

ANNUAL REPORT
FOR THE WESTERN SNOWY PLOVER
AT SAN LUIS OBISPO COAST DISTRICT IN 2017

Submitted by

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Recovery Permit #TE-082237-6.6

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INTRODUCTION

This report summarizes the 2017 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.

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, most 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 2017 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-082237-6.6 was issued to CSP with the District Superintendent as the principal officer. Authorized individuals listed on the permit are Lisa Andreano, Charlotte Bailey, Brian Barandon, Sylvia Bauer, Vincent Cicero, Jeff Ebner, Woodrow Eggers, Matthew Fresquez, Margaret Harrington, Jodi Isaacs, Seth Ontiveros, Regena Orr, Nicola Petch-Baker, John Sayers, Taryn Schingler-Kinney, 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 2017 WSP breeding season are located along 45 miles of coastline in San Luis Obispo County, California (Appendix 1). Nesting activity 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 2017, 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 (USFS) and CSP. WSP utilize an approximately one-eighth mile stretch of a wide, fairly level area which is a mixture of sand and cobblestone substrate. The general nesting area is bordered to the north and east by San Carpoforo Creek, creating a small sandspit. East of the creek is a sandy area with sparse vegetation. Beyond the creek on the north end of the beach is a large sandy area littered heavily with driftwood and low-growing vegetation. 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 2017, 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)

This approximately one-mile long beach was divided into two sections for convenience. The northern section (Arroyo Laguna North) is bordered to the north by Adobe Creek and to the south by Oak Knoll Creek. To the east of this section of beach is grassland. The southern section (Arroyo Laguna South) is a sandy beach backed by dunes. During the rainy season, two creeks flow into this southern section of beach: a small unnamed creek near the geographic center, and Tortuga Creek near the southern boundary. 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. During the winter of 2016-17, large amounts of new driftwood were 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 connector trail leads from the parking lot to the Bluff Trail and Villa Creek Beach. Rains during the winter of 2016-17 allowed wetland areas at Villa Creek Beach to flow out to the ocean for the early part of the breeding season.

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 (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 2017 breeding season.

The Southern Unit, henceforth referred to as Morro Strand, is the main nesting area at Morro Strand and was monitored during the 2017 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 ten 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, southern end of the campground, 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 2017 breeding season due to the creek creating a lagoon in the area.

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 also lies 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 is 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 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, shells, and sand, Morro Strand consists primarily of flat sandy beach. This continues on to the City property which bounds the south. 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 still manages the habitat in this area by installing symbolic fencing and signage. Therefore, the nests found on the private property are included with the CSP nest numbers.

The length of the contiguous beach from the northern tip of the Sandspit to the southern end at Hazard Canyon is approximately five and 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 this season.

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, and surfboard.

Monitoring

Monitoring on District beaches in 2017 began March 7th and ended September 21st. Beaches within HSSSP were monitored approximately once per week from the beginning of March until the end of July, depending on the presence of adult WSP and historic nesting activity. 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 31 times between May 13th and September 16th. 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 August 28th, 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 2017 (Appendices 3 & 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 1st and January 31st, 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 24th and June 7th, 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 later entered into a computer database and shared via a listserv in order to determine the age and origin of the WSP (Appendices 5 & 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 2017 can be found in Appendix 8.

Determining Nest Fate

During the 2017 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 the 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.

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 two weeks. 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. The only HSSSP beaches to receive symbolic fencing in 2017 were San Simeon Creek Beach and San Carpoforo Creek Beach. They were fenced on April 11th and May 5th, respectively.

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.

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 on all District beaches with the exception of San Simeon Creek Beach and San Carpoforo Creek Beach, where fencing was removed on August 1st.

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 2017, 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 last year. The Morro Strand project, funded by the CDFW Office of Spill Prevention and Response, has been successful with both of the aforementioned plants being reduced to maintenance levels.

In June 2012, an ice plant control project was initiated in the Morro Dunes Natural Preserve within MDO. This effort is part of a larger exotic plant control project targeting key invasive species throughout the Morro Dunes Natural Preserve. The ice plant predominantly grows in the foredunes, covering open sandy areas that have potential to be WSP breeding habitat.

Between October 2016 and February 2017, a previously treated area of approximately 140 acres located between the Sandspit day use parking lot and Army Road received herbicide treatment at maintenance levels. Treatments occurred during this time in order to avoid work in these areas during the WSP breeding season. Back dunes treatments continued year round. It is expected that an increase in open, sandy areas will result from this project, thus providing more potential WSP nesting habitat.

