1	4	6
July	0	3	3	2	3	1	4	6	6	2	0	1	3	3
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>37</b>	<b>38</b>	<b>30</b>	<b>16</b>	<b>38</b>	<b>26</b>	<b>21</b>	<b>31</b>	<b>20</b>	<b>23</b>	<b>24</b>	<b>10</b>	<b>14</b>	<b>21</b>

Fates were determined for all 21 nests (Table 8). Six nests hatched successfully (29%) and 15 failed (71%). Of the nests that failed, ten nests were depredated, four were abandoned, and one nest was non-viable. See the “Depredation” section for more information on nests lost to predators.

**Table 8:** Nest Fates and Percentages for Villa Creek Beach in 2018.

Total Nests	21	% Total	
Unknown Fate	0	0%	
Total With Known Fate	21	100%	
<b>Hatch</b>	<b>6</b>	<b>29%</b>	
<b>Fail</b>	<b>15</b>	<b>71%</b>	<b>% Failed</b>
Abandoned	4	19%	27%
Depredated	10	48%	67%
Non-viable	1	4%	6%

The unhatched eggs, eggs from the abandoned nests, and the eggs from the non-viable nest were collected. Collected eggs were analyzed to determine embryonic development at SBMNH (Appendix 11). Three collected eggs from three nests that were abandoned had no evidence of fertilization. One egg from an abandoned nest had a three week old embryo. This nest was

abandoned after two eggs were depredated by an unknown predator. Analyzation of the unhatched eggs revealed the eggs had no evidence of fertilization. One egg was collected after being incubated for at least 45 days. Analyzation revealed mold inside the egg most likely caused by a small crack in the egg during incubation.

The 21 Villa Creek Beach nests in 2018 produced a total of 51 eggs. Fourteen nests had a clutch size of three, two had a clutch size of two, and five had a clutch size of one. One nest experienced a reduction in clutch size from three eggs to one egg, after which it failed due to abandonment. Out of the 51 total eggs, 15 eggs (29%) hatched.

Table 9 shows the distribution of nests and their fates at Villa Creek Beach for the 2018 breeding season. The area with the most WSP nest locations was in the middle section of the main beach.

**Table 9:** Nest Distribution and Fate at Villa Creek Beach in 2018.

Area	# of Nests	% of Total Nests	Hatch	% of Known Fate Hatched Nests	Fail	% of Known Fate Failed Nests
<b>Back Area<sup>1</sup></b>	1	5%	0	0%	1	7%
<b>West of Villa Creek<sup>2</sup></b>	0	0%	0	0%	0	0%
<b>Main Beach: North</b>	5	24%	1	17%	4	27%
<b>Main Beach: Middle</b>	11	52%	4	66%	7	47%
<b>Main Beach: South</b>	4	19%	1	17%	3	19%
<b>Pocket Beaches</b>	0	0%	0	0%	0	0%
<b>Total</b>	<b>21</b>	<b>100%</b>	<b>6</b>	<b>100%</b>	<b>15</b>	<b>100%</b>

1. Area formerly known as "South of Villa Creek"

2. Area formerly known as "North of Villa Creek"

Table 10 shows a summary of WSP nest distribution across beach segments from 2001 through 2018. Since 2001, the majority of WSP nests have been located on the main beach, where nest numbers have ranged from nine nests in 2016 to 56 in 2004. In 2018, the majority of the nests (95%) were located on the main beach. See Appendix 1 for a map with area distinctions and Appendix 12 for nest locations.

**Table 10:** Distribution of Nests at Estero Bluffs State Park 2001-2018.

Year	West of Villa Creek <sup>1</sup>	Back Area <sup>2</sup>	Main Beach	Pocket Beaches	Cayucos Point <sup>3</sup>	Total
<b>2018</b>	<b>0</b>	<b>1</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>21</b>
2017	1	2	11	0	0	14
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 "South of Villa Creek"

2. Area formerly known as "North of Villa Creek"

3. Area formerly known as "Estero Bluffs"

### *Morro Strand*

A total of 12 nests were found at Morro Strand during the 2018 breeding season (Table 11). The month of July was the most prolific in terms of the number of new nests (six). The first nest was initiated on April 4<sup>th</sup>, and the last nest was found on July 25<sup>th</sup> with a calculated initiation date of July 24<sup>th</sup>. The first hatch occurred June 27<sup>th</sup>, and the last hatch occurred on August 21<sup>st</sup>. In 2018, the week with the greatest number of active nests on Morro Strand (five) ended on July 27<sup>th</sup>.

**Table 11:** Number of Nests Found by Month on Morro Strand 2004-2018.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
March	3	0	0	0	1	2	0	2	0	0	3	0	0	2	0
April	15	3	7	6	14	7	6	7	6	5	8	8	4	6	2
May	8	10	9	5	7	8	8	4	2	2	4	0	8	1	2
June	6	9	11	7	8	8	9	10	3	2	1	2	3	6	2
July	6	5	7	1	3	1	1	2	1	2	1	3	1	1	6
August	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<b>Total</b>	<b>38</b>	<b>27</b>	<b>34</b>	<b>19</b>	<b>33</b>	<b>26</b>	<b>24</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>17</b>	<b>13</b>	<b>16</b>	<b>16</b>	<b>12</b>

Fates were determined for 11 of the 12 nests (Table 12). Two nests hatched successfully (18%) and nine nests failed (82%). Of the nests that failed, eight nests were depredated, and one was abandoned. One additional nest was recorded as having an unknown fate. See the “Depredation” section for information on nests lost to predators.

**Table 12:** Nest Fates and Percentages for Morro Strand in 2018.

<b>Total Nests</b>	<b>12</b>	<b>% Total</b>	
Unknown Fate	1	8%	
Total With Known Fate	11	92%	
<b>Hatch</b>	<b>2</b>	<b>18%</b>	
<b>Fail</b>	<b>9</b>	<b>82%</b>	<b>% Failed Nests</b>
Abandoned	1	9%	11%
Depredated	8	73%	89%

The 12 Morro Strand nests in 2018 produced a total of 30 eggs. Eight nests had a clutch size of three, two had a clutch size of two, and two had a clutch size of one. Out of the 30 total eggs, five eggs (17%) hatched. Monitors also collected three eggs from two different nests. One egg was collected from a nest that hatched two out of three eggs, and two more eggs were collected from an abandoned nest. Monitors also found and collected one dropped egg at Morro Strand, however, this was not included in the total number of eggs. All collected eggs were later analyzed to determine embryonic development at SBMNH (Appendix 11). All eggs had no evidence of fertilization.

The distribution of nests and their fates within each beach segment in 2018 is shown in Table 13. The section with the highest number of nests (8 of the 12 known nests) was between Azure and Boardwalk Corridors. The two northernmost nests of the season, both of which failed, were found between the Hatteras and Easter Street Corridors.

**Table 13:** Nest Distribution and Fate at Morro Strand in 2018.

Area	# of Nests	% of Total Nests	Hatch	% of Known Fate Hatched Nests	Fail	% of Known Fate Failed Nests	Unknown Fate	% Unknown Fate
<b>Campground-Hatteras</b>	0	0%	0	0%	0	0%	0	0%
<b>Hatteras-Azure</b>	2	17%	0	0%	2	22%	0	0%
<b>Azure-Boardwalk</b>	8	66%	1	50%	6	67%	1	100%
<b>Boardwalk-Hwy 41</b>	2	17%	1	50%	1	11%	0	0%
<b>Total</b>	<b>12</b>	<b>100%</b>	<b>2</b>	<b>100%</b>	<b>9</b>	<b>100%</b>	<b>1</b>	<b>100%</b>

WSP nest distribution among Morro Strand beach segments from 1993 through 2018 is shown in Table 14. The number of WSP nests in 2018 was relatively low, following the overall trend of nesting decline on Morro Strand. The distribution of nests was consistent with previous years where the most nests occurred between the Azure and Boardwalk Corridors.

**Table 14:** Distribution of Nests at Morro Strand 1993-2018.

<b>Year</b>	<b>Campground- Hatteras<sup>1</sup></b>	<b>Hatteras- Azure<sup>2</sup></b>	<b>Azure- Boardwalk<sup>3</sup></b>	<b>Boardwalk- Hwy 41<sup>4</sup></b>	<b>Total</b>
<b>2018</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>12</b>
<b>2017</b>	<b>0</b>	<b>4</b>	<b>9</b>	<b>3</b>	<b>16</b>
<b>2016</b>	0	1	15	0	<b>16</b>
<b>2015</b>	0	2	11	0	<b>13</b>
<b>2014</b>	0	1	14	2	<b>17</b>
<b>2013</b>	0	1	9	2	<b>12</b>
<b>2012</b>	0	2	7	3	<b>12</b>
<b>2011</b>	0	6	13	6	<b>25</b>
<b>2010</b>	2	1	16	5	<b>24</b>
<b>2009</b>	7	5	10	4	<b>26</b>
<b>2008</b>	12	4	15	2	<b>33</b>
<b>2007</b>	5	2	11	1	<b>19</b>
<b>2006</b>	1	5	21	7	<b>34</b>
<b>2005</b>	4	5	15	3	<b>27</b>
<b>2004</b>	3	10	20	5	<b>38</b>
<b>2003</b>	4	8	24	4	<b>40</b>
<b>2002</b>	0	0	27	10	<b>37</b>
<b>2001</b>	0	0	11	2	<b>13</b>
<b>2000</b>	0	0	9	0	<b>9</b>
<b>1999</b>	0	0	18	0	<b>18</b>
<b>1998</b>	0	0	18	2	<b>20</b>
<b>1997</b>	0	10	25	15	<b>50</b>
<b>1996</b>	0	4	30	13	<b>47</b>
<b>1995</b>	N/A	N/A	N/A	N/A	<b>N/A</b>
<b>1994</b>	2	13	23	8	<b>46</b>
<b>1993</b>	0	3	5	6	<b>14</b>

See Appendix 1 for a map with area distinctions and Appendix 12 for nest locations.

### Sandspit

A total of 169 nests were found on the Sandspit this year (Table 15). Fifty-two nests were found in the month of June, comprising 31% of the season total – the highest monthly rate of nest initiation. Fifty-one nests were found in April. Eighty-one nests were found on the northern half of the Sandspit, and 88 were found on the southern half. The first nest was initiated on April 2<sup>nd</sup>, and the last nest was found on August 13<sup>th</sup> with a calculated initiation date of August 10<sup>th</sup>. The first hatch occurred on May 8<sup>th</sup>, and the last hatch occurred on August 20<sup>th</sup>. The week with the maximum number of active nests on the Sandspit ended on May 11<sup>th</sup> with 53 active nests.

**Table 15:** Number of Nests Found by Month at the Sandspit 2005-2018.

Month	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>March</b>	2	0	2	10	14	8	10	4	21	39	31	5	17	0
<b>April</b>	44	33	23	18	40	57	54	39	39	32	62	51	50	51
<b>May</b>	48	41	41	27	32	47	63	42	34	60	81	55	84	39
<b>June</b>	100	44	30	27	39	53	69	57	46	48	68	77	58	52
<b>July</b>	29	22	11	14	19	14	14	27	17	22	29	50	16	25
<b>August</b>	2	1	2	0	0	0	3	5	0	0	1	0	1	2
<b>Total</b>	<b>225</b>	<b>141</b>	<b>109</b>	<b>96</b>	<b>144</b>	<b>179</b>	<b>213</b>	<b>174</b>	<b>157</b>	<b>201</b>	<b>272</b>	<b>238</b>	<b>226</b>	<b>169</b>

A summary of nest fates for this season on the Sandspit can be found in Table 16. Of the 169 nests found, fates were determined for 163 nests. Eighty-six nests hatched successfully (53%).

**Table 16:** Nest Fates and Percentages for the Sandspit in 2018.

<b>Total Nests</b>	<b>169</b>	<b>% Total</b>	
Unknown Fate	6	4%	
Total With Known Fate	163	96%	
<b>Hatch</b>	<b>86</b>	<b>53%</b>	
<b>Fail</b>	<b>77</b>	<b>47%</b>	
Abandoned	17	10%	22%
Depredated	50	31%	65%
Tide	2	1%	3%
Wind	4	2%	5%
Non-viable	1	1%	1%
Unknown Fail	3	2%	4%

Of the 468 eggs produced a total of 232 (52%, excluding 18 eggs from six unknown fate nests) hatched. In one instance, it was unknown whether two or three eggs hatched from one three egg clutch. The number of eggs hatched (232) presumes that only two of these eggs hatched. Nine unhatched eggs from hatched clutches were analyzed for embryonic development. Three eggs had three week old embryos; one egg had a two week old embryo; one had a one week old embryo; and four eggs had no evidence of fertilization.

One nest had a clutch size of four, 143 had a clutch size of three, 10 had a clutch size of two, and 15 had a clutch size of one. Fourteen dropped eggs were never attributed to any active nests and were not included in the total egg or nest numbers. There was no evidence of fertilization in the dropped eggs that were analyzed for embryonic development.

Of the 163 nests found with known fates, 50 nests were depredated (31%). See the “Depredation” section for information on nests lost to predators.

Seventeen nests (10%) failed due to abandonment on the Sandspit. Of the 17 nests abandoned; seven nests had three eggs; two nests had two eggs; and eight nests had one egg. Eleven out of 33 abandoned eggs were analyzed to determine embryonic development at SBMNH. Six out of seven one egg clutches had no evidence of fertilization. The other one egg clutch had a one week old embryo. One of the abandoned three egg clutches lost two eggs due to unknown causes. The third egg was collected once it was determined to be abandoned. This egg had no evidence of fertilization. The other abandoned three egg clutch had two eggs with one week old embryos and one egg with no evidence of fertilization.

Two nests failed due to high tides (1%) and high winds claimed four nests (2%). One egg from one of the two nests that failed to tide was analyzed for embryonic development. This egg had no evidence of fertilization. One egg from one of the four nests that failed to wind was analyzed for embryonic development. This egg was determined to have no evidence of fertilization after being examined. Three nests failed for unknown reasons (2%). These nests were lost either to wind or a predator, and no shell fragments or eggs were found. One nest failed to “other”, a situation where the nest was active but non-viable and did not hatch. Non-viability was determined by examining the eggs at SBMNH.

Six nests were classified as having an unknown fate this season (4%). All six nests were three egg nests. Two nests lacked evidence of pips or chicks to confirm a hatch and also lacked evidence of predator tracks. Two nests had one egg missing, but no chick was seen and no pip was found. One nest was found with coyote tracks at the nest bowl on the hatch date, and chicks or pips were never found. One nest that was found at three eggs and not floated was washed by tide with the nest bowl intact. It also had coyote tracks to the nest bowl, foot traffic within two feet of the nest bowl, and an eggshell fragment.

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. Two nests, both starting with three eggs, experienced clutch size reductions in 2018. One of these nests hatched despite losing one egg to an unknown cause, and the other nest lost two eggs and eventually failed due to abandonment.

There were 11 incidents of nests moving to new locations. In these instances, final nest bowl sites were moved away from the original location by a range of about three inches up to four feet. Five of these nests were moved during periods of high surf. Of the 11 nests that moved, ten hatched, and one failed to abandonment.

In 2018, the highest number of Sandspit nests occurred between RM 5 and RM 4 (32). RM 2 to RM 1 had the most number of hatches (21). The area between RM 6 to RM 5 and RM 5 to RM 4 had the highest number of failed nests (17 each). One WSP nest was also found within a section of habitat south of American Canyon Trail, an area approximately one 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 their fates within each beach segment in 2018 are shown in Table 17. The table also includes percentages of nests failed and hatched.

**Table 17:** Nest Distribution and Fate at the Sandspit in 2018.

Area	# of Nests	% of Total Nests	Hatch	% of Known Fate Hatched Nests	Fail	% of Known Fate Failed Nests	Unknown Fate	% of Unknown Fates
SPB-RM6	12	7%	2	3%	10	13%	0	0%
RM6-RM5	21	12%	3	4%	17	22%	1	17%
RM5-RM4	32	19%	14	16%	17	22%	1	17%
RM4-RM3	27	16%	15	17%	10	13%	2	32%
RM3-RM2	20	12%	13	15%	7	9%	0	0%
RM2-RM1	28	17%	21	24%	6	8%	1	17%
RM1-SST	19	11%	12	14%	7	9%	0	0%
SST-HAZ	9	5%	5	6%	3	4%	1	17%
SOUTH HAZ	1	1%	1	1%	0	0%	0	0%
<b>Total</b>	<b>169</b>	<b>100%</b>	<b>86</b>	<b>100%</b>	<b>77</b>	<b>100%</b>	<b>6</b>	<b>100%</b>

WSP nest distribution among beach segments from 2000 through 2018 is shown in Table 18. Nest numbers between the CSP boundary and RM 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 18:** Distribution of Nests on the Sandspit 2000-2018.

Year	SPB-RM6	RM6-RM5	RM5-RM4	RM4-RM3	RM3-RM2	RM2-RM1	RM1-SST	SST-HAZ	SOUTH HAZ	Total
<b>2018</b>	<b>12</b>	<b>21</b>	<b>32</b>	<b>27</b>	<b>20</b>	<b>28</b>	<b>19</b>	<b>9</b>	<b>1</b>	<b>169</b>
<b>2017</b>	17	45	46	37	18	28	20	12	3	<b>226</b>
<b>2016</b>	16	36	59	40	27	25	21	10	4	<b>238</b>
<b>2015</b>	23	29	55	44	34	39	30	13	5	<b>272</b>
<b>2014</b>	21	23	35	30	24	31	22	10	5	<b>201</b>
<b>2013</b>	21	24	29	19	19	30	12	3	0	<b>157</b>
<b>2012</b>	21	25	40	19	14	21	17	9	0	<b>166</b>
<b>2011</b>	37	37	42	29	28	24	12	4	0	<b>213</b>
<b>2010</b>	20	35	29	31	26	22	14	2	0	<b>179</b>
<b>2009</b>	18	27	24	30	12	22	8	3	0	<b>144</b>
<b>2008</b>	10	19	20	16	13	10	2	6	0	<b>96</b>
<b>2007</b>	12	21	19	23	12	12	7	3	0	<b>109</b>
<b>2006</b>	12	24	26	33	15	21	7	3	0	<b>141</b>
<b>2005</b>	12	39	48	39	27	30	18	12	0	<b>225</b>
<b>2004</b>	41	55	50	47	29	34	12	4	0	<b>272</b>
<b>2003</b>	23	26	32	26	17	17	5	N/A	N/A	<b>146</b>
<b>2002</b>	24	16	30	16	7	7	7	N/A	N/A	<b>107</b>
<b>2001</b>	29	24	24	8	5	4	6	N/A	N/A	<b>100</b>
<b>2000</b>	19	18	25	19	11	5	2	N/A	N/A	<b>99</b>

See Appendix 1 for a map with area distinctions and Appendix 12 for nest locations.

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 2018, there were 65 Sandspit nests with verifiable incubation periods. Sixty of the nests hatched within the expected range, and five hatched outside of this range. The range of verified incubation periods for successfully hatching nests was between 24 and 33 days. Table 19 provides a summary of incubation duration data for successful nests with known clutch initiation dates on the Sandpit in 2018.

**Table 19:** Number of Nests Hatched by Days Incubated at the Sandspit in 2018.

	Early			Average					Late	
Days Incubated	24	25	26	27	28	29	30	31	32	33
# of Nests Hatched	1	2	21	19	13	4	3	0	1	1
<i>Expected Range</i>										

### Floated Eggs

Nests discovered at their completed clutch size, with no discernable initiation date, were floated to provide an EHD. In 2018, 35 nests were floated to determine an EHD. See Appendix 8 for float data.

#### Hearst San Simeon State Park

In 2018, one nest was discovered at three eggs in HSSSP and floated to determine an EHD. This nest, located at San Carpoforo Creek Beach, failed 13 days after being floated to coyote depredation.

#### Villa Creek Beach

This season, three nests were found at three eggs at Villa Creek Beach. All three nests were floated, and an EHD was determined for each. Two of these nests failed to coyote, three and 21 days after being floated, and one nest hatched. One nest was found at one egg and never gained additional eggs. This nest was floated but failed to hatch. This nest was considered non-viable after incubation continued 24 days after the EHD and was still being incubated until it was collected.

#### Morro Strand

Due to the high prevalence of depredations, nests typically are not floated at Morro Strand unless an enclosure is also being erected around the nest. In 2018, one nest was found at three eggs, but it was not floated to determine an EHD. Due to a lack of sufficient evidence for a determination of either a hatch or a fail, the nest was ultimately ruled to have an unknown fate.

#### Sandspit

During the 2018 breeding season, 34 nests were found at three eggs on the Sandspit. Twenty-seven of these nests were floated, and an EHD projected for each. Of the seven three egg clutch

nests not floated, five failed to depredation, one hatched prior to being floated, and one had an unknown fate. Of the 27 floated three egg nests, 17 hatched, nine failed, and one had an unknown fate. Out of the nine failed nests, five were depredated by coyote with a range of 2 to 25 days after being floated. Of the other four failed nests, two failed to an unknown predator, one failed due to abandonment, and one failed due to an unknown cause.

This season, five nests were found at two eggs with third eggs never being produced. Two of the nests were never floated. One was depredated by coyote and the other nest was determined to be abandoned prior to being able to float the nests. Three of the two egg clutch nests were floated, and two of these nests hatched. The other floated nest failed to abandonment.

Of the 87 eggs floated on the Sandspit, a total of 51 eggs hatched (59%) from 20 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. The first nest hatched in the District was at the Sandspit on May 8<sup>th</sup>, and the first chick to fledge was observed on June 4<sup>th</sup> also at the Sandspit.

#### Hearst San Simeon State Park

No chicks were seen or known to have fledged from any beaches in HSSSP in 2018.

#### Villa Creek Beach

Fifteen chicks hatched from six successful nests at Villa Creek Beach in 2018. The first chicks to be seen on Villa Creek Beach were observed on May 18<sup>th</sup>, and the first fledge was observed June 15<sup>th</sup>. The highest number of chicks observed on one day at Villa Creek Beach was five. Six confirmed fledges from four nests were observed at Villa Creek Beach. Being a relatively small beach, it is fairly certain there were no other fledges. The fledging success (number of fledglings divided by the number of chicks hatched) was 40%. The number of chicks fledged per males was .9. This was based on seven adult breeding males from the maximum number of active nests plus males with chicks. The last chicks fledged on September 7<sup>th</sup> making the length of the breeding period at Villa Creek Beach 157 days. The length of the breeding period was calculated from the date of the first calculated nest initiation to the date of the last known fledge.

#### Morro Strand

Five chicks hatched from two successful nests at Morro Strand in 2018. The first chicks were observed on June 30<sup>th</sup>, and the first fledges were observed on July 24<sup>th</sup>. The highest number of chicks observed in one day at Morro Strand was three. Four chicks from two nests were found to have fledged from Morro Strand in 2018. The fledging success was 80%. The number of chicks fledged per male was 1.0. This was based on four adult breeding males from the maximum

number of active nests plus a male with chicks. The last chicks fledged on September 18<sup>th</sup> making the length of the breeding period at Morro Strand 167 days.

### Sandspit

Two hundred thirty-two chicks hatched from the 86 successful nests on the Sandspit in 2018. One nest in the south had two chicks hatch and one egg that either hatched or was predated by coyote, so that egg was not included in the number of chicks hatched. Broods with chicks of varying ages were seen throughout the season after the first hatch on May 8<sup>th</sup> with the chicks seen on May 9<sup>th</sup>. The highest number of chicks observed during one day at the Sandspit occurred on May 30<sup>th</sup> with 20 chicks observed.

Twenty-three WSP were confirmed to have fledged from the Sandspit in 2018. The first fledge was observed on June 4<sup>th</sup>. The highest number of fledges seen during one day occurred on June 18<sup>th</sup> with 12 fledges observed. Four banded males (gg:og, oa:ya, rb:bg, and wa:ga) were associated with six fledged chicks on the Sandspit. Confirmation of additional fledges on the Sandspit was compromised by the absence of individual bird identification. The high density of nests on the Sandpit exacerbated the problem and made it difficult to link specific fledges precisely to specific nests, but it is highly likely many more juveniles fledged from the Sandspit. The first dispersed juvenile known to reach the Sandspit from another beach arrived on July 8<sup>th</sup>. This juvenile, banded rr:wy, fledged from ODSVRA.

On August 27<sup>th</sup>, the last chick was seen within four days of fledging, making the length of the breeding season 147 days long.

## **Depredation**

A summary of nest depredation on District beaches from 2001 through 2018 is shown in Appendix 13.

### Predator Presence across District Beaches

Figure 5 provides a graphical representation of the number of days non-avian predators were detected by observation or tracks across District beaches in 2018. 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 5:** Number of Days Non-Avian Predators Detected Across District Beaches in 2018.

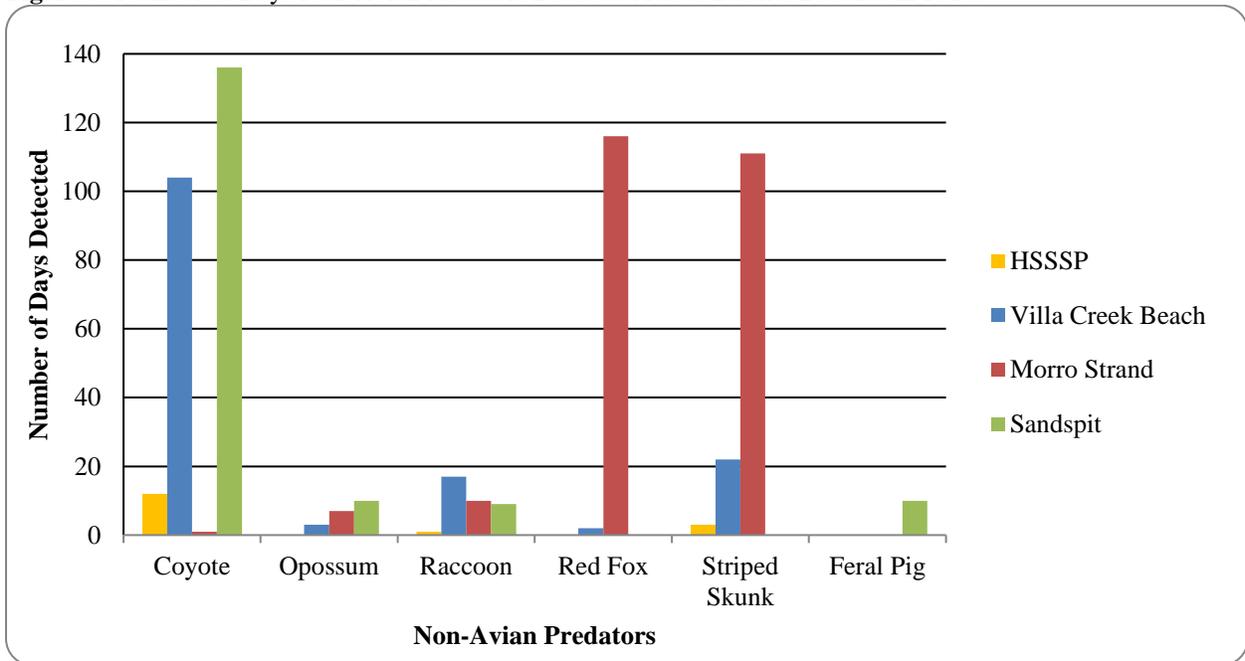
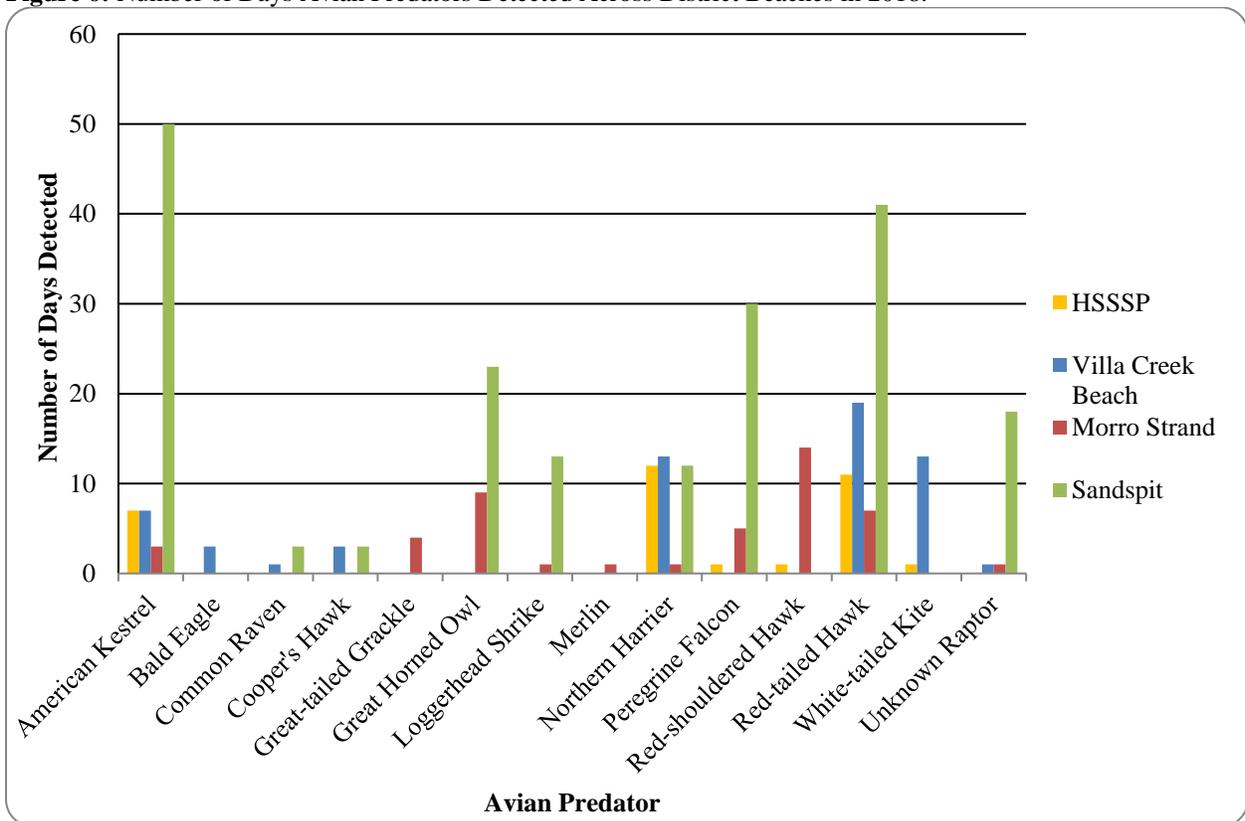


Figure 6 provides a graphical representation of the number of days avian predators were detected across District beaches by observation or tracks in 2018.

**Figure 6:** Number of Days Avian Predators Detected Across District Beaches in 2018.



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

Predator Management across District Beaches

Predator removal activity did not take place on any District beach in 2018 due to no funding being available.

Hearst San Simeon State Park

One nest failed to coyote depredation at San Carpoforo Creek Beach. No predator control activities took place within HSSSP.

Based on observations of tracks and live animals, the most prevalent avian predator at HSSSP was the American Crow, which was observed on 26 different surveys. All other avian species were seen less frequently ( $\leq 12$  times) and included American Kestrels (*Falco sparverius*), Northern Harriers (*Circus hudsonius*), Peregrine Falcons (*Falco peregrinus*), Red-shouldered Hawks (*Buteo lineatus*), Red-tailed Hawks (*Buteo jamaicensis*), and White-tailed Kites (*Elanus leucurus*). The most frequently observed non-avian predator at HSSSP was coyote.

Villa Creek Beach

There were 21 nests with known fates this year at Villa Creek Beach. Of these 21 known fate nests, ten failed due to predators. Eight of these nests were depredated by coyote, and two were depredated by an unknown predator. A summary of nest depredations can be found in Table 20 and the distribution of depredations in Table 21.

**Table 20:** Nest Depredations by Predator on Villa Creek Beach in 2018.

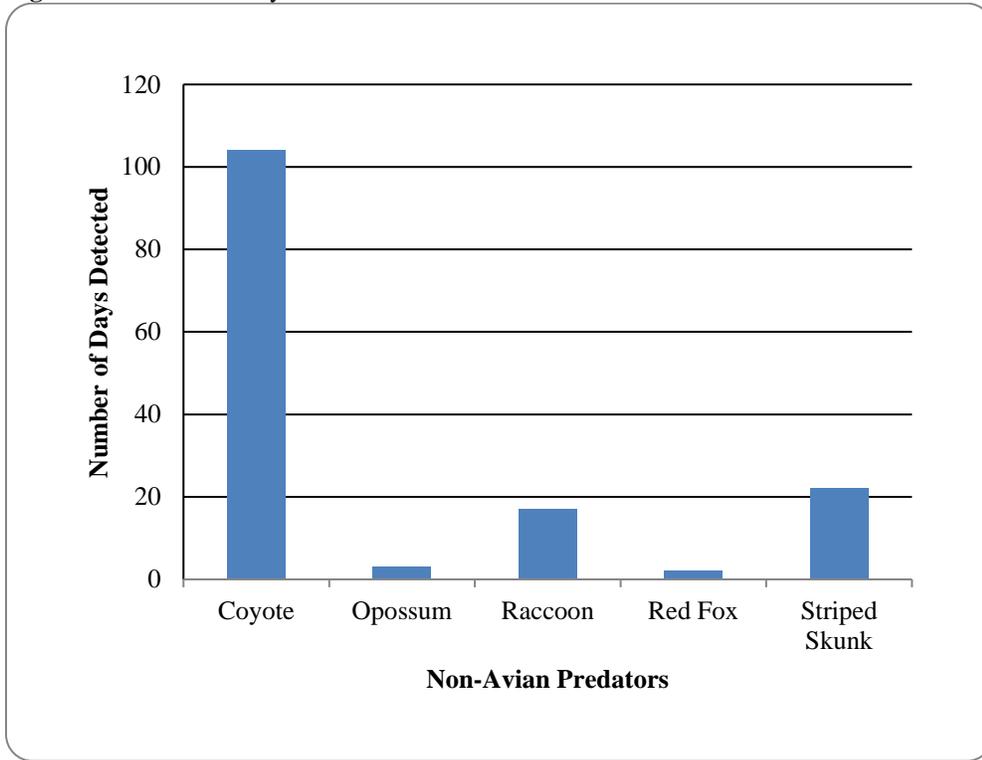
Total Nests	21		
Depredated Nests	10	% Depredated Nests	% of Total Nests
Coyote	8	80%	38%
Unknown Predator	2	20%	10%

**Table 21:** Distribution of Nest Depredations by Predator on Villa Creek Beach in 2018.

Area	Predators		Total Depredated	Total Nests
	Coyote	Unknown Predator		
Back Area	1	0	1	1
West of Villa Creek	0	0	0	0
Main Beach: North	2	0	2	5
Main Beach: Middle	4	2	6	11
Main Beach: South	1	0	1	4
Pocket Beaches	0	0	0	0
<b>Total</b>	<b>8</b>	<b>2</b>	<b>10</b>	<b>21</b>

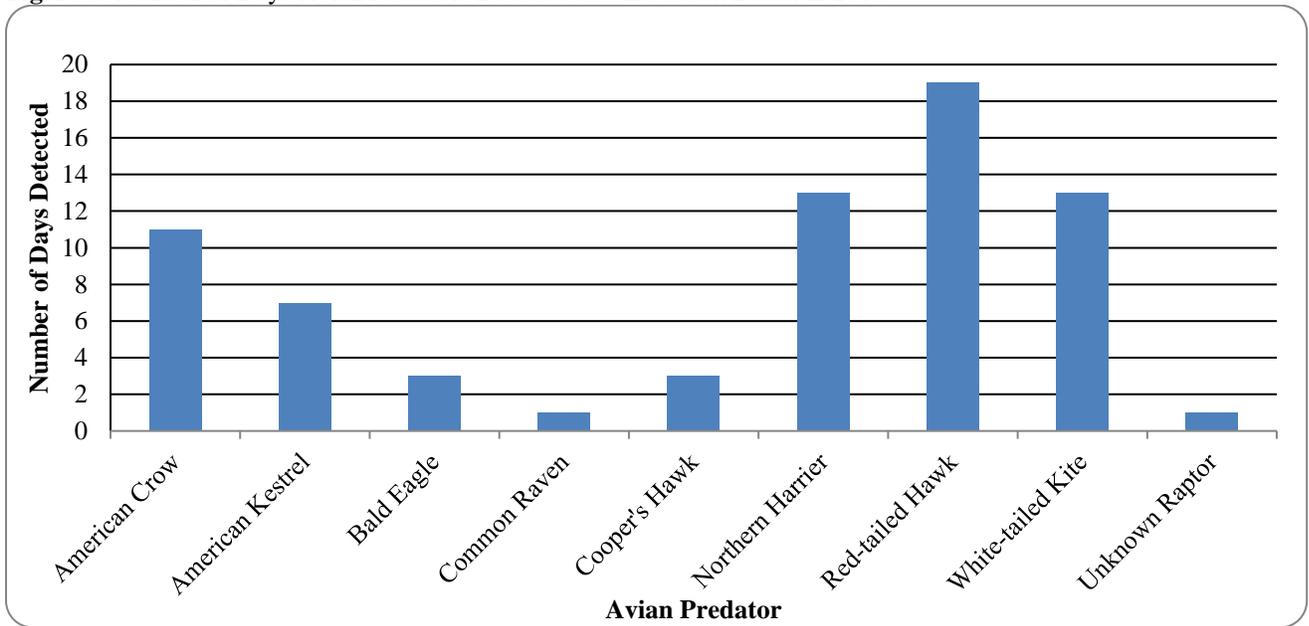
Figure 7 provides a graphical representation of the number of days non-avian predators were detected on Villa Creek Beach in 2018. Combining sightings of live animals and their signs (i.e. tracks, scat, etc.), the most commonly observed mammal on Villa Creek Beach was coyote. No predator removal activities took place at Villa Creek Beach in 2018.

**Figure 7:** Number of Days Non-Avian Predators Detected at Villa Creek Beach in 2018.



Avian predators seen at Villa Creek Beach during the 2018 breeding season were American Crow, American Kestrel, Bald Eagle (*Haliaeetus leucocephalus*), California Gull (*Larus californicus*), Common Raven (*Corvus corax*), Cooper’s Hawk (*Accipiter cooperii*), Heermann’s Gull (*Larus heermanni*), Northern Harrier, Red-tailed Hawk, Ring-billed Gull (*Larus delawarensis*), Western Gull (*Larus occidentalis*) and White-tailed Kite. Figure 8 provides a graphical representation of the number of days each of these were detected on Villa Creek Beach in 2018 excluding gulls, which greatly exceeded the other avian sightings.

**Figure 8:** Number of Days Avian Predators Detected at Villa Creek Beach in 2018.



***Morro Strand***

Predators destroyed 8 of the 12 nests this year at Morro Strand. Three of the depredations were committed by red fox, two by American Crow, two by striped skunk, and one by an unknown predator. A summary of nest depredations can be found in Table 22.

**Table 22:** Nest Depredations by Predator on Morro Strand in 2018.

Total Nests	12		
Depredated Nests	8	% Depredated Nests	% of Total Nests
American Crow	2	25%	18%
Red Fox	3	38%	27%
Striped Skunk	2	25%	18%
Unknown Predator	1	12%	9%

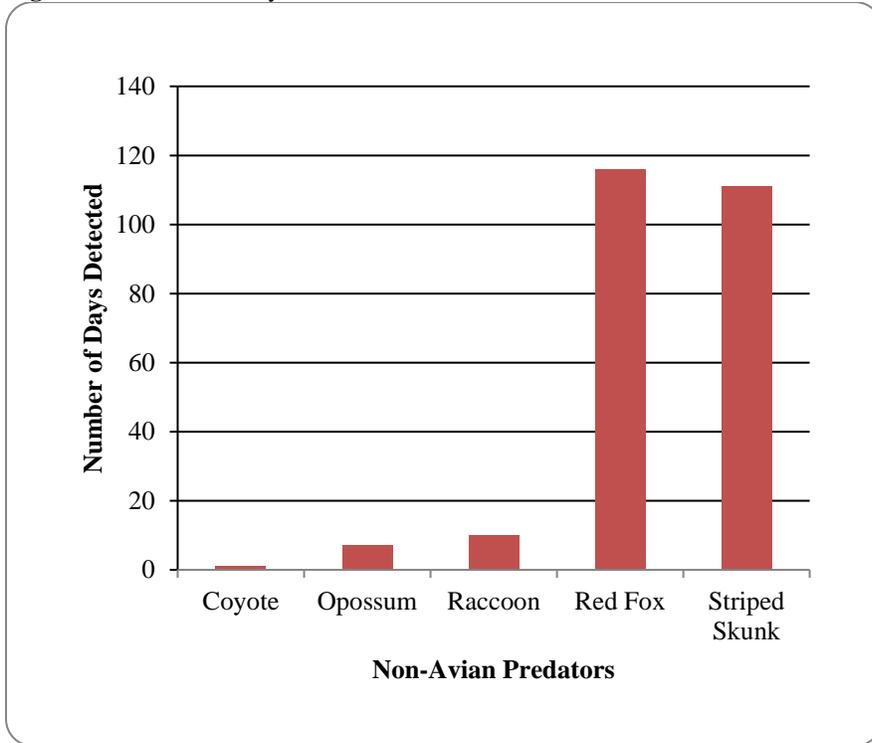
Table 23 lists the nest depredations according to predator among beach segments for Morro Strand in 2018.