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. This project was slated to start in November of 2016, but due to the contractor having issues with the dredge project prior to Morro Bay harbor, they did not start dredging until February 6, 2017. Where the spoils were being deposited is prime nesting habitat for WSP, so CSP required that the dredge outflow pipe be removed from Morro Strand prior to the official start of the nesting season on March 1st. The pipe was removed on February 28th. The dredge outflow pipe was then routed through Morro Bay harbor and out into the ocean to an offshore disposal site.

A high surf event occurred during the weekend of April 8th causing 6,000 feet of the dredge outflow pipe to break loose. 3,400 feet of the 14 inch pipe washed up onto the Sandspit on City and CSP property with the remaining pipe caught in the surf zone. A portion of the pipe washed ashore within 30 feet of an active WSP nest and damaged the symbolic fencing in the process. The contractor developed a plan to remove the pipe with Army Corps of Engineers, USFWS, City, and CSP review and approval. They separated the pipe into several hundred foot sections and then attempted pulling the pipe into the ocean with a boat. They were unsuccessful at getting any of the pipe off the beach. CSP and the contractor had WSP monitors on the beach during the entire nine hour operation. The WSP stayed on the nest adjacent to the pipe the entire time with the nest hatching the following week. The pipe then stayed on the beach for the remainder of the nesting season with several nests found close to the pipe.

A second attempt to remove the pipe with the help of two excavators on the beach occurred during the non-breeding season from November 2nd through 6th. WSP monitors were onsite again to monitor the removal efforts. This time the contractor was able to remove all of the pipe except for one 250 foot section, which was buried in the tidal zone. The contractor plans to return in early 2018 at a low tide to attempt removal of this pipe section.

In the meantime, one more 250 foot section of pipe washed up on the Sandspit at the far south end near Hazards. The contractor was able to pull this section off the beach by boat without having any equipment on the Sandspit. The contractor then pulled the pipe back to Morro Bay harbor and out of the water.

Predator Management

Monitors determined the presence of potential predators through either direct observation or by tracks. Predator removal activity took place between April 18th and June 30th and was conducted by United States Department of Agriculture (USDA) Wildlife Services. In total, USDA Wildlife Services spent 158 hours on predator removal activities within the District in 2017.

Methods for removing predators included shooting, calling, spot-lighting, and two types of trapping: cage and padded leg-hold. Shooting was performed with a 12 gauge shotgun using high density non-toxic shot. The calling method utilized a handheld or electronic device which produced a sound to lure the predator within range of a firearm. Calling effort is measured in hours spent projecting the call and tracking the target. Spotlighting was used to search for animals in the dark before pursuing with a firearm and is measured by hours spent beaming the light and tailing the target.

Cage traps are baited metal enclosures which are sized differently depending on the animal targeted. The leg trapping method consisted of a padded jaw trap which ensnared the leg of an animal. Effort for trapping is measured in “trap night” or “trap day”, which is when a trap is set in the early evening and checked in the early morning, or set in the morning and checked in the evening, respectively. All target species discovered in traps were immediately euthanized with an injection of sodium pentobarbital.

In past years, the District has used ten-foot by ten-foot single nest enclosures in an attempt to enhance hatch rate success at Morro Strand, a beach that typically has high rates of nest depredation. However, this practice was halted in the middle of the 2014 season when it was determined that the enclosures were ineffective in promoting hatching success due to high rates of abandonment. The abandonments were suspected to be due to the depredation of adult WSP. After losing 82% of the first nests to depredation, the District made the decision to start using enclosures again at Morro Strand. Enclosures were used on all nests found at Morro Strand for the rest of the season (5); all of these nests successfully hatched. In order to ensure compliance with protocol, enclosures were monitored regularly, with their effectiveness evaluated continually. See Appendix 9 for a summary of enclosed and unenclosed nest fates at Morro Strand.

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 well-being 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 4th. As in past years, WSP monitors again assisted Rangers with the enforcement of regulations on July 4th, 2017. 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 2017 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). The information kiosk at the Morro Strand Campground displayed WSP educational information. 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.

2017 also marked the twelfth 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 24th, one WSP monitor 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 40 visitors to the booth, most of whom were children.