**Table 23:** Distribution of Nest Depredations by Predator on Morro Strand in 2018.

Area	Predators				Total Depredated	Total Nests
	American Crow	Red Fox	Striped Skunk	Unknown Predator		
Hatteras-Azure	1	0	1	0	2	2
Azure-Boardwalk	1	3	0	1	5	8
Boardwalk-Hwy 41	0	0	1	0	1	2
<b>Total</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>12</b>

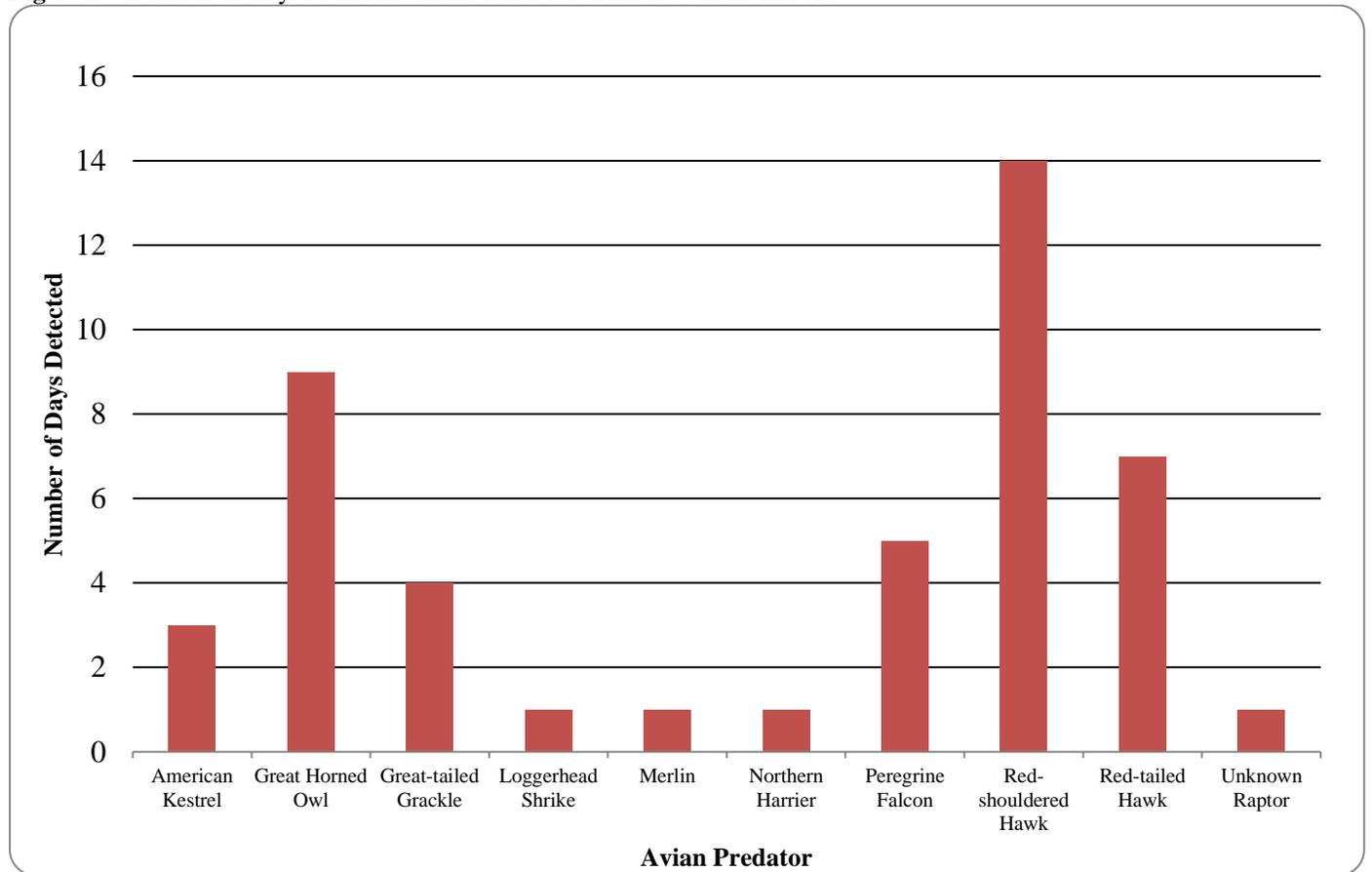
Figure 9 provides a graphical representation of the number of days non-avian predators were detected on Morro Strand in 2018. Combining sightings of live animals and their signs (i.e. tracks, scat, etc.), the most commonly observed mammal was red fox, which was observed on 116 days during the breeding season. The second most commonly observed predator was striped skunk, seen 111 times. All other mammalian predators were each observed on ten or less occasions during the breeding season. No predator removal activities took place on Morro Strand in 2018.

**Figure 9:** Number of Days Non-Avian Predators Detected on Morro Strand in 2018.



In 2018, American Crows were again observed foraging the entire length of Morro Strand and were seen on 134 days out of the 167 days monitoring during the breeding season. American Crows were responsible for the depredation of two nests on Morro Strand this year. Other avian predators observed on Morro Strand were American Kestrel, California Gull, Great Horned Owl (*Bubo virginianus*), Great-tailed Grackle (*Quiscalus mexicanus*), Heermann’s Gull, Loggerhead Shrike (*Lanius ludovicianus*), Merlin (*Falco columbarius*), Northern Harrier, Peregrine Falcon, Red-shouldered Hawk, Red-tailed Hawk, Ring-billed Gull, and Western Gull. Excluding the gulls, evidence of these avian predators was 14 times or less for each species. Figure 10 provides a graphical representation of the number of days avian predators were detected on Morro Strand in 2018 excluding American Crows and gulls which greatly exceeded other avian sightings.

**Figure 10:** Number of Days Avian Predators Detected on Morro Strand in 2018.



Sandspit

Predators took 50 of the 169 nests this year on the Sandspit (Table 24). Coyotes were responsible for the majority (78%) of all the nest depredations by consuming 39 nests. The additional 11 nest depredations were attributed to unknown predators (6) and unknown avian predators (5).

**Table 24:** Nest Depredations by Predator on the Sandspit in 2018.

Total Nests	169		
Depredated Nests	50	% Depredated Nests	% of Total Nests
Coyote	39	78%	23%
Unknown Avian	5	10%	3%
Unknown Predator	6	12%	4%

A summary of nest locations and depredations on the Sandspit in 2018 can be found in Table 25.

**Table 25:** Distribution of Nest Depredations by Predator on the Sandspit in 2018.

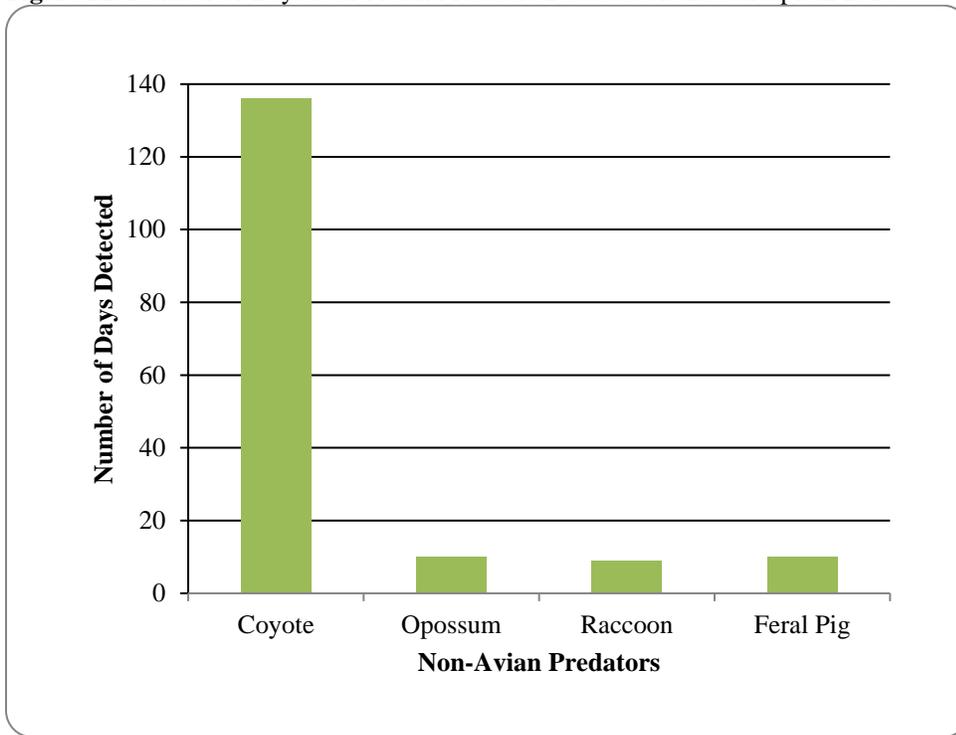
Area	Predators			Total Depredated	Total Nests
	Coyote	Unknown Avian	Unknown Predator		
SPB-RM6	4	1	1	6	12
RM6-RM5	9	2	3	14	21
RM5-RM4	10	2	2	14	32
RM4-RM3	5	0	0	5	27
RM3-RM2	5	0	0	5	20
RM2-RM1	2	0	0	2	28
RM1-SST	4	0	0	4	19
SST-HAZ	0	0	0	0	9
South HAZ	0	0	0	0	1
<b>Total</b>	39	5	6	50	169

No predator control for WSP protection occurred in 2018 on the Sandspit.

This season, the highest incident of coyote depredation occurred during the week ending on July 20<sup>th</sup>, when nine nests were lost to coyote depredation. Five nests were lost to coyotes in the northern section of the Sandspit, and four were lost in the south. On a near 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 136 days during the monitoring season. The only other mammalian predators observed on the Sandspit during the 2018 breeding season were feral pig (*Sus scrofa*), raccoon (*Procyon lotor*), and Virginia opossum (*Didelphis virginiana*). Feral pigs were detected ten days, Opossum tracks were observed on ten days, and raccoons were observed on nine days. Feral pigs likely came to the Sandspit from the estuary; while their presence has mostly been detected in the backdunes, they consume verbena and can trample WSP nests.

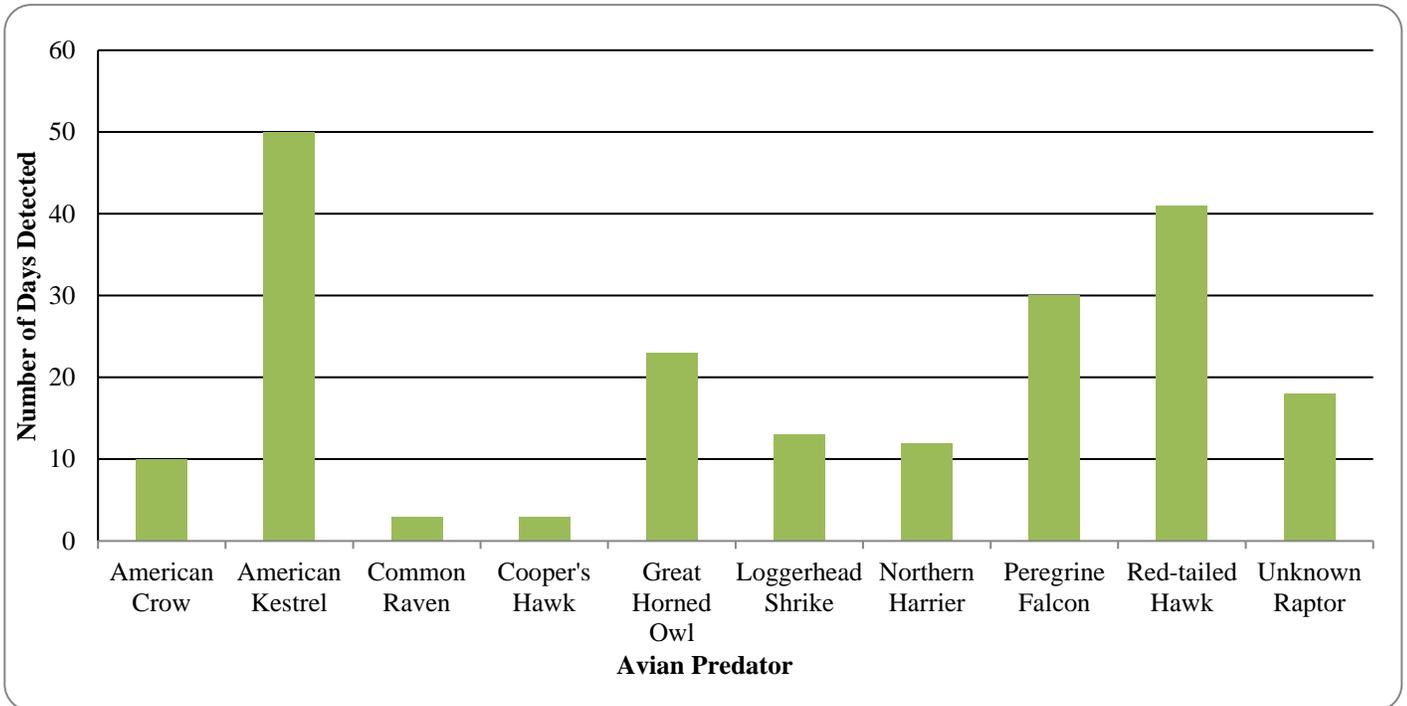
Figure 11 provides a graphical representation of the number of days non-avian predators were detected on the Sandspit in 2018.

**Figure 11:** Number of Days Non-Avian Predators Detected on the Sandspit in 2018.



In 2018, monitors sighted the following avian predators on the Sandspit: American Crow, American Kestrel, California Gull, Common Raven, Cooper’s Hawk, Great Horned Owl, Heermann’s Gull, Loggerhead Shrike, Northern Harrier, Peregrine Falcon, Red-tailed Hawk , and Western Gull. Figure 12 provides a graphical representation of the number of days avian predators were detected on the Sandspit in 2018 excluding gulls which greatly exceeded other avian sightings.

**Figure 12:** Number of Days Avian Predators Detected on the Sandspit in 2018.



### 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 and drone use, and public contacts.

Dogs are not permitted on District WSP beaches, with the exception being San Carpoforo Creek Beach in HSSSP. The ambiguous property boundary dividing beach ownership between CSP and the U.S. Forest Service makes enforcement of dog restrictions at San Carpoforo Creek Beach difficult.

On all other beaches, however, visitors seen with dogs were contacted and requested to leave the beach. Dog walkers that were unable to be contacted, usually due to distance from the WSP monitor, were observed and their presence was recorded. Rangers made contacts and issued citations for uncooperative dog walkers.

Individual human tracks within the symbolically fenced nesting 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 generally beach visitors asking specific questions.

### Hearst San Simeon State Park

Visitors were not commonly seen during monitoring of HSSSP beaches in 2018. As in previous years, Arroyo Laguna, San Simeon Creek Beach, and Santa Rosa Creek Beach remained more popular with visitors in 2018 than other HSSSP beaches.

On May 20, 2017, a large landslide blocked a portion of Highway One near Big Sur. This affected visitation of HSSSP beaches during the 2017 season. As of July 18, 2018, construction repairing this section of roadway was completed and access through the closed area was restored. A large increase in the number of visitors was observed in the weeks following the re-opening.

There were 56 public contacts by WSP monitors at HSSSP beaches involving 95 people. This was nearly three times as many public contacts as were had in the 2017 season (19 contacts). The increase in public contacts may be due to increased monitor presence on HSSSP beaches compared to previous years and/or due to the re-opening of Highway One. Fifty-five contacts were recorded as positive with only one considered neutral. WSP monitors answered questions on topics related to WSP, as well as additional topics such as elephant seals and the local area.

Illegal dog walkers were personally contacted by monitors 19 times in 2018. An additional eight illegal dog walkers were seen, but monitors were unable to make contact with them. Dog tracks were recorded 77 times on HSSSP beaches where dogs were not allowed.

San Carpoforo Creek Beach, Sidney's Lagoon, Arroyo Laguna, and San Simeon Creek Beach were fenced in 2018. Thirty-seven sets of foot traffic were recorded within the fenced area at San Simeon Creek Beach, while an additional five sets were observed at San Carpoforo Creek Beach.

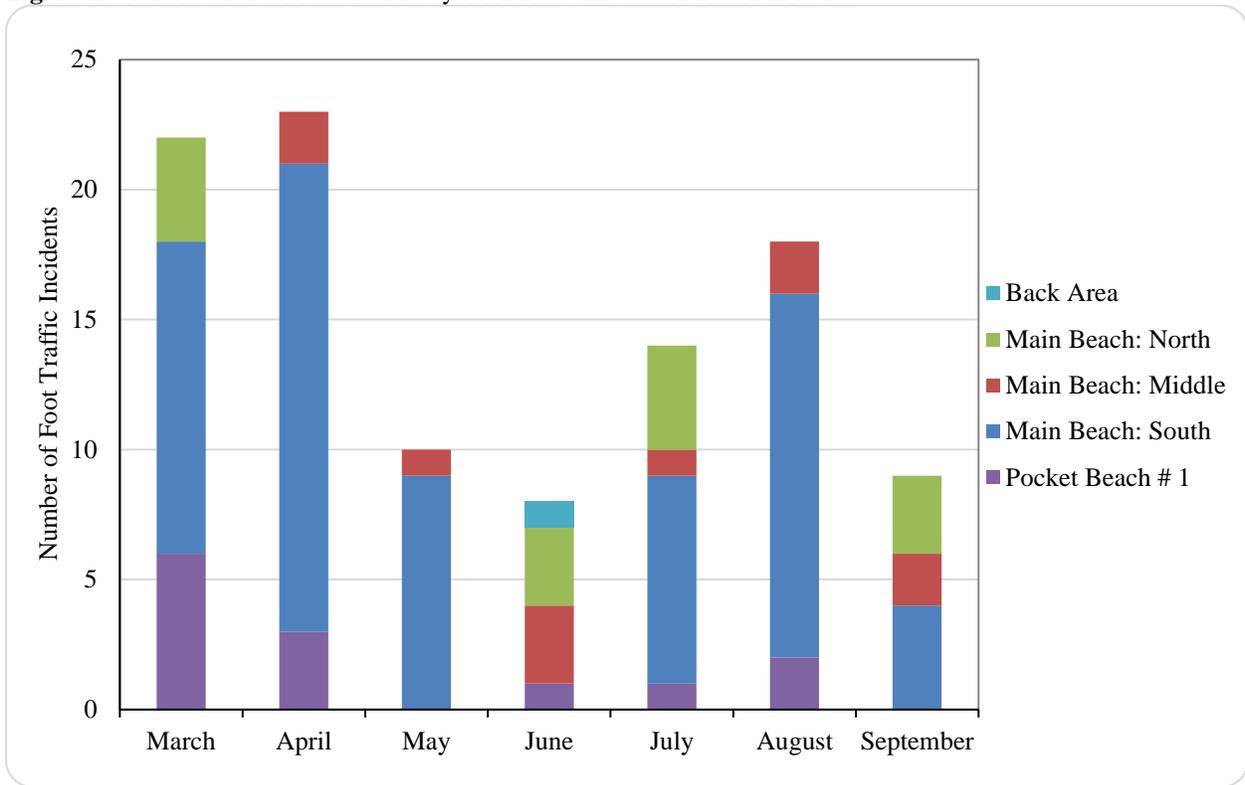
A number of acts of vandalism were observed in 2018 at HSSSP beaches. These included one cut rope, two bent poles, and eight defaced or bent signs. In addition, 16 fire pits were found at San Carpoforo Creek Beach.

### Villa Creek Beach

WSP protection measures to eliminate pedestrian access through nesting habitat continued this year at Villa Creek Beach. Former trails continued to be fenced off, and "Do Not Enter" signs were clearly posted.

There were 104 documented incidents of human foot traffic inside the habitat, although the actual number of people entering the habitat could have been higher due to the difficulty of deciphering individual footprints. The greatest number of foot traffic incidents occurred during the month of April (Figure 13). The largest amount (63% of all foot traffic) was recorded on the south end of the main beach. In 2017, there were 179 incidents of foot traffic inside the habitat.

**Figure 13:** Distribution of Foot Traffic by Month at Villa Creek Beach in 2018.



When seen, trespassers were contacted and informed about the rules and regulations regarding the closed areas and educated about the WSP breeding season. Monitors witnessed nine separate incidents (19 individuals) of trespassing inside the fenced off areas. Seven of the contacts were recorded as positive and two as neutral. With the two neutral contacts, the people left the fenced area prior to being contacted by a monitor.

Monitors made six contacts in 2018 for illegal dog walking on Villa Creek Beach. All six illegal dog walkers were contacted personally by monitors. Four of these contacts were regarded as positive and two as neutral. In addition to contacts for illegal dog walking, 38 sets of dog tracks were observed on Villa Creek Beach in 2018. Nine of these occurred inside the fenced habitat, and 29 occurred outside.

A summary of the distribution of dog tracks, dog contacts, and foot traffic at Villa Creek Beach is available in Table 26 and in Table 27 comparing these totals to previous years.

**Table 26:** Dog Tracks, Dog Contacts, and Foot Traffic at Villa Creek Beach in 2018.

Area	Dog Tracks	Dog Contacts	Foot Traffic
Back Area	0	0	1
West of Villa Creek	0	0	13
Main Beach: North	13	1	14
Main Beach: Middle	7	0	11
Main Beach: South	17	2	65
Pocket Beaches	1	0	0
Access Trail	0	3	NA
<b>Total</b>	<b>38</b>	<b>6</b>	<b>104</b>

**Table 27:** Dog Tracks, Dog Contacts, and Foot Traffic at Villa Creek Beach 2013-2018

	Dog Tracks	Dog Contacts	Foot Traffic
<b>2018</b>	38	6	104
<b>2017</b>	36	13	179
<b>2016</b>	10	5	80
<b>2015</b>	6	6	135
<b>2014</b>	11	2	108
<b>2013</b>	14	1	83

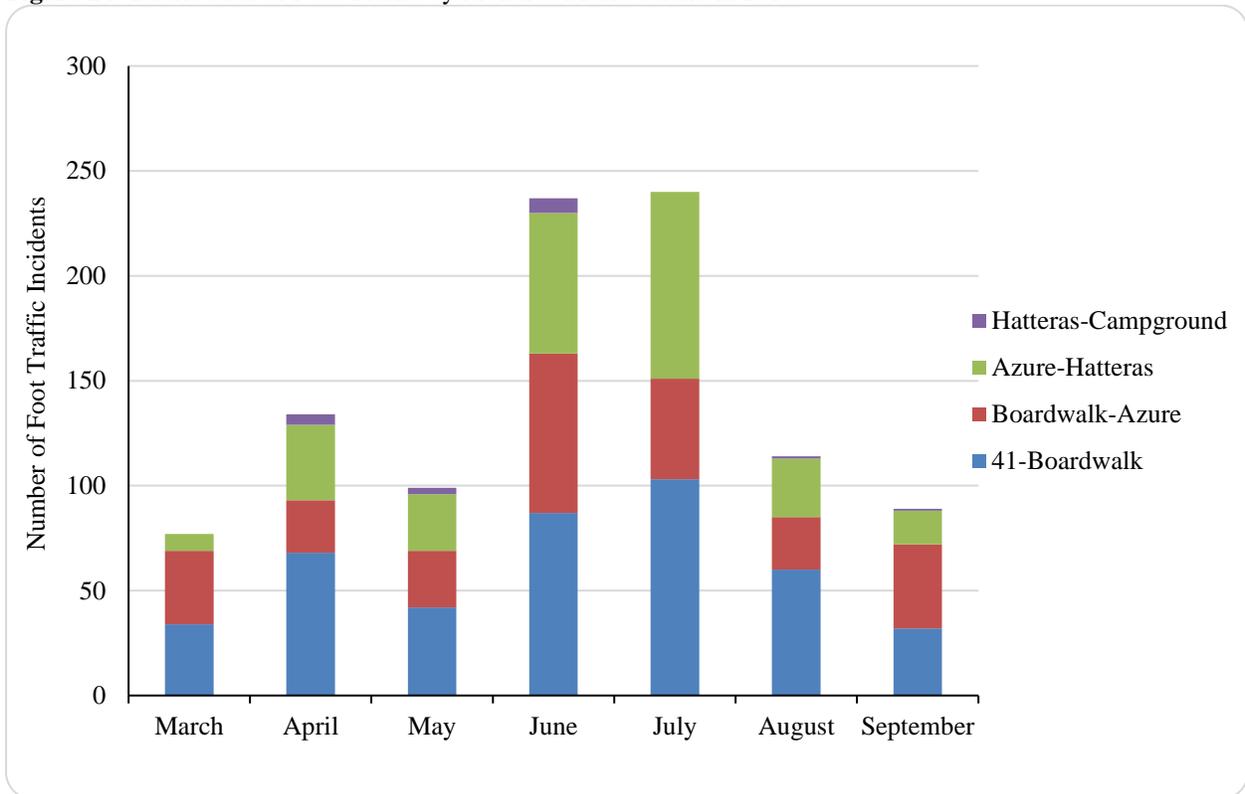
Ninety-seven additional public contacts were made throughout the year at Villa Creek Beach. In most instances, the visitor approached the monitor with various questions or comments. All were considered positive contacts.

Acts of vandalism on Villa Creek Beach in 2018 occurred mostly during the winter season, which included one illegal campsite with a firepit and trash.

*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 2018, there were a total of 990 documented incidents of human foot traffic inside the fenced habitat. Much of the foot traffic recorded may be attributed to homeless camps that were continually present during the breeding season. June and July had the greatest number of foot traffic incidents with 237 and 240, respectively (Figure 14). The foot traffic recorded in these months was distributed fairly evenly.

**Figure 14:** Distribution of Foot Traffic by Month at Morro Strand in 2018.



Throughout the season, numerous homeless camps were discovered beyond the foredunes between the Azure and 41 Corridors. Multiple sets of foot traffic, often accompanied by bike tracks, were observed leading from these camps to the beach. On more than one occasion foot traffic coming from the direction of active homeless camps came as close as one foot from active nests. Rangers made efforts to clear out these camps and several individuals received citations. The presence of homeless camps was a recurring issue throughout the season, as it was in 2017 also.

In 2015, a path cutting through a heavily vegetated area and the closed nesting 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. Efforts have been made by CSP staff to block these paths with brushy vegetation and through revegetation. In 2018, an effort to revegetate the path by planting willow cuttings was undertaken, but the willows were uprooted one month after being planted.

In 2018, monitors witnessed 47 individuals trespassing inside the WSP habitat during 22 incidents. Sixteen of the contacts were recorded as positive, five as neutral, and one as negative. Two of the five neutral contacts were only visual as the monitor could not make personal contact with those trespassing. The only negative contact occurred when a person inside the habitat was hostile and noncompliant when asked to follow the monitor out of the habitat.

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 seven kite flying incidents; all were personally contacted and considered positive with only one considered neutral. WSP monitors also observed seven incidents of drones and one incident of a powered paraglider in violation of the posted order. Five of the drone operators were contacted. The paraglider was observed flying as low as 40 feet over the habitat during which there were two active nests. Monitors observed the paraglider flushing many birds from the beach and efforts to direct him away from the habitat with hand signals were ignored. Rangers were notified, but contact was unable to be made with the pilot.

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 breeding season. These signs established a more visible CSP boundary marker to lessen confusion about the change in regulations. Permanent “No Dogs on Beach” signs cannot be positioned closer to the water due to the fluctuating tides. Another sandwich board sign is in place near the entrance to the beach at the Highway 41 Corridor. This sign illustrates with arrows the City/CSP boundary and in which direction dogs on-leash are allowed. 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 204 dog contacts involving 399 people and 250 dogs. During these 204 contacts, dogs were observed as being off-leash in 92 of them. Of the total contacts, 134 were recorded as positive, 63 as neutral, and seven as negative. Monitors made personal contact with dog walkers in 164 incidents involving 331 people. The remaining contacts were visual due to distance from or evasion of the monitor, which also accounted for most of the neutral contacts. In addition to contacts with illegal dog walkers, 355 sets of dog tracks were observed along the beach (outside the fenced habitat), and 104 sets were recorded within the habitat.

A summary of the distribution of dog tracks, dog contacts, and foot traffic is available in Table 28 and in Table 29 comparing these totals to previous years.

**Table 28:** Dog Tracks, Dog Contacts, and Foot Traffic at Morro Strand in 2018.

<b>Area</b>	<b>Dog Tracks</b>	<b>Dog Contacts</b>	<b>Foot Traffic</b>
<b>North Point-Campground</b>	36	19	NA
<b>Campground-Hatteras</b>	114	31	17
<b>Hatteras-Azure</b>	77	39	271
<b>Azure- Boardwalk</b>	128	60	276
<b>Boardwalk-Hwy 41</b>	104	55	426
<b>Total</b>	<b>459</b>	<b>204</b>	<b>990</b>

**Table 29:** Dog Tracks, Dog Contacts, and Foot Traffic at Morro Strand 2013-2018.

	<b>Dog Tracks</b>	<b>Dog Contacts</b>	<b>Foot Traffic</b>
<b>2018</b>	<b>459</b>	<b>204</b>	<b>990</b>
<b>2017</b>	668	247	2254
<b>2016</b>	162	96	978
<b>2015</b>	130	102	1387
<b>2014</b>	279	152	1353
<b>2013</b>	150	118	1005

An additional 222 public contacts were made throughout the year at Morro Strand. In most instances, the visitor approached the monitor with various questions or comments. All of the contacts except two were positive.

Morro Strand was monitored on all days before and after the July 4<sup>th</sup> holiday. Three WSP monitors were on the beach on the 4<sup>th</sup> of July from approximately 3:00 pm until 9:00 pm. They answered questions, ensured visitors were following CSP regulations, and monitored WSP activity. A fireworks display in the nearby town of Cayucos was visible from Morro Strand which attracted beachgoers later in the afternoon and evening. Monitors made seven dog contacts, four public contacts, and two trespassing contacts. Illegal fireworks being set off at Morro Strand were witnessed only once on July 4<sup>th</sup>.

Vandalism was discovered by monitors on 41 occasions this season. The most frequently recorded form of vandalism was missing or damaged signs which was recorded ten times. Additional incidents involved bent poles (8), illegal firepits (6), fireworks debris (5), and cut rope (5).

In 2018, two organized runs involving thousands of participants occurred within Morro Strand during the WSP breeding season. These runs included the “Miracle Miles for Kids” and “Brian Waterbury Memorial Rock to Pier Fun Run and Rock’n Around the Pier Half Marathon”, occurring on April 21<sup>st</sup> and July 14<sup>th</sup>, respectively. Races were observed by WSP monitors to ensure compliance with beach regulations, such as the ban on dogs and drones and no trespassing inside the fenced off habitat. Overall, event organizers were successful in communicating beach rules to runners, and there were very few infractions.

### Sandspit

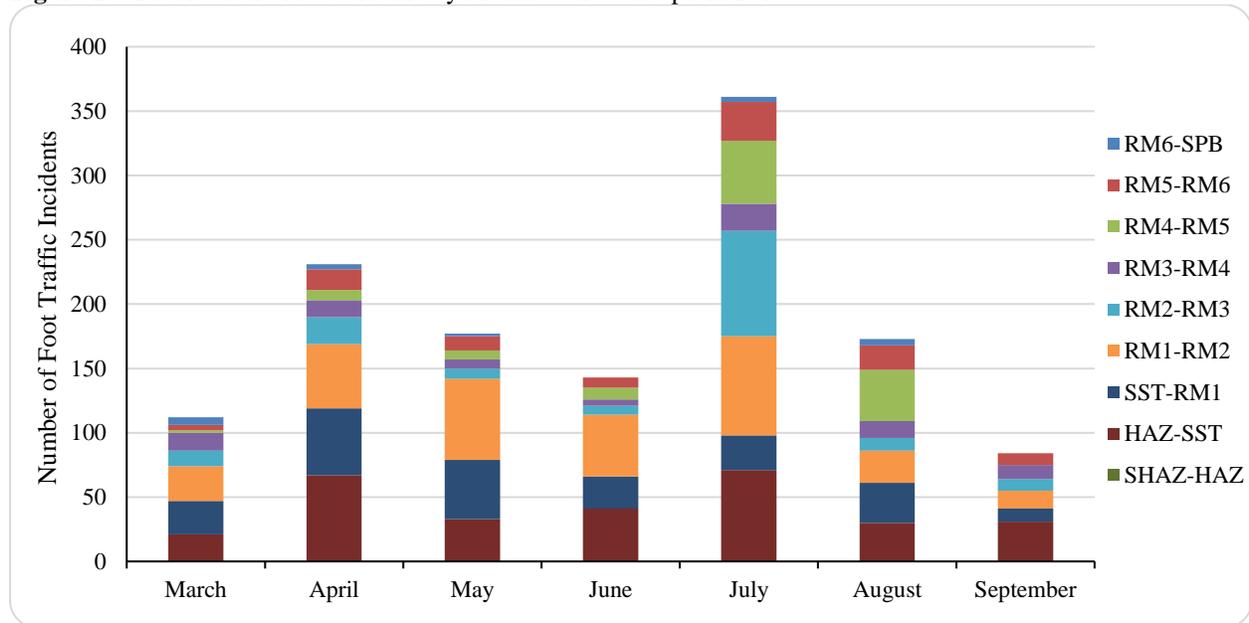
The Sandspit experiences a lower intensity of human activity compared to other District beaches. As usual, the highest concentration of human activity occurred at the south end of the Sandspit. Equestrians and pedestrians gained access to the beach from the Hazard Reef Trail, American Canyon Trail, Sandspit 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 2018, WSP monitors witnessed 24 trespass violations involving 64 violators. Twenty-one of these trespass incidents occurred on the southern half of the Sandspit. When possible, trespassers were contacted by WSP monitors. All but eight groups 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 communicated with and sometimes actively went in the opposite direction.

Monitors also recorded 1,281 incidents of foot traffic inside the WSP habitat with 77% of these incidents occurring on the southern half of the Sandspit. The actual number of violations 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 four occasions, trespassers walked within three feet of an active nest. On 12 other occasions trespassers were within ten feet of a nest. July had the greatest amount of foot traffic with 361 tracks recorded (Figure 15).

**Figure 15:** Distribution of Foot Traffic by Month at the Sandspit in 2018.



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.

Monitors made 43 contacts of illegal dog walkers (58 total dogs) on the Sandspit. Four dog contacts occurred on the north half of the Sandspit, and 39 occurred on the south half. Monitors were able to personally contact the owner of the dogs on 37 occasions. Of the six instances where dog owners were not contacted, one was due to the distance between the dog owner and monitor, and the others left the beach upon seeing the monitor. In addition to contacts with

illegal dog walkers, dog tracks were observed 56 times inside the fenced habitat and 80 times outside the habitat. In 2017, 37 illegal dog walkers were contacted.

A summary of the distribution of dog tracks, dog contacts, and foot traffic is available in Table 30 and in Table 31 comparing these totals to previous years.

**Table 30:** Dog Tracks, Dog Contacts, and Foot Traffic at the Sandspit in 2018.

<b>Area</b>	<b>Dog Tracks</b>	<b>Dog Contacts</b>	<b>Foot Traffic</b>
<b>SPB-RM6</b>	5	0	21
<b>RM6-RM5</b>	7	2	97
<b>RM5-RM4</b>	4	1	115
<b>RM4-RM3</b>	12	2	84
<b>RM3-RM2</b>	7	1	149
<b>RM2-RM1</b>	52	14	304
<b>RM1-SST</b>	27	12	217
<b>SST-HAZ</b>	13	11	294
<b>SOUTH HAZ</b>	9	0	0
<b>Total</b>	<b>136</b>	<b>43</b>	<b>1281</b>

**Table 31:** Dog Tracks, Dog Contacts, and Foot Traffic at the Sandspit 2013-2018.

	<b>Dog Tracks</b>	<b>Dog Contacts</b>	<b>Foot Traffic</b>
<b>2018</b>	<b>136</b>	<b>43</b>	<b>1281</b>
<b>2017</b>	98	37	1070
<b>2016</b>	42	25	509
<b>2015</b>	39	28	659
<b>2014</b>	25	22	1003
<b>2013</b>	19	14	774

Five violations of the aerial restriction rule were observed this year. Two of these violations involved non-motorized paragliders over the southern end of the WSP habitat, and one involved two motorized paragliders. A Ranger was contacted for two of these violations. Low-flying aircraft were also a concern on the Sandspit this year occurring in five separate incidents, three of which were the same plane. One complaint was submitted to the Federal Aviation Administration in regards to another incident involving a low-flying aircraft.

One hundred sixty-eight additional public contacts were made throughout the year. One hundred thirty-seven of those contacts occurred on the southern half of the Sandspit. In most instances the visitors approached monitors with various questions or comments. All of the contacts were positive.

Several forms of vandalism occurred on the Sandspit in 2018. These included 18 incidents of fence poles being removed or bent; four incidents where the symbolic fencing rope was deliberately cut; and three signs defaced. Monitors also observed evidence of five illegal

campfires and two illegal campsites. In addition, there were five incidents of sand/rock art built inside the habitat.

## CONCLUSIONS

In 2018, the San Luis Obispo Coast District continued to work towards reaching its WSP recovery potential. During the range-wide breeding window survey, a minimum of 140 adult WSP were observed, including 71 males, 62 females, and 7 individuals of an unknown sex. According to the USFWS Recovery Plan, the overall recovery population potential for the District is 159 individuals, meaning the District did not meet its recovery potential in 2018. It is also important to note that while some beaches, like Morro Strand, failed to meet recovery standards other beaches, such as the Sandspit, exceeded population potentials.

Appendix 10 depicts the number of nests found by month on all District beaches. Data is included for the years 2004 through 2018 for comparison. Across the District, the highest number of nests found in one breeding season occurred in 2004. After the 2004 season, 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 nests in the District decreased by 55 between 2017 and 2018. The number of District nests in 2018 (203) was below the average number of nests in the District during the previous 14 years (242).

Tables in Appendix 10a provide a summary of nest initiation dates for all District beaches from 2002 through 2018. Nests on District beaches in previous seasons have been initiated as early as March 9<sup>th</sup>. In 2018, the first nest for the District was initiated on the Sandspit on April 2<sup>nd</sup>, which is 18 days later than the District's first 2017 nest. The last nest initiated in the District was also on the Sandspit and was calculated to be initiated on August 10<sup>th</sup>. The nest was found at three eggs and then abandoned which made using its float data inaccurate in determining an EHD. The last chicks fledged on September 18<sup>th</sup>, which is 12 days later than the last fledge of the 2017 season. The 2018 breeding season was six days shorter than the 2017 season (170 vs. 176 days).

District beaches had a hatch rate of 48% in 2018 (Appendix 10d). This hatch rate was only slightly above the average of 47% (years 2005-2017), and represents a slight decrease of 4% since 2017. The number of nests hatched in 2018 (94) was below the average of 108 (2005-2017). This resulted in a total of 38 fewer nests hatched in 2018 across the District than in the previous year.

Nesting success has varied on District beaches between 2001 and 2018 (Appendix 10e). The continuing trend for Villa Creek Beach has been a steady decline in the number of hatches since it was opened to the public in 2001. In 2018, there were six recorded hatches compared to the ten hatches in 2017. Morro Strand also shows a similar decline in nest success with only two to five hatches in each year since 2012. This trend continued in the 2018 season with a total of two hatches. At the Sandspit, there was high nest success during the 2004 season, followed by a rapid

drop through 2007, from which time there has been a slow but steady increase. The number of Sandspit hatches in 2018 (86) was slightly below the average of 90 between 2005 and 2017.

Sixty-nine nests were depredated in 2018, representing a 35% depredation rate across District beaches (Appendix 13). Throughout the previous 13 years, the average depredation rate has been 32%. Villa Creek Beach had ten nest depredations this year, which is slightly below average, Morro Strand and the Sandspit had an average depredation year with eight and 50 nests lost, respectively. Villa Creek Beach had its highest recorded year of coyote depredation with eight nests taken, while Morro Strand was impacted by American Crows, red fox, and striped skunks. The most prevalent predator on the Sandspit continued to be coyote in 2018.

Nesting activity across District beaches was analyzed between 2001 and 2018 to determine beach productivity (Appendix 10e). The Sandspit, since 2005, has historically hatched 50% of 2,544 nests. Next in productivity is Villa Creek Beach (37% of 535 nests), which has been more productive than Morro Strand (31% of 420 nests). HSSSP has had very few nests historically but has been productive (61% of 36 nests) within its small sample size.

Examination of nest failures (Appendix 14) 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 (44%) is substantially higher than the District average of 31%. Morro Strand has a rate of nest abandonment (17%) well above the District average of 8%. Failed nests at HSSSP are most often due to unknown causes (12%) because of reduced monitoring efforts on those beaches. The District average for nests failing to unknown causes is 2%.

A total of 252 chicks hatched on District beaches this year. There was a total of 33 confirmed fledges on District beaches in 2018. 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 2018 WSP season was provided by CSP Natural Resources Maintenance funding, MDO mitigation funds, and District Home Base funding. Approximately, \$130,000 was spent on the WSP program this season. This amount 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 to provide long-term protection of this species and its habitat year round. To maintain and improve nest success for future years, it is important to continue developing the WSP management program. The following, in non-prioritized order, are management actions for the success of the District WSP program. The District would like to continue, add, or improve upon:

1. Monitoring during the breeding and non-breeding seasons.

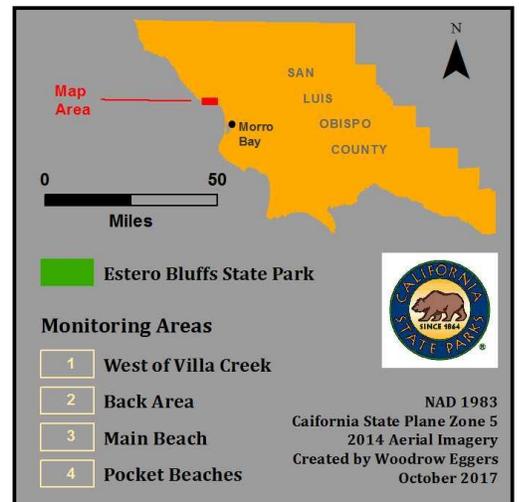
- a. Maintaining a core of permitted monitors who possess field experience within the District.
  - b. Managing for the protection of nesting and wintering habitat for WSP and other shorebirds.
2. Symbolic fencing and sign installation along WSP nesting habitat to keep recreation out of closed areas and control access points during the breeding season.
  - a. Installing brightly colored WSP signs at the access corridors on District beaches to make the corridors more visible.
3. Moving towards fulfilling USFWS WSP Recovery Plan management recommendations.
4. Secure permanent funding for the District WSP program.
5. Funding for on on-going predator management control actions to remove problematic species.
  - a. Utilizing wildlife cameras at appropriate locations to determine target species responsible for depredations of nests and adult WSP.
6. Utilizing nest exclosures at appropriate time to increase hatching success.
7. Annual WSP training for CSP staff and volunteers.
8. 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.
9. Ensuring all corridors, facilities, and actions are compliant with Americans with Disabilities Act and California Environmental Quality Act guidelines.
10. Maintaining involvement with range-wide and Recovery Unit Five recovery efforts for the WSP.
11. Including CSP Ranger staff in weekly WSP meetings to increase communication and coordination within the District for achieving our WSP recovery potential.
12. Visiting other WSP areas to learn about how other programs are managed and monitored.
13. Enforcement of CSP regulations throughout the year.
  - a. Daily vehicle patrols by CSP Ranger staff to enforce rules and regulations affecting WSP habitat (i.e., dogs on beach, illegal fires, people trespassing inside closed nesting habitat, and kite flying).

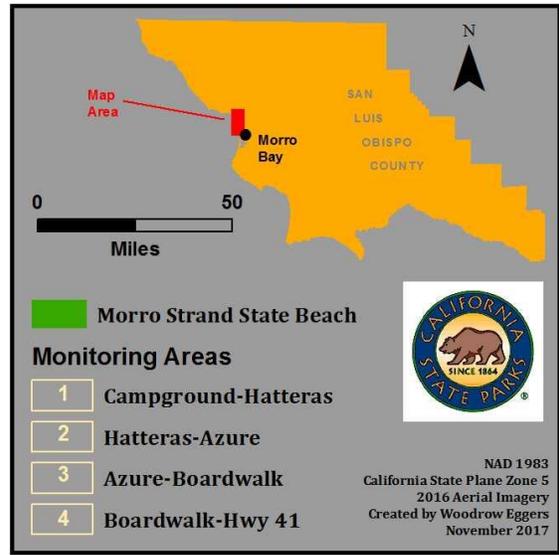
14. Non-native plant removal program to create more WSP habitat.
15. Investigating remedies with the City for the removal of American Crows from Morro Strand.
16. Developing an outreach and education program.
17. Maintaining communications with Morro Bay High School regarding beach use restrictions and project objectives during the WSP breeding season.
18. Increased staff and volunteer presence on July 4<sup>th</sup> to prevent disturbance to nesting WSP and to educate visitors.
19. Providing WSP informational binder at the campground kiosks to aid in educating the campers.
20. 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.
21. Marking corridors on the east side (bayside) of the Sandspit using easily-visible flags, and erecting signage with directions to the nearest corridor at popular kayak landing areas. Continue to provide accurate maps of corridor locations to local kayak rental businesses.
22. Providing training to monitors on how to operate wildlife cameras near WSP nests with minimal disturbance to WSP.
23. Partnering with the City in assisting them with their fence installation and removal.
24. Complete the Predator Management Plan for the District.
25. 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.
26. Provide WSP informational flyers to equestrians

Appendix 1 – Site Maps



Appendix 1 – Site Maps





Appendix 1 – Site Maps



Appendix 2 – Nest Card Example

Nest card from nest number SSS010 on the south half of the Sandspit between Sharks Inlet Corridor and Star Log.

SIC-SL HATCH  
SSS010



SSS010 4-11-2018.JPG



SSS010 4-11-2018 View.JPG

4/11 3E BNB  
4/12 3E BNB 9 enlarged  
4/13 3E  
4/14 3E 30NB AC  
4/17 BON  
4/18 3E PNB  
4/19 3E  
4/20 3E PNB  
4/23 3E PNB  
4/24 3E  
4/25 3E  
4/26 3E  
4/27 3E  
4/28 3E BNB  
4/30 3E  
5/1 3E  
5/2 3E BNB  
5/3 3E BNB  
5/4 3E BNB  
5/7 3E 2BNB  
5/8 3E ASF floated  
5/9 3 chicks in NB  
BNB Hatched

SIC-SL HATCH  
SSS010

**Nest Map**

abramin dune  
dark sand  
white kelp  
wrack mounds  
large kelp mound SSS010  
4th N of SIC  
3rd N of SIC

Nest #:	SSS010
Date Found:	4-11-2018
Number of Eggs When Found:	3
Number of Eggs in Completed Clutch:	3
Float Data:	pipped, piped, peeped, pipped, piped
Dates of Subsequent Eggs:	N/A
Predicted Hatching Date:	5/9/18
Date Eggs Last Observed:	5/8
Date Nest First Observed Empty:	
Fate -- Hatch or Fail:	Hatch
Cause of Failure:	
Evidence of Failure:	
Evidence of Hatch:	3 chicks in NB
Date of Hatch:	5/9
Number of Eggs Hatched:	3
Colored Band Combinations:	
Lat/Long:	10 S 693506 3909813
Exclosure Date:	
Exclosure Builders:	

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

Appendix 3 – Winter Window Survey Results on District Beaches 2002-2018

<b>Year</b>	<i>San Carpofooro Creek Beach</i>	<i>Point Sierra Nevada</i>	<i>Arroyo de la Cruz</i>	<i>Sidney's Lagoon</i>	<i>Piedras Blancas</i>	<i>Arroyo Laguna</i>	<i>San Simeon Creek Beach</i>	<i>Santa Rosa Creek Beach</i>	<b>Hearst San Simeon State Park Total</b>	<b>Villa Creek Beach Total</b>	<i>Morro Strand North (Old Creek)</i>	<i>Morro Strand South</i>	<b>Morro Strand Total</b>	<b>Sandspit Total</b>	<b>District Total</b>
<b>2002</b>	-	-	-	-	-	-	98	-	98	24	-	50	50	74	<b>246</b>
<b>2003</b>	-	-	-	-	-	0	99	-	99	77	-	0	0	0	<b>176</b>
<b>2004</b>	26	-	-	-	-	0	143	-	169	32	-	249	249	103	<b>553</b>
<b>2005</b>	46	-	-	-	-	-	54	-	100	45	-	44	44	3	<b>192</b>
<b>2006</b>	52	-	0	0	-	0	38	0	90	84	-	8	8	41	<b>223</b>
<b>2007</b>	11	0	-	8	-	0	0	-	19	106	-	10	10	30	<b>165</b>
<b>2008</b>	-	-	-	-	-	-	-	-	-	10	0	1	1	55	<b>66</b>
<b>2009</b>	-	-	-	-	-	-	-	-	-	63	0	0	0	19	<b>82</b>
<b>2010</b>	-	-	-	-	-	-	-	-	-	112	0	105	105	40	<b>257</b>
<b>2011</b>	0	-	0	0	-	31	0	18	49	52	0	24	24	0	<b>125</b>
<b>2012</b>	16	-	2	0	0	27	46	0	91	28	0	1	1	0	<b>120</b>
<b>2013</b>	1	0	-	0	-	0	33	0	34	33	0	81	81	50	<b>198</b>
<b>2014</b>	26	0	0	0	-	0	93	0	119	0	-	141	141	76	<b>336</b>
<b>2015</b>	0	0	0	0	0	0	144	0	144	35	0	106	106	130	<b>415</b>
<b>2016</b>	0	0	0	0	-	0	193	0	193	0	0	5	5	123	<b>321</b>
<b>2017</b>	14	0	0	0	0	6	0	0	20	0	-	55	55	201	<b>276</b>
<b>2018</b>	0	0	0	0	0	0	54	4	58	16	0	56	56	23	<b>153</b>
<b>Average</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>71</b>	<b>2</b>	<b>92</b>	<b>42</b>	<b>0</b>	<b>55</b>	<b>55</b>	<b>57</b>	<b>230</b>

Appendix 4 – Breeding Window Survey Results on District Beaches 2002-2018

<b>Year</b>	<b>San Carpofooro Creek Beach</b>	<b>Point Sierra Nevada</b>	<b>Arroyo de la Cruz</b>	<b>Sidney's Lagoon</b>	<b>Piedras Blancas</b>	<b>Arroyo Laguna</b>	<b>San Simeon Creek Beach</b>	<b>Santa Rosa Creek Beach</b>	<b>Hearst San Simeon State Park Total</b>	<b>Villa Creek Beach Total</b>	<b>Morro Strand Total</b>	<b>Sandspit Total</b>	<b>District Total</b>
2002	0	-	-	-	-	-	3	-	3	38	19	56	116
2003	-	-	-	-	-	0	0	-	0	30	23	114	167
2004	0	-	-	-	-	2	1	0	3	31	21	203	258
2005	1	-	0	3	-	2	6	-	12	33	21	181	247
2006	3	-	-	2	-	3	7	-	15	23	24	100	162
2007	0	-	-	1	0	1	2	-	4	17	17	84	122
2008	0	0	0	0	0	1	0	0	1	12	17	59	89
2009	-	-	-	-	-	-	-	-	-	16	18	97	131
2010	0	-	-	0	-	0	1	0	1	14	16	89	120
2011	0	-	-	0	-	0	0	0	0	17	9	114	140
2012	2	-	-	0	-	0	0	0	2	13	2	113	130
2013	4	-	-	1	-	3	1	0	9	11	7	101	128
2014	0	-	-	-	-	7	0	3	10	16	12	105	143
2015	1	-	-	0	-	0	0	0	1	16	5	151	173
2016	3	-	-	0	-	7	6	0	16	8	7	154	185
2017	3	0	0	0	0	5	0	0	8	6	2	149	165
2018	0	-	-	0	-	2	0	0	2	9	4	125	140
<b>Average</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>18</b>	<b>13</b>	<b>117</b>	<b>154</b>

Appendix 5 - Banded WSP with Known Origins Observed on District Beaches October 2017 - February 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
a/y/a:v	F	10/03/17	01/30/18	4	Oregon '14	Sandspit	
ab:go	F	10/07/17	02/14/18	10	Salinas River NWR '11	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	
an:ww	U	10/03/17	11/14/17	4	VAFB '15	San Simeon Creek Beach, Morro Strand, Sandspit	
an:wy	J	11/07/17	12/19/17	2	VAFB '17	San Simeon Creek Beach	
an:yw	J	10/17/17	10/17/17	1	VAFB '17	Morro Strand	
an:yy	U	10/11/17	02/28/18	13	VAFB '15	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	Possible leg injury -- see Injured WSP section for details
aw:ll	U	01/16/18	02/22/18	5	Pajaro Spit '16	San Simeon Creek Beach, Santa Rosa Creek Beach	
ay:aa	M	10/03/17	10/24/17	4	Marina SB '14	Sandspit	
ay:bl	U	10/17/17	01/23/18	4	Fort Ord Dunes SP '16	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	
b:g/w	J	10/17/17	10/17/17	1	VAFB '17	Sandspit	
b:or	F	10/03/17	02/14/18	9	VAFB '13	Morro Strand, Sandspit	Formerly nb:or
b/a/b:g	F	10/03/17	01/30/18	6	Oregon '15	Sandspit	
Ba:wy	F	10/03/17	02/01/18	5	Moss Landing Salt Ponds '14	Morro Strand, Sandspit	Banded as an adult
bb:gb	M	10/03/17	01/30/18	9	ODSVRA '15	Sandspit	
bb:gr	U	01/23/18	01/23/18	1	ODSVRA '15	San Simeon Creek Beach	
bb:ob	M	10/03/17	02/20/18	10	ODSVRA '16	Sandspit	
bb:or	J	10/31/17	10/31/17	1	ODSVRA '17	Morro Strand	
bb:rr	J	12/19/17	12/25/17	2	ODSVRA '17	San Simeon Creek Beach	
bb:vg	J	11/23/17	02/22/18	8	ODSVRA '17	San Simeon Creek Beach, Santa Rosa Creek Beach, Villa Creek Beach, Morro Strand	
Bo:bb	M	10/17/17	02/07/18	6	Fort Ord Dunes SP '17	San Carpoforo Creek Beach	Banded as an adult
by:oa	U	02/07/18	02/07/18	1	Salinas River NWR '14	San Simeon Creek Beach	
By:rb	M	10/03/17	02/14/18	9	Marina SB '15	Morro Strand, Sandspit	Banded as an adult
g:g/y/g	F	10/03/17	11/14/17	7	VAFB '16	Sandspit	
ga:gr	U	10/10/17	12/12/17	5	ODSVRA '15	Morro Strand, Sandspit	
ga:pb	M	10/17/17	02/07/18	6	ODSVRA '16 or '17	San Carpoforo Creek Beach	
ga:rg	U	12/05/17	12/05/17	1	ODSVRA '16	Morro Strand	

Appendix 5 - Banded WSP with Known Origins Observed on District Beaches October 2017 - February 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
ga:ry	J	10/17/17	02/22/18	6	ODSVRA '17	San Carpoforo Creek Beach, San Simeon Creek Beach, Santa Rosa Creek Beach	
gg:og	M	10/10/17	02/07/18	12	ODSVRA '14	Sandspit	
gg:pb	F	10/17/17	02/22/18	6	ODSVRA '12	Arroyo Laguna, San Simeon Creek Beach	
gg:pr	U	10/24/17	02/14/18	6	ODSVRA '16	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	
gg:wb	M	10/10/17	12/05/17	4	ODSVRA '13	Sandspit	
go:gb	U	10/17/17	02/07/18	6	Fort Ord Dunes SP '15	Arroyo Laguna, San Simeon Creek Beach	
ka:gr	F	10/17/17	01/30/18	4	San Francisco Bay '15	Arroyo Laguna, San Simeon Creek Beach	
l/y/l:k	J	10/10/17	02/15/18	9	Oregon '17	Sandspit	
lw:aw	U	10/17/17	01/24/18	4	Salinas River SB '16	San Carpoforo Creek Beach	
nb:ar	J	10/03/17	01/16/18	6	VAFB '17	Morro Strand	
nb:gw	U	01/23/18	01/23/18	1	VAFB '17	Sandspit	
nb:ng	J	10/17/17	12/05/17	4	VAFB '17	Morro Strand, Sandspit	
nb:yj	U	10/03/17	10/03/17	1	VAFB '15	Morro Strand	
no:ny	U	10/24/17	02/01/18	8	VAFB '16	Morro Strand, Sandspit	
no:py	J	10/03/17	02/07/18	6	VAFB '17	San Simeon Creek Beach, Morro Strand	
no:wb	F	10/17/17	02/07/18	5	VAFB '16	Arroyo Laguna, San Simeon Creek Beach	
nr:gg	M	10/03/17	02/15/18	6	VAFB '15	Sandspit	
ns:pb	F	10/17/17	02/07/18	5	VAFB '14	San Simeon Creek Beach	Formerly no:pb
o:by	U	10/17/17	02/14/18	6	VAFB '13	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	Formerly no:by -- part of o tape missing
o:g/w/g	J	11/01/17	12/05/17	2	VAFB '17	Morro Strand	
o:w/r/w	J	10/03/17	02/14/18	7	VAFB '17	Morro Strand, Sandspit	
o:y:k	J	10/17/17	01/30/18	7	Oregon '17	Morro Strand, Sandspit	
oa:ya	M	10/03/17	02/14/18	9	Pajaro Spit '14	Sandspit	
ow:wr	F	10/03/17	02/22/18	16	Fort Ord Dunes SP '15	Villa Creek Beach, Morro Strand	
Oy:br	M	10/03/17	01/30/18	4	Fort Ord Dunes SP '16	Sandspit	Banded as an adult
oy:gv	J	10/10/17	02/14/18	7	Marina SB '17	Sandspit	

Appendix 5 - Banded WSP with Known Origins Observed on District Beaches October 2017 - February 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
oy:rl	F	10/15/17	02/14/18	11	Fort Ord Dunes SP '16	Villa Creek Beach, Morro Strand	
pg:ob	F	10/03/17	02/14/18	8	ODSVRA '14	Sandspit	
pg:or	J	10/17/17	01/30/18	5	ODSVRA '17	San Simeon Creek Beach, Morro Strand, Sandspit	
pv:aw	J	10/11/17	02/14/18	7	ODSVRA '17	Arroyo Laguna, San Simeon Creek Beach	
pv:gw	J	11/07/17	11/07/17	1	ODSVRA '17	San Simeon Creek Beach	
pv:vb	J	10/24/17	02/01/18	6	ODSVRA '17	Morro Strand, Sandspit	
pv:yr	J	10/17/17	02/14/18	5	ODSVRA '17	San Simeon Creek Beach, Morro Strand, Sandspit	Seen at San Simeon Creek Beach and Sandspit on 10/17/17 -- 2 fledges with same band combination
r/g:k	J	12/05/17	02/01/18	3	Oregon '17	Morro Strand	
ra:gy	F	10/17/17	10/31/17	3	Salinas River NWR '14	Arroyo Laguna, San Simeon Creek Beach, Sandspit	
rb:bg	M	10/03/17	02/15/18	8	Fort Ord Dunes SP '15	Morro Strand, Sandspit	
rg:yb	M	10/24/17	02/01/18	5	Oregon '11	Morro Strand	
rr:ag	J	10/10/17	02/01/18	10	ODSVRA '17	Villa Creek Beach, Morro Strand, Sandspit	
rr:vy	U	11/14/17	02/16/18	4	ODSVRA '16	San Simeon Creek Beach, Santa Rosa Creek Beach	
rr:ww	M	10/17/17	02/27/18	7	ODSVRA '10	Sandspit	
Rw:br	M	10/17/17	02/07/18	7	Zmudowski SB '09	San Carpoforo Creek Beach	Banded as an adult -- upper R appears half white
v:w	M	12/12/17	02/07/18	5	ODSVRA '08	Morro Strand	Formerly pv:pw
v:w/b/w	F	02/14/18	02/14/18	1	VAFB '16	Morro Strand	v not seen or missing
vv:gw	F	10/17/17	02/14/18	7	ODSVRA '15	Arroyo Laguna, San Simeon Creek Beach	
w:ob	F	10/17/17	12/19/17	5	VAFB '13	Arroyo Laguna, San Simeon Creek Beach	Formerly nw:ob
w:w/o/w	J	10/17/17	11/07/17	4	VAFB '17	Morro Strand	
wa:ga	M	10/03/17	01/30/18	7	Pajaro Spit '14	Sandspit	
wy:ga	F	10/17/17	02/14/18	10	Pajaro Dunes '14	Arroyo Laguna, San Simeon Creek Beach, Santa Rosa Creek Beach	
yr:wg	M	01/16/18	01/16/18	1	Monterey SB '15	San Carpoforo Creek Beach	

Appendix 6 - Banded WSP with Known Origins Observed on District Beaches March-September 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
:or	F	03/05/18	09/18/18	52	VAFB '13	Villa Creek Beach, Morro Strand, Sandspit	Formerly nb:or; one nest hatched and one nest failed to an unknown avian predator on the Sandspit; one nest with v:w at Morro Strand failed to red fox
:w/b/w	U	03/20/18	09/18/18	3	VAFB '16	Morro Strand	Formerly v:w/b/w
a/y/a:r	J	09/18/18	09/18/18	1	Oregon '18	Santa Rosa Creek Beach	
ab:go	F	07/17/18	08/02/18	3	Salinas River NWR '11	Sandspit	Found dead; see Injured/Dead WSP section for more information
ab:ra	J	09/18/18	09/18/18	1	Salinas River SB '18	Sandspit	
an:bw	J	09/18/18	09/18/18	1	VAFB '18	Arroyo Laguna	
an:ww	U	09/11/18	09/18/18	2	VAFB '15	Morro Strand	
an:wy	U	03/18/18	03/18/18	1	VAFB '17	Santa Rosa Creek Beach	
an:yy	F	03/23/18	09/18/18	4	VAFB '15	San Simeon Creek Beach, Santa Rosa Creek Beach	Leg sticks out; see Injured/Dead WSP section for more information
av:ag	F	06/06/18	06/07/18	2	Point Reyes NS '17	Morro Strand, Sandspit	
ay:aa	M	03/26/18	08/31/18	36	Marina SB '14	Sandspit	One nest hatched; another potential nest hatched
ay:gv	M	04/23/18	09/25/18	37	Fort Ord Dunes SP '17	Sandspit	Paired
b/a/b:g	F	08/01/18	09/20/18	9	Oregon '15	Sandspit	
b/o:r	J	08/14/18	08/17/18	3	Oregon '18	Villa Creek Beach	
Ba:wy	F	03/06/18	09/18/18	24	Moss Landing Salt Ponds '14	Morro Strand, Sandspit	Banded as an adult; one nest hatched on the City property of the Sandspit; one nest failed to American Crow at Morro Strand
bb:ar	U	08/21/18	09/20/18	8	ODSVRA '17 or '18	Villa Creek Beach, Morro Strand	
bb:gw	J	08/08/18	08/08/18	1	ODSVRA '18	Villa Creek Beach	
bb:ob	M	03/05/18	03/27/18	3	ODSVRA '16	Morro Strand, Sandspit	
bb:rg	J	09/05/18	09/14/18	2	ODSVRA '18	Morro Strand	
bb:vg	F	03/14/18	09/18/18	5	ODSVRA '17	Morro Strand	
bg:ga	J	08/05/18	08/05/18	1	South Marina Dunes '18	Morro Strand	
bg:wa	J	08/29/18	08/29/18	1	Salinas River SB '18	Villa Creek Beach	
Bo:bb	M	03/05/18	04/12/18	6	Fort Ord Dunes SP '17	San Carpoforo Creek Beach	Banded as an adult; one nest failed to coyote

Appendix 6 - Banded WSP with Known Origins Observed on District Beaches March-September 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
By:rb	M	08/08/18	09/14/18	7	Marina SB '15	Morro Strand, Sandspit	
ga:aw	J	08/21/18	09/18/18	2	ODSVRA '18	Villa Creek Beach, Sandspit	
ga:pb	M	03/05/18	03/19/18	3	ODSVRA '16 or '17	San Carpoforo Creek Beach	
ga:ry	M	03/13/18	05/15/18	12	ODSVRA '17	Arroyo Laguna	
ga:wy	J	08/27/18	8/27/2018	1	ODSVRA '18	Morro Strand	
gg:aw	U	08/21/18	08/21/18	1	ODSVRA '17 or '18	Santa Rosa Creek Beach	
gg:og	M	03/05/18	09/25/18	71	ODSVRA '14	Sandspit	One nest hatched with one confirmed fledge; one nest had an unknown fate
gg:pb	F	03/07/18	09/18/18	41	ODSVRA '12	Arroyo Laguna, San Simeon Creek Beach, Morro Strand, Sandspit	Probably two individuals (three adults with gg:pb combo alive); one nest hatched on the Sandspit
gg:pg	J	08/09/18	08/12/18	3	ODSVRA '18	Morro Strand, Sandspit	
gg:pr	U	3/19/2018	06/06/18	2	ODSVRA '16	Arroyo Laguna, Morro Strand	
gn:by	U	04/23/18	04/23/18	1	VAFB '17	Sandspit	
go:aa	J	08/10/18	08/18/18	2	Fort Ord Dunes SP '18	Morro Strand	
go:gb	U	08/18/18	09/21/18	5	Fort Ord Dunes SP '15	Arroyo Laguna, Morro Strand	
go:wa	J	09/06/18	09/06/18	1	Fort Ord Dunes SP '18	Sandspit	
kk:or	U	05/04/18	05/04/18	1	San Francisco Bay '08 or '17	Morro Strand	2008 kk:or seen at Alviso Ponds until 2009; in 2017, another chick was banded as kk:or at Eden Landing nine days before kk:or was seen at Alviso Ponds with two chicks; kk:or observed at ODSVRA on 05/08/18
no:ny	M	09/18/18	09/20/18	2	VAFB '16	Morro Strand, Sandspit	
no:or	U	04/13/18	04/13/18	1	VAFB '16	Sandspit	
no:py	F	03/12/18	03/27/18	3	VAFB '17	San Simeon Creek Beach, Morro Strand, Sandspit	
no:wb	F	03/13/18	09/18/18	45	VAFB '16	Arroyo Laguna, Santa Rosa Creek Beach, Morro Strand, Sandspit	One nest hatched and one nest with oa:ya failed to coyote on Sandspit
nr:gg	M	03/05/18	09/18/18	24	VAFB '15	Sandspit	One nest had an unknown fate
nr:rr	F	04/16/18	06/01/18	14	VAFB '17	Sandspit	One nest hatched

Appendix 6 - Banded WSP with Known Origins Observed on District Beaches March-September 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
ns:pb	F	03/19/18	03/27/18	2	VAFB '14	San Simeon Creek Beach, Santa Rosa Creek Beach	Formerly no:pb
nw:	U	08/01/18	08/01/18	1	VAFB	Villa Creek Beach	Year unknown without right bands
o:w/r/w	F	03/14/18	09/18/18	8	VAFB '17	Morro Strand	
o/w/o:r	J	09/14/18	09/14/18	1	Oregon '18	Morro Strand	
o/y:k	M	03/14/18	05/07/18	11	Oregon '17	Morro Strand, Sandspit	Paired
oa:gy	M	07/06/18	07/06/18	1	Fort Ord Dunes SP '17	Sandspit	
oa:ya	M	03/13/18	09/25/18	55	Pajaro Spit '14	Morro Strand, Sandspit	One nest hatched with two confirmed fledges; one nest with no:wb failed to coyote; one nest had an unknown fate; all nests were on the Sandspit
ow:wr	F	03/05/18	09/18/18	86	Fort Ord Dunes SP '15	Villa Creek Beach, Sandspit	Two nests hatched; one nest failed to unknown predator; one nest failed to coyote; one nest was abandoned; all nests were at Villa Creek Beach
Oy:br	M	07/10/18	09/18/18	13	Fort Ord Dunes SP '16	Sandspit	Banded as an adult
oy:gv	F	03/13/18	09/06/18	6	Marina SB '17	Sandspit	One potential nest was abandoned
oy:rl	F	03/05/18	09/20/18	10	Fort Ord Dunes SP '16	Villa Creek Beach, Morro Strand, Sandspit	
pg:gy	J	09/11/18	09/20/18	3	ODSVRA '18	Morro Strand	
pg:ob	F	03/13/18	03/14/18	2	ODSVRA '14	Sandspit	
pg:rb	J	09/11/18	09/18/18	3	ODSVRA '18	Sandspit	
pg:wb	J	09/11/18	09/11/18	1	ODSVRA '18	Villa Creek Beach	
pg:yb	M	03/14/18	03/15/18	2	ODSVRA '17	Morro Strand	
pv:aw	M	03/13/18	05/22/18	12	ODSVRA '17	San Carpoforo Creek Beach, Arroyo Laguna	
pv:gy	J	08/21/18	09/20/18	2	ODSVRA '18	Sandspit	
pv:pb	F	03/05/18	03/05/18	1	ODSVRA '15	Morro Strand	
pv:vb	F	03/15/18	04/19/18	9	ODSVRA '17	Morro Strand	
pv:yr	F	03/05/18	3/15/2018	3	ODSVRA '17	Sandspit	
r/g:k	F	03/05/18	09/18/18	14	Oregon '17	Morro Strand	
ra:gy	F	06/26/18	09/25/18	18	Salinas River NWR '14	Sandspit	

Appendix 6 - Banded WSP with Known Origins Observed on District Beaches March-September 2018

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
rb:bg	M	03/12/18	09/25/18	50	Fort Ord Dunes SP '15	Sandspit	Two nests hatched, at least one fledge
ro:va	J	07/17/18	07/17/18	1	Salinas River SB '18	Morro Strand	
rr:ag	M	03/05/18	09/18/18	14	ODSVRA '17	Morro Strand	
rr:vy	F	03/13/18	09/18/18	42	ODSVRA '16	San Simeon Creek Beach, Santa Rosa Creek Beach, Villa Creek Beach, Sandspit	
rr:ww	M	03/05/18	03/20/18	5	ODSVRA '10	Sandspit	
rr:wy	J	07/08/18	07/28/18	10	ODSVRA '18	Morro Strand	
Rw:br	M	03/05/18	08/28/18	4	Zmudowski SB '09	San Carpoforo Creek Beach	Banded as an adult
s:by	U	08/21/18	09/21/18	4	VAFB '13	Arroyo Laguna, Santa Rosa Creek Beach	Formerly no:by
Sk:	M	03/12/18	09/20/18	29	Coronado NAS, Sea World '15	Sandspit	Formerly Sk:k/a k/l; two nests hatched on City property with at least one fledge
v:w	M	03/06/18	09/18/18	60	ODSVRA '08	Villa Creek Beach, Morro Strand	Formerly pv:pw; one nest was abandoned after two eggs were depredated at Villa Creek Beach; one nest had an unknown fate and two other potential nests failed to red fox (one with :or) at Morro Strand
vg:ry	F	04/04/18	04/26/18	4	ODSVRA '17	Point Sierra Nevada, Sandspit	
vg:vr	J	08/17/18	08/17/18	1	ODSVRA '18	Morro Strand	
vg:yg	J	08/16/18	08/21/18	3	ODSVRA '18	Morro Strand, Sandspit	
vg:yw	J	08/07/18	09/14/18	6	ODSVRA '18	Morro Strand	
vv:ab	U	07/24/18	07/24/18	1	ODSVRA '17	Sandspit	
vv:gw	F	08/31/18	09/14/18	2	ODSVRA '15	Morro Strand	
vv:or	M	03/15/18	08/10/18	66	ODSVRA '15	Morro Strand, Sandspit	One potential nest failed to AMCR and one nest hatched with at least two fledges at Morro Strand
w:ob	F	03/19/18	03/19/18	1	VAFB '13	Arroyo Laguna	Formerly nw:ob
w/o/w:r	J	09/18/18	09/18/18	1	Oregon '18	Arroyo Laguna	
wa:ga	M	03/05/18	09/25/18	57	Pajaro Spit '14	Sandspit	Two nests hatched with two fledges likely

Appendix 6 - Banded WSP with Known Origins Observed on District Beaches March-September 2018

<b>Band Combination</b>	<b>Sex</b>	<b>First Seen</b>	<b>Last Seen</b>	<b># Times Seen</b>	<b>History</b>	<b>Location</b>	<b>Notes</b>
wb:va	J	07/26/18	08/04/18	5	Fort Ord Dunes SP '18	Villa Creek Beach, Morro Strand	
wg:gw	J	08/08/18	08/08/18	1	Fort Ord Dunes SP '18	Sandspit	
wg:yr	J	08/05/18	08/13/18	3	Fort Ord Dunes SP '18	Morro Strand, Sandspit	
wr:ba	J	09/18/18	09/18/18	1	Salinas River SB '18	Arroyo Laguna	
wy:ga	F	03/13/18	09/18/18	6	Pajaro Dunes '14	Arroyo Laguna, Santa Rosa Creek Beach	
y/g:r	J	08/28/18	08/28/18	1	Oregon '18	Arroyo Laguna	
ya:va	J	07/31/18	07/31/18	1	Monterey SB '18	Villa Creek Beach	
yo:ya	J	08/29/18	08/29/18	1	Salinas River SB '18	Sandspit	

Appendix 7 - Injured and Dead WSP on District Beaches October 2017 - September 2018

Date	Location	Sex	Age	Band Combination	Description of Injury	Actions Taken	Comments
10/11/17	San Simeon Creek Beach	F	Adult	an:yy	Left leg angled unnaturally outward at times but not always apparent.	None	Observed eight additional times at San Simeon Creek Beach until 02/28/18 in the same condition. Injury did not appear to hinder foraging or movement.
10/17/17	Sandspit	U	Unknown		Injury to right leg/foot. Right foot was held off ground but no apparent reason why.	None	Injury did not impair foraging or movement.
10/31/17	Arroyo Laguna	F	Adult	an:yy	Left leg angled outward when walking.	None	Same bird as at San Simeon Creek Beach.
11/07/17	San Carpoforo Creek Beach	U	Unknown		Left leg appeared broken.	None	Injury did not impair movement.
02/03/18	Santa Rosa Creek Beach	F	Adult	an:yy	Left leg angled outward but not readily apparent.	None	Same bird as at San Simeon Creek Beach. Also, observed on 03/27/18 at Santa Rosa Creek Beach.
04/17/18	Sandspit	M	Adult		Left side auricular feathers matted and clumpy sand on bill.	None	Appeared to be able to see out of left eye. Injury did not impair movement.
05/31/18	Sandspit	U	Adult		Tar on right wing.	None	Injury did not impair foraging or movement.
08/02/18	Sandspit	F	Adult	ab:go	Dead	Notified USFWS. Collected with documentation. Sent to CDFW Marine Wildlife & Veterinary Care & Research Center for necropsy.	Found badly decomposed in tide line. Last seen alive on 07/19/18. Carcass was radiographed but no fractures found.
08/21/18	Morro Strand	M	Adult		Hopping on left leg; right foot dangling possibly swollen.	None	Most likely the same bird was observed again on 09/05/18 in same condition.
08/21/18	Morro Strand	U	Juvenile		Dead; missing head and most of body.	Documented and collected	Depredated by unknown avian predator.
08/28/18	San Simeon Creek Beach	F	Adult	an:yy	Left leg angled outward.	None	Same bird observed during previous winter. Injury did not impair movement.
08/28/18	San Carpoforo Creek Beach	M	Adult	Rw:br	"w" band has tar on it.	None	Tar appeared to be only on band. Did not hinder the bird.

Appendix 8 – 2018 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	Cause of Failed Nests	Date Failure	# of Days Before Failing	Floated By
<b>HSSSP -- San Carpoforo Creek Beach</b>										
SC01	30°, 30°, 30°	04/12/18	25	05/07/18			Coyote	04/25/18	13	R Orr
<b>Villa Creek Beach</b>										
VC05	60°, 75°, 85°	05/01/18	21	05/22/18			Coyote	05/04/18	3	W Eggers
VC16	40°, 45°, 70°	06/13/18	23	07/06/18			Coyote	07/04/18	21	W Eggers
VC19	9 mm, 9 mm, 10 mm	07/06/18	12	07/18/18	12	07/18/18				W Eggers
VC20	10 mm	07/17/18	11	07/28/18			Non-viable	08/21/18	35	R Orr
<b>Sandspit</b>										
<b>North</b>										
NSS020	90°, 90°, 10 mm	05/08/18	13	05/21/18	15	05/23/18				R Slack*
NSS021	85°, 90°, 15 mm	05/08/18	15	05/23/18	14	05/22/18				R Slack*
NSS025	90°, 90°, 90°	05/08/18	17	05/25/18			Unknown	05/20/18	12	R Orr
NSS027	17 mm, 17 mm, 19 mm	05/08/18	8	05/16/18	8	05/16/18				R Slack*
NSS028	35°, 40°, 70°	05/08/18	21	05/29/18			Coyote	05/23/18	15	R Orr
NSS029	40°, 70°, 90°	05/08/18	20	05/28/18			Unknown Predator	05/11/18	3	R Slack*
NSS036	45°, 45°, 70°	05/24/18	23	06/16/18	25	06/18/18				R Orr
NSS049	60°, 60°, 60°	06/06/18	21	06/27/18			Unknown Predator	06/07/18	1	R Orr
NSS052	10 mm, 10 mm, 11 mm	06/22/18	11	07/03/18	10	07/02/18				R Orr
NSS068	13 mm, 15 mm, 15 mm	07/11/18	8	07/19/18			Coyote	07/13/18	2	R Orr
NSS075	70°, 70°, 80°	07/11/18	19	07/30/18			Coyote	07/18/18	7	R Orr
NSS080	9 mm, 13 mm, 14 mm	07/31/18	9	08/09/18	3	08/03/18				W Eggers
<b>South</b>										
SSS010	3 cracked	05/08/18	1	05/09/18	1	05/09/18				R Slack*
SSS018	17 mm, 17 mm, 18 mm	05/08/18	8	05/16/18		05/13/18	Unknown Fate	05/13/18		R Slack*
SSS020	14 mm, 14 mm, 15 mm	05/08/18	10	05/18/18	10	05/18/18				R Slack*
SSS024	15 mm, 15 mm, 15 mm	05/08/18	7	05/15/18	12	05/20/18				R Slack*
SSS025	90°, 10 mm, 12 mm	05/08/18	16	05/24/18	15	05/23/18				R Slack*
SSS033	30°, 55°, 70°	05/08/18	23	05/31/18	22	05/30/18				R Slack*
SSS042	55°, 90°	05/30/18	19	06/18/18	21	06/20/18				R Orr
SSS043	20°, 20°, 20°	05/23/18	27	06/19/18	27	06/19/18				R Orr

Appendix 8 – 2018 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	Cause of Failed Nests	Date Failure	# of Days Before Failing	Floated By
SSS050	25°, 30°, 35°	05/30/18	26	06/25/18	26	06/25/18				R Orr
SSS053	30°, 45°, 50°	06/08/18	24	07/02/18	25	07/03/18				R Orr
SSS064	90°, 9 mm, 12 mm	06/27/18	14	07/11/18	15	07/12/18				R Orr
SSS067	0°, 10°, 20°	06/25/18	27	07/22/18			Coyote	07/20/18	25	W Eggers
SSS073	70°, 80°	07/07/18	20	07/27/18	19	07/26/18				W Eggers
SSS078	50°, 55°, 90°	07/11/18	21	08/01/18	20	07/31/18				R Orr
SSS079	25°, 30°, 30°	07/09/18	26	08/04/18			Coyote	07/20/18	11	R Orr
SSS080	30°, 40°, 45°	07/11/18	25	08/05/18	26	08/06/18				R Orr
SSS084	70°, 80°	07/31/18	19	08/19/18			Abandoned	08/03/18	3	W Eggers
SSS087	70°, 80°, 85°	07/31/18	19	08/19/18	20	08/20/18				W Eggers

NOTES

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 surface of water.

\* Nests floated under supervision of Regena Orr.

Appendix 9 - WSP Population Census Data on District Beaches October 2017 – September 2018

Date	San Carpofofo Creek Beach	Point Sierra Nevada	Arroyo de la Cruz	Sidney's Lagoon	Piedras Blancas	Arroyo Laguna	San Simeon Creek Beach	Santa Rosa Creek Beach	Hearst San Simeon State Park Total
10/03/17	13	-	0	-	-	76	28	0	117
10/04/17	-	-	-	-	-	-	-	15	15
10/06/17	-	1	-	-	-	-	-	-	1
10/11/17	31	0	-	11	-	-	67	-	109
10/15/17	-	-	2	-	-	-	-	-	2
10/17/17	44	0	1	19	-	101	74	36	275
10/24/17	32	0	-	-	-	34	70	27	163
10/31/17	36	0	0	6	-	57	45	24	168
11/07/17	34	0	-	-	-	26	106	0	166
11/14/17	0	-	-	-	-	-	100	-	100
11/15/17	-	0	0	14	-	88	-	0	102
12/19/17	-	-	-	-	-	32	46	-	78
01/03/18	-	-	-	-	-	56	79	-	135
01/16/18	33	0	0	0	0	0	54	3	90
01/23/18 <sup>2</sup>	0	0	0	0	0	0	54	4	58
01/24/18	33	-	-	-	-	-	-	-	33
01/30/18	39	0	-	-	-	0	156	5	200
02/02/18	-	-	15	-	-	-	-	-	15
02/07/18	28	0	0	0	-	-	158	-	186
02/14/18	0	0	-	-	-	0	29	121	150
02/22/18	0	0	0	0	0	13	27	78	118
03/27/18	25	-	-	-	-	52	7	32	116
04/10/18	2	-	-	-	-	20	2	0	24
05/15/18	1	0	0	0	0	6	0	0	7
05/22/18 <sup>3</sup>	0	-	-	0	-	2	0	0	2
06/12/18	0	-	-	0	0	0	0	0	0
07/17/18	0	0	0	0	0	0	6	5	11
08/21/18	4	0	0	-	0	17	0	32	53
09/18/18	13	1	0	4	-	65	15	14	112

Date	Villa Creek Beach Total	Male	Female	Unknown	Juvenile	Chick	Morro Strand North (Old Creek)	Morro Strand South	Morro Strand Total	Male	Female	Unknown	Juvenile	Chick	Sandspit Total <sup>1</sup>	Male	Female	Unknown	Juvenile	Chick
10/03/17	29			29			0	140	140			140			120			120		
10/10/17	25			25			0	158	158			158			99			99		
10/17/17	24			24			0	143	143			143			130			130		
10/24/17	43			43			0	125	125			125			117			117		
10/31/17	0			0			0	196	196			196			100			100		
11/07/17	42			42			0	133	133			133			98			98		
11/14/17	11			11			0	48	48			48			129			129		
12/05/17	13			13			-	194	194			194			42			42		
12/12/17	13			13			-	178	178			178			61			61		
12/21/17	18			18			-	99	99			99			-			-		
01/02/18	3			3			-	160	160			160			-			-		
01/16/18	0			0			0	209	209			209			-			-		
01/23/18 <sup>2</sup>	16			16			0	56	56			56			23			23		
01/30/18	17			17			0	136	136			136			78			78		
02/06/18	5			5			0	5	5			5			2			2		
02/14/18	11			11			-	134	134			134			20			20		
02/22/18	10			10			-	1	1			1			0			0		
03/27/18	20	8	12				-	62	62	22	31	9			22	9	7	6		
04/10/18	7	3	4				-	60	60	28	28	4			67	34	26	7		
05/15/18	8	4	4				-	0	0						89	47	42			4
05/22/18 <sup>3</sup>	9	5	4				-	4	4	2	2				125	63	55	7		8
06/12/18	8	4	4				-	1	1		1				75	34	36	3	2	4
07/17/18	17	4	8	4	1		-	45	45	7	12	19	7		101	64	35	1	1	7
08/21/18	16		1	15		3	-	147	147	2	1	142	2	2	83			78		5
09/18/18	27			26	1		-	100	100			97	3		77			77		

HSSSP data not delineated by sex/age. Totals do not include chicks.

NOTES

- 1. Sandspit data does not include City property
- 2. Winter window survey
- 3. Breeding window survey

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

= Indicates the change from winter surveys to breeding season surveys

Appendix 10 - Number of Nests Found By Month On District Beaches 2004-2018



\* Date of discovery not recorded for all nests that year

Appendix 10a - Nest Initiation and Last Hatch Dates Summary for District Beaches

<b>Hearst San Simeon State Park</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2018	10-Apr*	-
2017	5-May	-
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*

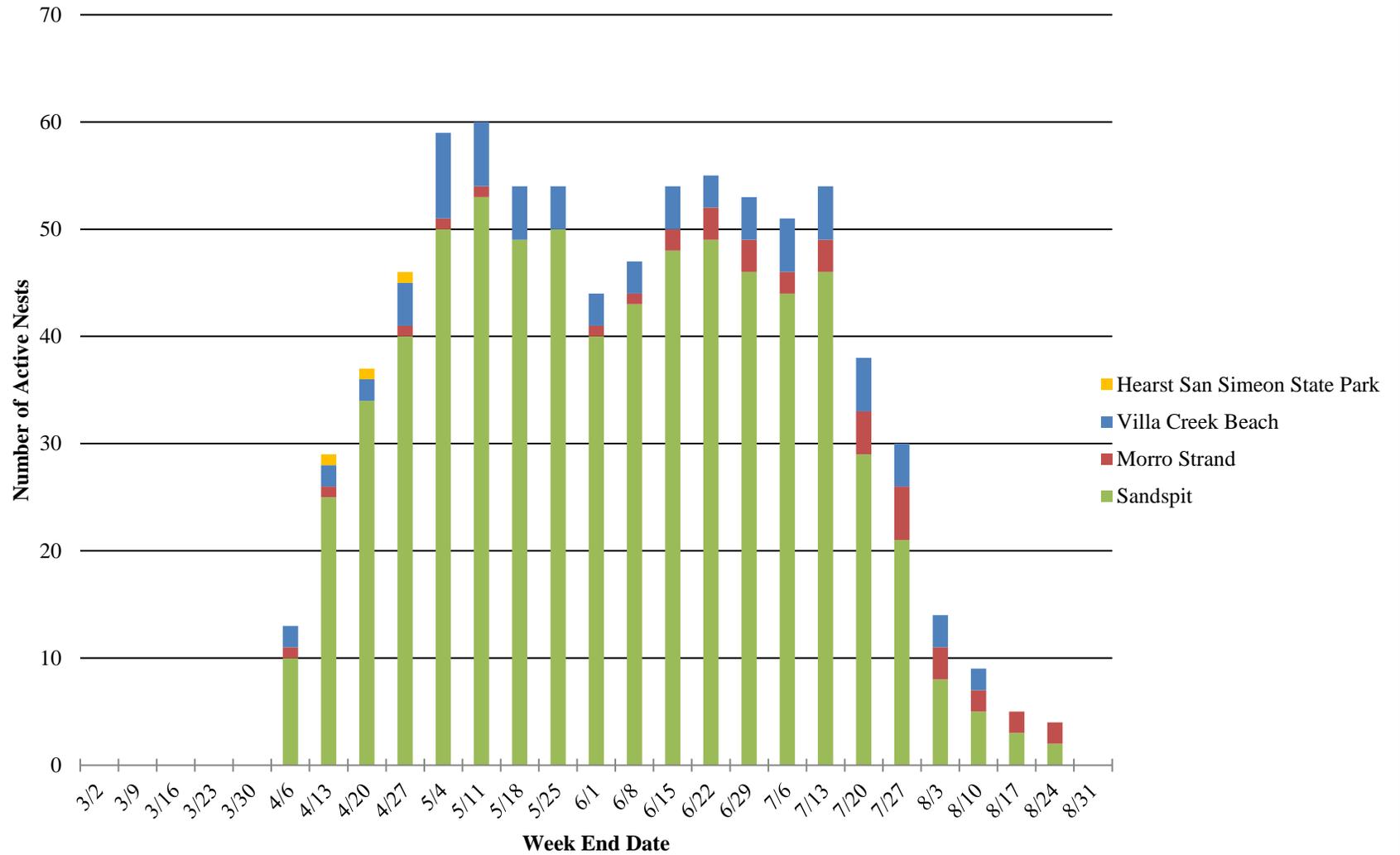
<b>Villa Creek Beach</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2018	4-Apr*	10-Aug
2017	12-Apr	9-Aug
2016	13-Apr	14-Jul*
2015	25-Mar	22-Jul
2014	21-Mar	21-Jul*
2013	5-Apr	22-Jun
2012	9-Apr	14-Aug
2011	5-Apr	29-Jul
2010	31-Mar*	28-Jul
2009	9-Mar	29-Jun
2008	17-Mar	5-Aug
2007	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

<b>Morro Strand</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2018	4-Apr	21-Aug
2017	27-Mar	1-Aug
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

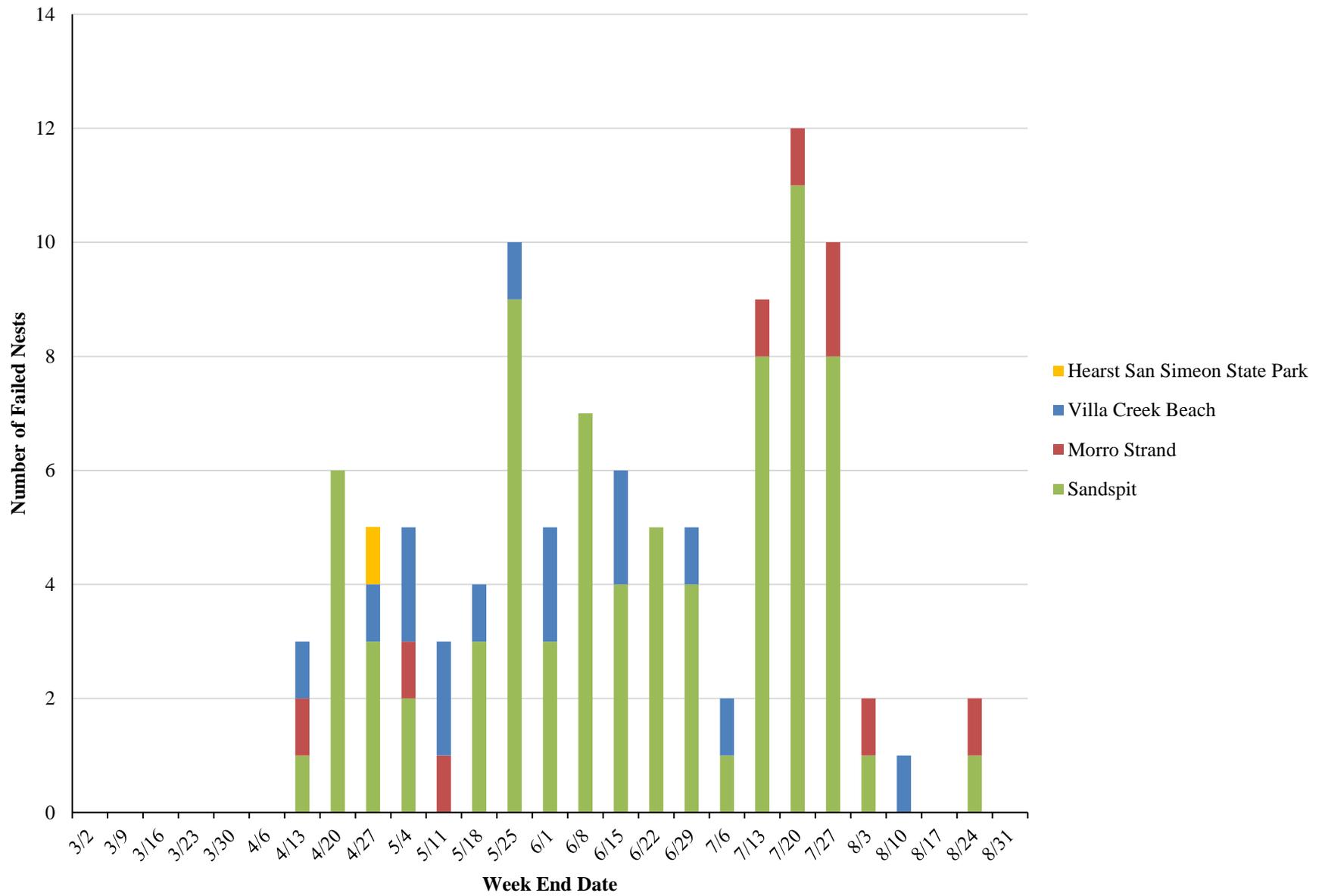
<b>Sandspit</b>		
<b>Year</b>	<b>First Nest Initiation</b>	<b>Last Nest Hatched</b>
2018	2-Apr	20-Aug
2017	15-Mar	8-Aug
2016	28-Mar	13-Aug
2015	13-Mar	24-Aug
2014	12-Mar	18-Aug
2013	21-Mar	12-Aug
2012	14-Mar	18-Aug
2011	15-Mar	23-Aug
2010	19-Mar	8-Aug
2009	9-Mar	17-Aug
2008	18-Mar	18-Aug
2007	21-Mar	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 10b - Number of Active Nests through Progressive Weeks of the 2018 Breeding Season



Appendix 10c - Number of Failed Nests through Progressive Weeks of the 2018 Breeding Season



## Appendix 10d - Summary of WSP Nest Fates at District Beaches 2001-2018

	2018		2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004 <sup>1</sup>		2003 <sup>1</sup>		2002 <sup>1,2</sup>		2001 <sup>1,2</sup>					
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%				
<b>Hearst San Simeon State Park</b>																																								
Total # of nests	1		2		1		1		0		0		3		0		0		2		2		6		11		5		0		1		1		1		N/A			
# Nests hatched	0		0		0		1	100%	0		0		1	33%	0		0		0		2	100%	5	83%	7	64%	5	100%	0		0		0		1	100%	0			
Failed predator	1	100%	1	100%	0		0		0		0		0		0		0		1	50%	0		0		0		0		0		1	100%	0		0		0			
Failed wind	0		0		0		0		0		0		0		0		0		1	50%	0		0		0		0		0		0		0		0		0			
Failed abandoned	0		0		0		0		0		0		2	67%	0		0		0		0		0		0		0		0		0		0		0		0			
Failed tide	0		0		0		0		0		0		0		0		0		0		0		1	17%	0		0		0		0		0		0		0			
Failed human	0		0		0		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		0		0		0			
Failed unknown	0		0		0		0		0		0		0		0		0		0		0		0		4	36%	0		0		0		0		0		0			
Unknown fate	0		1		1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
<b>Villa Creek Beach</b>																																								
Total # of nests	21		14		10		24		23		20		31		21		26		38		16		30		40		37		66		35		44		39					
# Nests hatched	6	29%	10	71%	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	10	48%	1	7%	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		0		2	9%	0		0		0		1	4%	1	3%	0		1	4%	0		0		0		0		0		0		0		0			
Failed abandoned	4	19%	2	14%	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		1	7%	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		0		1	4%	0		1	3%	0		0		0		1	3%	0		0		0		0		1	2%	0		0		3	8%				
Failed other	1	5%	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	2%	0		0			
Failed unknown	0		0		0		0		0		0		0		0		0		0		0		0		0		0		5	8%	4	11%	3	7%	1	3%				
Unknown fate	0		0		1		1		0		1		0		1		0		2		2		2		1		0		0		0		0		0		0			
<b>Morro Strand</b>																																								
Total # of nests	12		16		16		13		17		12		12		25		24		26		33		19		34		27		38		45		37		14					
# Nests hatched	2	18%	5	31%	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	8	73%	9	56%	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		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		0			
Failed abandoned	1	9%	1	6%	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		0		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		0		0		1	3%	0		1	3%	0		0		0		0			
Failed other	0		0		0		1	8%	0		0		0		0		0		0		0		0		0		0		2	5%	0		0		0		0			
Failed unknown	0		1	6%	1	6%	0		1	6%	0		0		0		0		1	4%	1	3%	0		0		0		2	5%	2	4%	9	24%	2	14%				
Unknown fate	1		0		0		1		0		0		0		0		1		0		2		0		1		0		0		0		0		0		0			
<b>Sandspit</b>																																								
Total # of nests	169		226		238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109					
# Nests hatched	86	53%	117	52%	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	50	31%	63	28%	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	4	2%	6	3%	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		0			
Failed abandoned	17	10%	18	8%	21	9%	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	2	1%	18	8%	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		0		0		1	0%	0		0		0		0		0		0		0		0		0		2	3%	4	4%		
Failed other	1	1%	0		1	0%	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Failed unknown	3	2%	1	0%	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		0			
Unknown fate	6		3		1		6		7		3		5		3		2		2		1		0		5		7		0		12		34		2					
<b>Total # of Nests- ALL BEACHES</b>	<b>203</b>		<b>258</b>		<b>265</b>		<b>310</b>		<b>241</b>		<b>189</b>		<b>220</b>		<b>259</b>		<b>229</b>		<b>210</b>		<b>147</b>		<b>164</b>		<b>226</b>		<b>294</b>		<b>376</b>		<b>227</b>		<b>191</b>		<b>162</b>					
<b># Nests Hatched- ALL BEACHES</b>	<b>94</b>	<b>48%</b>	<b>132</b>	<b>52%</b>	<b>99</b>	<b>38%</b>	<b>140</b>	<b>46%</b>	<b>142</b>	<b>61%</b>	<b>96</b>	<b>52%</b>	<b>78</b>	<b>36%</b>	<b>134</b>	<b>53%</b>	<b>104</b>	<b>46%</b>	<b>109</b>	<b>53%</b>	<b>72</b>	<b>51%</b>	<b>44</b>	<b>27%</b>	<b>103</b>	<b>47%</b>	<b>146</b>	<b>51%</b>	<b>177</b>	<b>47%</b>	<b>119</b>	<b>55%</b>	<b>70</b>	<b>45%</b>	<b>71</b>	<b>44%</b>				

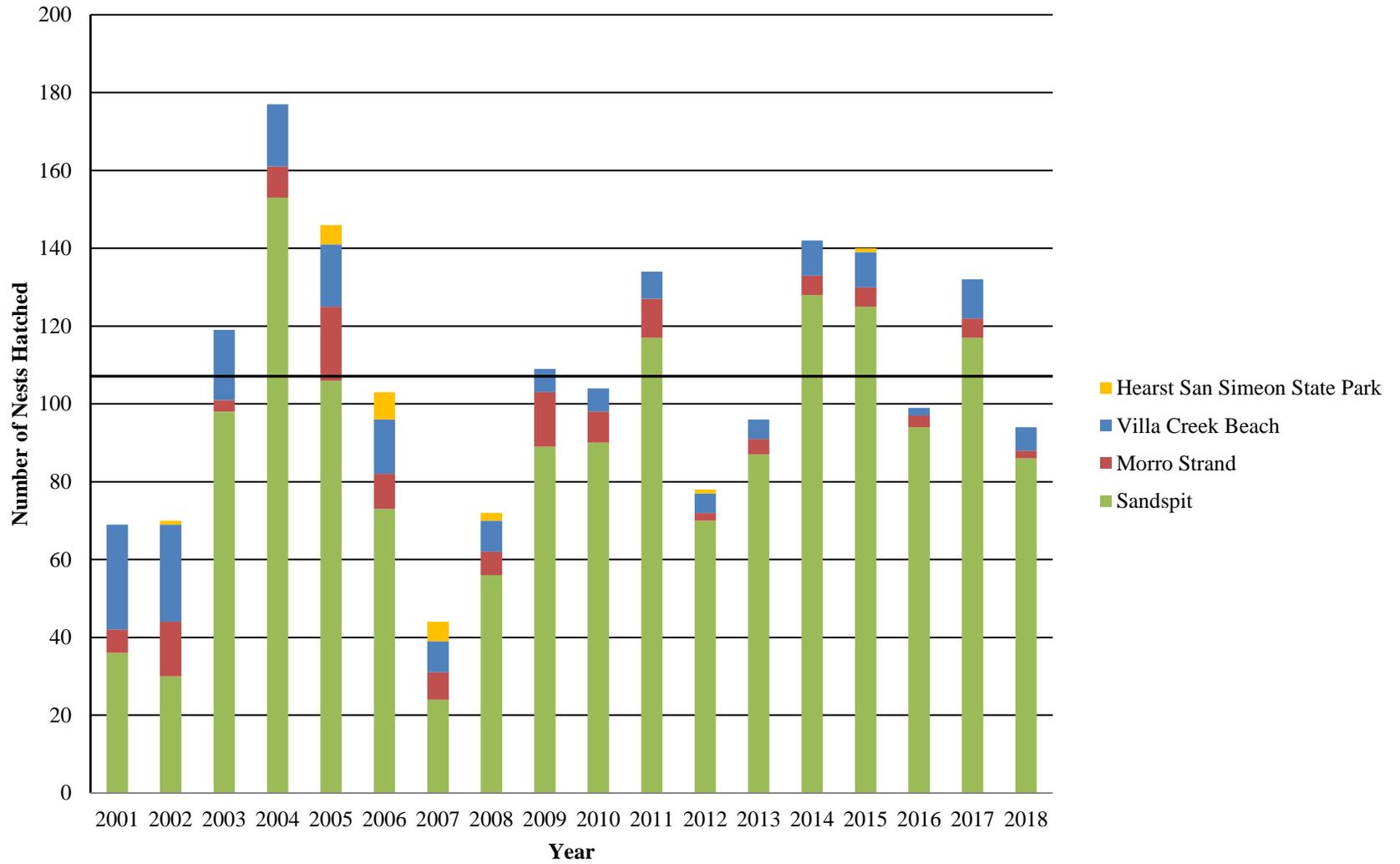
All percentage calculations exclude nests with unknown fates

**NOTES**

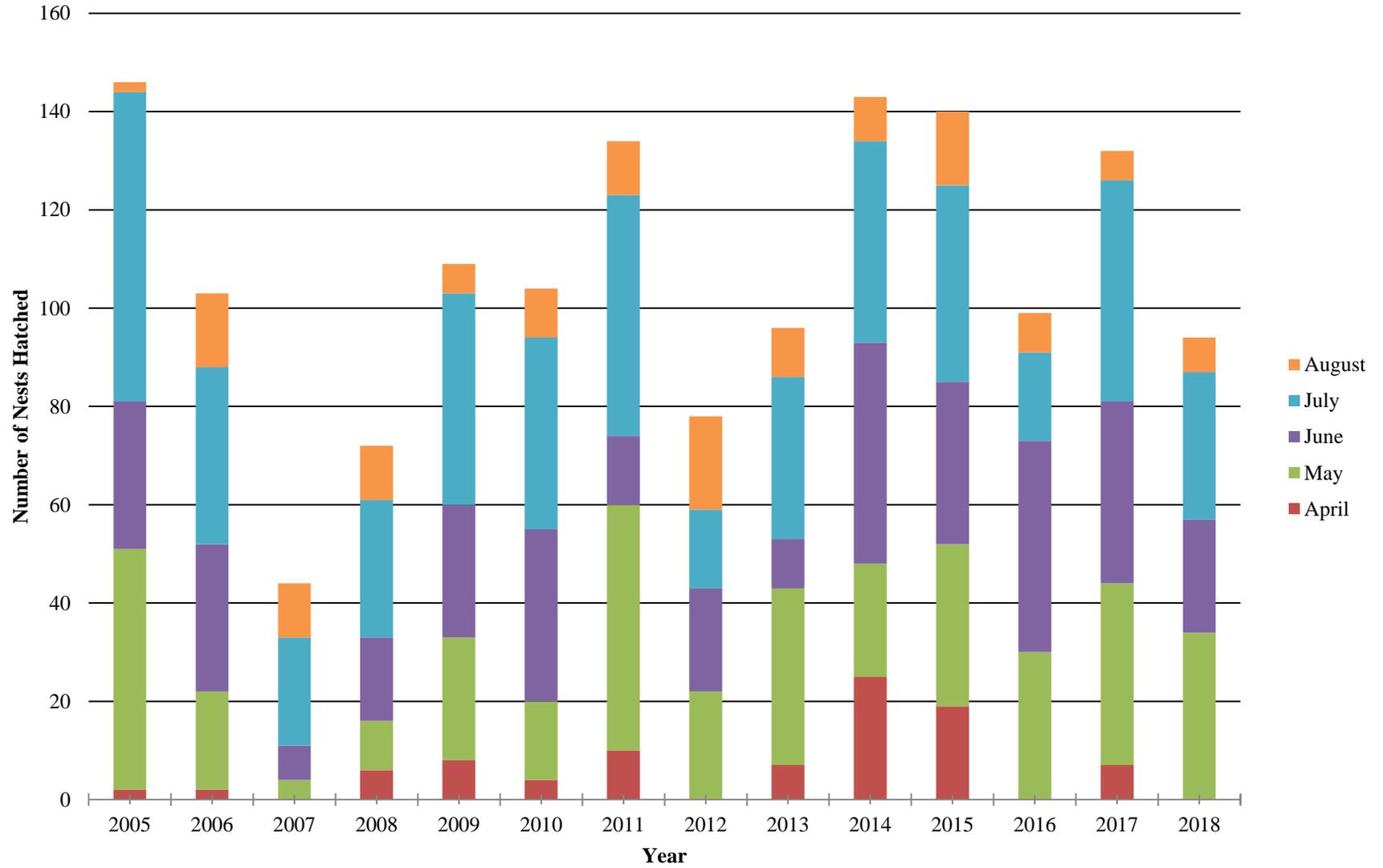
1. HSSSP was not monitored in 2001 and 2002-04 numbers only include San Simeon Creek Beach

2. Numbers for 2001-02 include City

Appendix 10e - Total Nests Hatched on District Beaches 2001-2018



Appendix 10f - Nests Hatched by Month on District Beaches 2005-2018



Appendix 11 – 2018 Salvaged WSP Eggs and Specimens

Collected Eggs										
Nest #	UTM	Date Nest Found	Clutch Size	Nest Fate	Cause of Failure	Fate Date	# of Eggs Collected	Date Collected	Collected By	Embryonic Stage
<b>Villa Creek Beach</b>										
VC04	10 S 684487 3925898	04/27/18	1	Fail	Abandoned	05/09/18	1	05/09/18	R Orr	No evidence of fertilization
VC08	10 S 684577 3925822	05/02/18	1	Fail	Abandoned	05/04/18	1	05/08/18	W Eggers	No evidence of fertilization
VC09	10 S 684503 3925890	05/02/18	1	Fail	Abandoned	05/09/18	1	05/09/18	R Orr	No evidence of fertilization
VC10	10 S 684271 3925985	05/04/18	3	Fail	Abandoned	05/30/18	1	06/07/18	W Eggers	3 week old embryo
VC17	10 S 684523 3925872	06/22/18	3	Hatch	N/A	07/23/18	2	07/30/18	W Eggers	(2) No evidence of fertilization
VC20	10 S 684346 3925964	07/06/18	1	Fail	Non-viable	07/31/18	1	08/21/18	R Orr	No evidence of fertilization
<b>Morro Strand</b>										
MS03	10 S 693877 3918373	05/07/18	2	Fail	Abandoned	05/10/18	2	05/14/18	W Eggers	(2) No evidence of fertilization
MS12	10 S 693926 3918150	07/25/18	3	Hatch	N/A	08/21/18	1	08/21/18	R Orr	No evidence of fertilization
MSDE01	10 S 693874 3918402	04/23/18	1	Dropped Egg	N/A	N/A	1	04/25/18	R Orr	No evidence of fertilization
<b>Sandspit</b>										
<b>North</b>										
NSS003	10 S 694030 3912128	04/06/18	1	Fail	Wind	04/11/18	1	04/11/18	R Orr	No evidence of fertilization
NSS006	10 S 694155 3913004	04/10/18	3	Fail	Tide	04/16/18	1	06/22/18	R Orr	No evidence of fertilization
NSS007	10 S 693953 3911737	04/10/18	1	Fail	Abandoned	04/12/18	1	04/17/18	R Orr	No evidence of fertilization
NSS009	10 S 694025 3912080	04/11/18	1	Fail	Abandoned	04/13/18	1	04/17/18	R Orr	No evidence of fertilization
NSS013	10 S 693932 3911590	04/16/18	3	Hatch	N/A	05/17/18	1	05/22/18	R Orr	3 week old embryo
NSS015	10 S 694181 3913177	04/23/18	3	Fail	Abandoned	05/01/18	3	05/08/18	R Orr	(2) 1 week old embryo and (1) No evidence of fertilization
NSS020	10 S 694062 3912401	04/26/18	3	Hatch	N/A	05/23/18	1	06/06/18	R Orr	3 week old embryo
NSS030	10 S 694270 3914344	05/10/18	3	Fail	Abandoned	05/22/18	1	05/24/18	R Orr	No evidence of fertilization
NSS035	10 S 694219 3913399	05/18/18	3	Fail	Coyote	05/24/18	1	05/24/18	R Orr	1 week old embryo
NSS044	10 S 693945 3911742	06/01/18	3	Fail	Non-viable	07/11/18	3	08/20/18	W Eggers	(3) No evidence of fertilization
NSS056	10 S 694259 3914330	06/13/18	1	Fail	Tide	06/14/18	1	06/22/18	R Orr	No evidence of fertilization
NSS059	10 S 694257 3914197	06/15/18	3	Hatch	N/A	07/17/18	1	07/31/18	W Eggers	2 week old embryo
NSS069	10 S 694149 3912949	06/29/18	3	Hatch	N/A	07/30/18	1	08/20/18	W Eggers	1 week old embryo
NSS077	10 S 694250 3913631	07/11/18	1	Fail	Abandoned	07/24/18	1	07/31/18	W Eggers	No evidence of fertilization
NSSDE01	10 S 694034 3912347	04/10/18	1	Dropped Egg	N/A	N/A	1	04/11/18	R Orr	No evidence of fertilization
NSSDE02	10 S 694114 3912737	05/08/18	1	Dropped Egg	N/A	N/A	1	05/22/18	R Orr	No evidence of fertilization

Appendix 11 – 2018 Salvaged WSP Eggs and Specimens

Nest #	UTM	Date Nest Found	Clutch Size	Nest Fate	Cause of Failure	Fate Date	# of Eggs Collected	Date Collected	Collected By	Embryonic Stage
<b>North</b>										
NSSDE03	10 S 694245 3913833	05/23/18	1	Dropped Egg	N/A	N/A	1	05/24/18	R Orr	No evidence of fertilization
NSSDE04	10 S 694067 3912478	07/27/18	1	Dropped Egg	N/A	N/A	1	08/20/18	W Eggers	No evidence of fertilization
NSSDE05	10 S 694251 3913821	06/11/18	1	Dropped Egg	N/A	N/A	1	06/22/18	R Orr	No evidence of fertilization
NSSDE06	10 S 694076 3912502	06/08/18	1	Dropped Egg	N/A	N/A	1	06/22/18	R Orr	No evidence of fertilization
NSSDE07	10 S 694163 3913084	06/22/18	1	Dropped Egg	N/A	N/A	1	06/22/18	R Orr	No evidence of fertilization
NSSDE08	10 S 694087 3912617	06/21/18	1	Dropped Egg	N/A	N/A	1	06/22/18	R Orr	No evidence of fertilization
NSSDE10	10 S 693931 3911643	07/11/18	1	Dropped Egg	N/A	N/A	1	07/18/18	R Orr	No evidence of fertilization
<b>South</b>										
SSS001	10 S 693452 3909554	04/02/18	3	Fail	Abandoned	04/09/18	3	04/17/18	R Orr	Not analyzed in 2018
SSS006	10 S 693061 3908371	04/09/18	3	Fail	Abandoned	05/22/18	3	05/22/18	R Orr	Not analyzed in 2018
SSS007	10 S 693563 3910002	04/09/18	1	Fail	Abandoned	04/13/18	1	04/17/18	R Orr	No evidence of fertilization
SSS009	10 S 692987 3908146	04/11/18	1	Fail	Abandoned	04/13/18	1	04/17/18	R Orr	No evidence of fertilization
SSS011	10 S 693899 3911420	04/11/18	3	Unknown	N/A	05/14/18	2	05/22/18	R Orr	Not analyzed in 2018
SSS017	10 S 693370 3909270	04/18/18	3	Hatch	N/A	05/21/18	1	05/24/18	R Orr	No evidence of fertilization
SSS021	10 S 693840 3911112	04/20/18	3	Hatch	N/A	05/29/18	2	05/31/18	R Orr	Not analyzed in 2018
SSS028	10 S 693050 3908320	05/02/18	3	Fail	Abandoned	05/18/18	3	05/30/18	R Orr	Not analyzed in 2018
SSS039	10 S 693895 3911456	05/21/18	3	Hatch	N/A	06/19/18	2	06/25/18	W Eggers	Not analyzed in 2018
SSS040	10 S 693661 3910360	05/23/18	1	Fail	Abandoned	05/29/18	1	05/30/18	R Orr	No evidence of fertilization
SSS041	10 S 693665 3910510	05/23/18	3	Hatch	N/A	06/23/18	1	06/25/18	W Eggers	3 week old embryo
SSS042	10 S 693751 3910878	05/23/18	2	Hatch	N/A	06/20/18	1	06/25/18	W Eggers	No evidence of fertilization
SSS043	10 S 693382 3909360	05/23/18	3	Hatch	N/A	06/19/18	1	06/25/18	W Eggers	No evidence of fertilization
SSS045	10 S 693147 3908689	05/23/18	3	Unknown	N/A	06/25/18	2	06/27/18	R Orr	Not analyzed in 2018
SSS048	10 S 693280 3909039	05/30/18	3	Fail	Abandoned	07/07/18	3	07/07/18	W Eggers	Not analyzed in 2018
SSS049	10 S 693616 3910227	05/30/18	2	Fail	Wind	06/01/18	2	06/08/18	R Orr	Not analyzed in 2018
SSS053	10 S 693210 3908845	06/06/18	3	Hatch	N/A	07/03/18	1	07/07/18	W Eggers	No evidence of fertilization
SSS054	10 S 693299 3909153	06/06/18	1	Fail	Wind	06/11/18	1	06/25/18	W Eggers	No evidence of fertilization
SSS063	10 S 693359 3909293	06/20/18	3	Hatch	N/A	07/19/18	2	07/31/18	W Eggers	Not analyzed in 2018
SSS076	10 S 693779 3910981	07/02/18	1	Fail	Abandoned	07/16/18	1	07/18/18	R Orr	1 week old embryo
SSS078	10 S 693659 3910387	07/09/18	3	Hatch	N/A	07/31/18	2	08/20/18	W Eggers	Not analyzed in 2018
SSS081	10 S 693850 3911221	07/11/18	2	Fail	Abandoned	07/11/18	2	07/18/18	R Orr	Not analyzed in 2018
SSS084	10 S 693203 3908864	07/23/18	2	Fail	Abandoned	08/03/18	2	08/27/18	W Eggers	Not analyzed in 2018
SSS088	10 S 693661 3910492	08/13/18	3	Fail	Abandoned	08/22/18	3	08/27/18	W Eggers	Not analyzed in 2018
SSSDE01	10 S 693652 3910357	03/05/18	1	Dropped Egg	N/A	N/A	1	03/07/18	R Orr	No evidence of fertilization
SSSDE02	10 S 693908 3911569	06/06/18	1	Dropped Egg	N/A	N/A	1	06/06/18	R Orr	No evidence of fertilization
SSSDE03	10 S 693501 3909693	06/01/18	1	Dropped Egg	N/A	N/A	1	06/08/18	R Orr	No evidence of fertilization
SSSDE04	10 S 693284 3909102	06/13/18	1	Dropped Egg	N/A	N/A	1	06/25/18	W Eggers	No evidence of fertilization

Appendix 11 – 2018 Salvaged WSP Eggs and Specimens

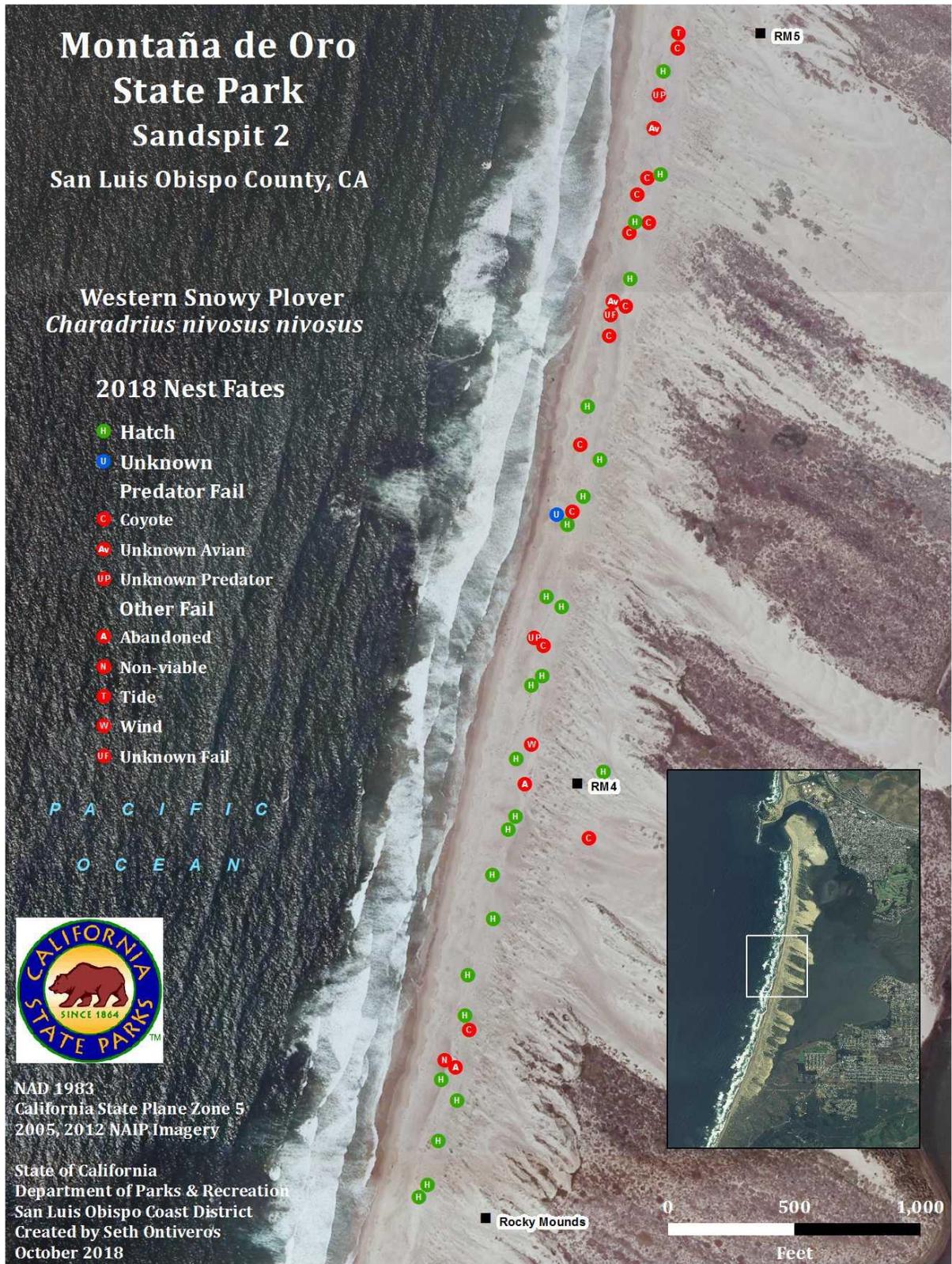
Salvaged WSP Specimens					
Descriptive Location	UTM	Age	Specimen Description	Date Collected	Collected By
Sandspit	10 S 693443 3909824	Adult	Banded ab:go, found dead in tide line in an advanced state of decomposition.	08/02/18	S Bauer
Morro Strand	10 S 693833 3918282	Unknown	Wings, tail connected to legs; found depredated by unknown predator	08/21/18	R Orr



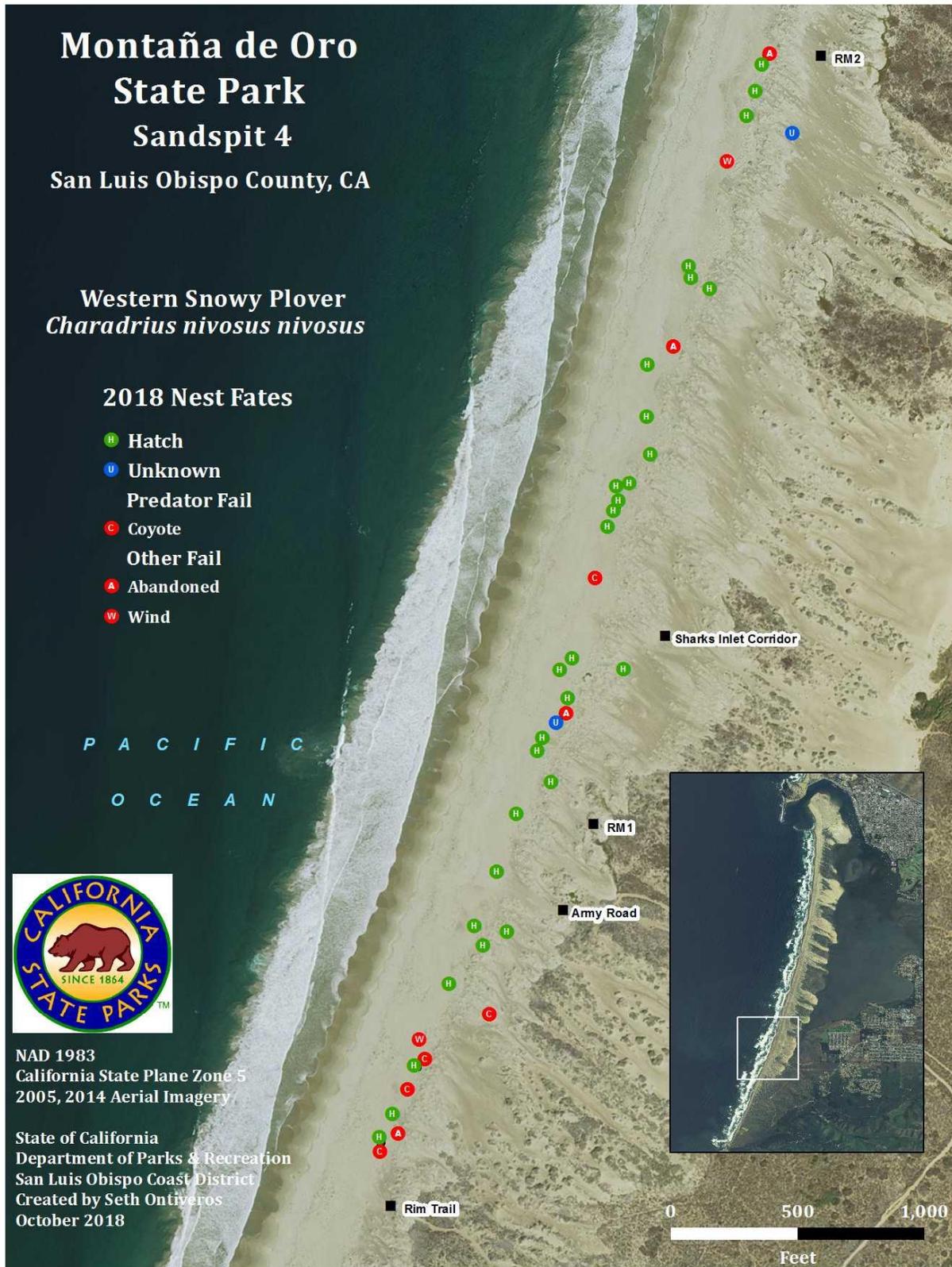
















Appendix 13 – Summary of WSP Nest Depredations on District Beaches 2001-2018

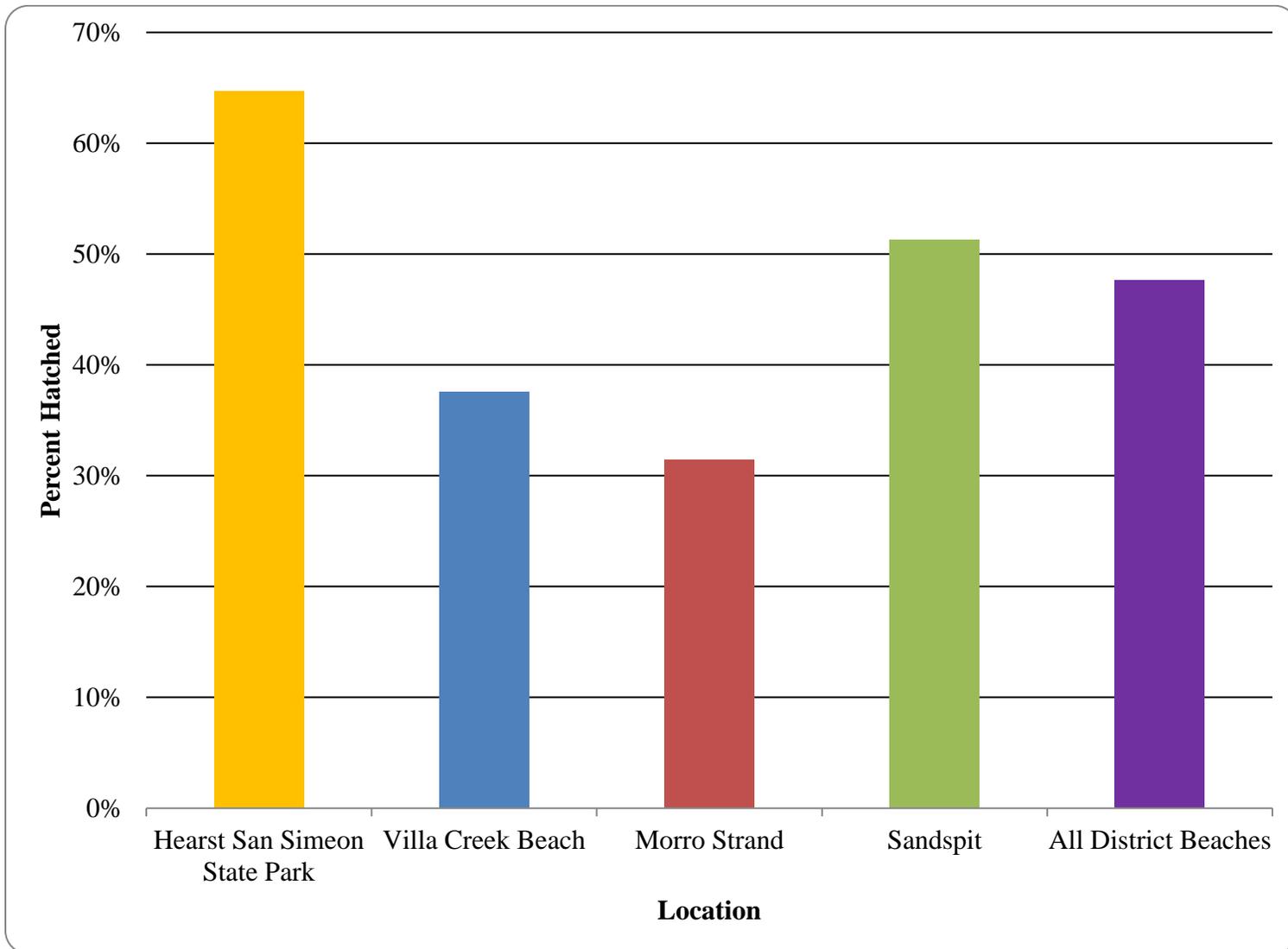
	2018		2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004 <sup>2</sup>		2003 <sup>2</sup>		2002 <sup>1,2</sup>		2001 <sup>1,2</sup>			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
<b>Sandspit</b>																																						
Total # of nests	169		226		238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109			
Total Depredated	50		63		98		108		24		30		74		51		35		23		20		59		46		69		48		9		29		50			
Coyote	39	78%	55	87%	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		0		0		0		1	2%
Domestic Dog	0		0		0		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		0		0		30	63%	7	78%	27	93%	43	86%		
American Crow	0		2	3%	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		0		0		0	
Gull Species	0		0		0		0		0		0		11	15%	0		0		0		0		0		0		10	14%	0		0		0		0		0	
Unknown Mammal	0		0		0		0		0		0	0%	0		0		0		0		0		0		0		0		1	2%	0		1	3%	2	4%		
Unknown Avian	5	10%	2	3%	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			
Unknown Predator	6	12%	4	6%	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		0		0		1	2%	0		0		0		0		0		0		1	2%	0		1	3%	0		0	
Unknown fate	6		3		1		6		7		3		5		3		2		2		1		0		5		7		0		12		34		2			
<b>Total # of Nests- ALL BEACHES</b>	<b>203</b>		<b>258</b>		<b>265</b>		<b>310</b>		<b>241</b>		<b>189</b>		<b>220</b>		<b>259</b>		<b>229</b>		<b>210</b>		<b>147</b>		<b>164</b>		<b>226</b>		<b>294</b>		<b>376</b>		<b>227</b>		<b>191</b>		<b>162</b>			
<b># Nests Depredated- ALL BEACHES</b>	<b>69</b>	<b>35%</b>	<b>74</b>	<b>29%</b>	<b>113</b>	<b>43%</b>	<b>123</b>	<b>41%</b>	<b>37</b>	<b>16%</b>	<b>46</b>	<b>25%</b>	<b>104</b>	<b>48%</b>	<b>70</b>	<b>27%</b>	<b>54</b>	<b>24%</b>	<b>55</b>	<b>27%</b>	<b>31</b>	<b>22%</b>	<b>80</b>	<b>49%</b>	<b>69</b>	<b>32%</b>	<b>86</b>	<b>30%</b>	<b>91</b>	<b>24%</b>	<b>56</b>	<b>26%</b>	<b>45</b>	<b>29%</b>	<b>60</b>	<b>38%</b>		

NOTES

1. Numbers for 2001-02 include City property.

2. HSSSP was not monitored in 2001 and 2002-04 numbers only include San Simeon Creek Beach.

Appendix 14 – Cumulative Nests and Fates 2001-2018



Appendix 14 – Cumulative Nests and Fates 2001-2018