On September 16th, two WSP monitors gave presentations on WSP to volunteers participating in the 31st Annual Coastal Cleanup Day at the Sandspit. The intent behind these presentations was to educate volunteers on the conservation status and general biology, lifecycle, 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 three talks to local organizations, two WSP programs conducted during the Morro Bay Winter Bird Festival, and one article in the Morro Bay National Estuary Program blog. CSP resources staff also gave five talks to other CSP employees and docents with the goal of educating them on the WSP program. In addition to these activities, WSP were also among the topics discussed by Morro Bay Museum of Natural History docents at the museum information desk, during their Nature Center programs, and during their approximately 50 different walks/discussions throughout the year.

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.

Volunteer Efforts

Volunteers, through their contributions of time and effort across a wide array of activities, are an integral part of the District's WSP program. In 2017, seven volunteers contributed 206 hours of service through WSP monitoring, outreach, attendance at monthly WSP meetings, training, conducting recreational surveys, and fencing (Table 1).

Table 1: Volunteer Hours and Activities in 2017.

Volunteer Activities	Hours
WSP Monitoring	175.5
Outreach	6
WSP Monthly Meetings	11
Recreational Surveying	7.5
Fencing	6
Total	206

In addition to these efforts, volunteers and WSP monitors worked together to remove approximately 900 pounds of trash and 50 pounds of recyclable materials from the Sandspit during Coastal Cleanup Day on September 16th.

RESULTS

Wintering WSP

To monitor wintering populations on District beaches, censuses were conducted from October 2016 through February 2017 (Table 2 & Appendix 10).

Table 2: Summary of Winter Census Results from District Beaches in 2017.

Location	# of Winter Censuses	Low Count	High Count	Average
<i>San Carpofooro Creek Beach</i>	5	4	24	13
<i>Point Sierra Nevada</i>	9	0	2	<1
<i>Arroyo de la Cruz</i>	5	0	0	0
<i>Sidney's Lagoon</i>	9	0	18	3
<i>Piedras Blancas</i>	5	0	5	1
<i>Arroyo Laguna</i>	13	0	138	61
<i>San Simeon Creek Beach</i>	16	0	157	55
<i>Santa Rosa Creek Beach</i>	10	0	2	<1
Hearst San Simeon State Park	21	0	187	84
Villa Creek Beach	18	0	75	36
<i>Morro Strand North (Old Creek)</i>	11	0	22	2
<i>Morro Strand South</i>	21	0	145	39
Morro Strand	23	0	145	37
Sandspit ¹	17	36	233	129

1. Data does not include City property

District beaches have historically provided high quality wintering habitat for wintering WSP. Several of the beaches in HSSSP in particular continue to be more popular with wintering WSP than with breeding season activity. Overall, the combined average and estimated population across all District beaches was 286 individuals.

One of the winter censuses, conducted on January 24th, was part of the annual range-wide winter window survey for the U.S. Pacific Coast. Overall, a minimum of 276 WSP were observed across all District beaches during the 2017 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 10). The USFWS Recovery Plan for WSP defines the breeding bird management potential for WSP beaches, however, Santa Rosa Creek Beach and Old Creek do not have defined potentials. One of the May censuses was part of the annual range-wide breeding window survey (Table 3 & Appendix 4). This survey was conducted on May 23rd at Villa Creek Beach, Morro Strand, and the Sandspit. The survey for HSSSP was conducted on May 24th.

Table 3: Breeding Window Survey Results on District Beaches in 2017.

Location	Male	Female	Unknown	Juvenile	Chick	Total ¹	BBMP ²
<i>San Carpofo Creek Beach</i>	1	2	0	0	0	3	10
<i>Point Sierra Nevada</i>	0	0	0	0	0	0	0
<i>Arroyo de la Cruz</i>	0	0	0	0	0	0	0
<i>Sidney's Lagoon</i>	0	0	0	0	0	0	0
<i>Piedras Blancas</i>	0	0	0	0	0	0	0
<i>Arroyo Laguna</i>	2	3	0	0	0	5	6
<i>San Simeon Creek Beach</i>	0	0	0	0	0	0	0
<i>Santa Rosa Creek Beach</i>	0	0	0	0	0	0	0
Hearst San Simeon State Park	3	5	0	0	0	8	16
Villa Creek Beach	2	4	0	0	0	6	25
<i>Morro Strand North (Old Creek)</i>	-	-	-	-	-	-	-
<i>Morro Strand South</i>	1	1	0	0	0	2	36
Morro Strand	1	1	0	0	0	2	36
Sandspit ³	71	68	10	0	6	149	82
District	77	78	10	0	6	165	159

1. Total does not include juveniles or chicks

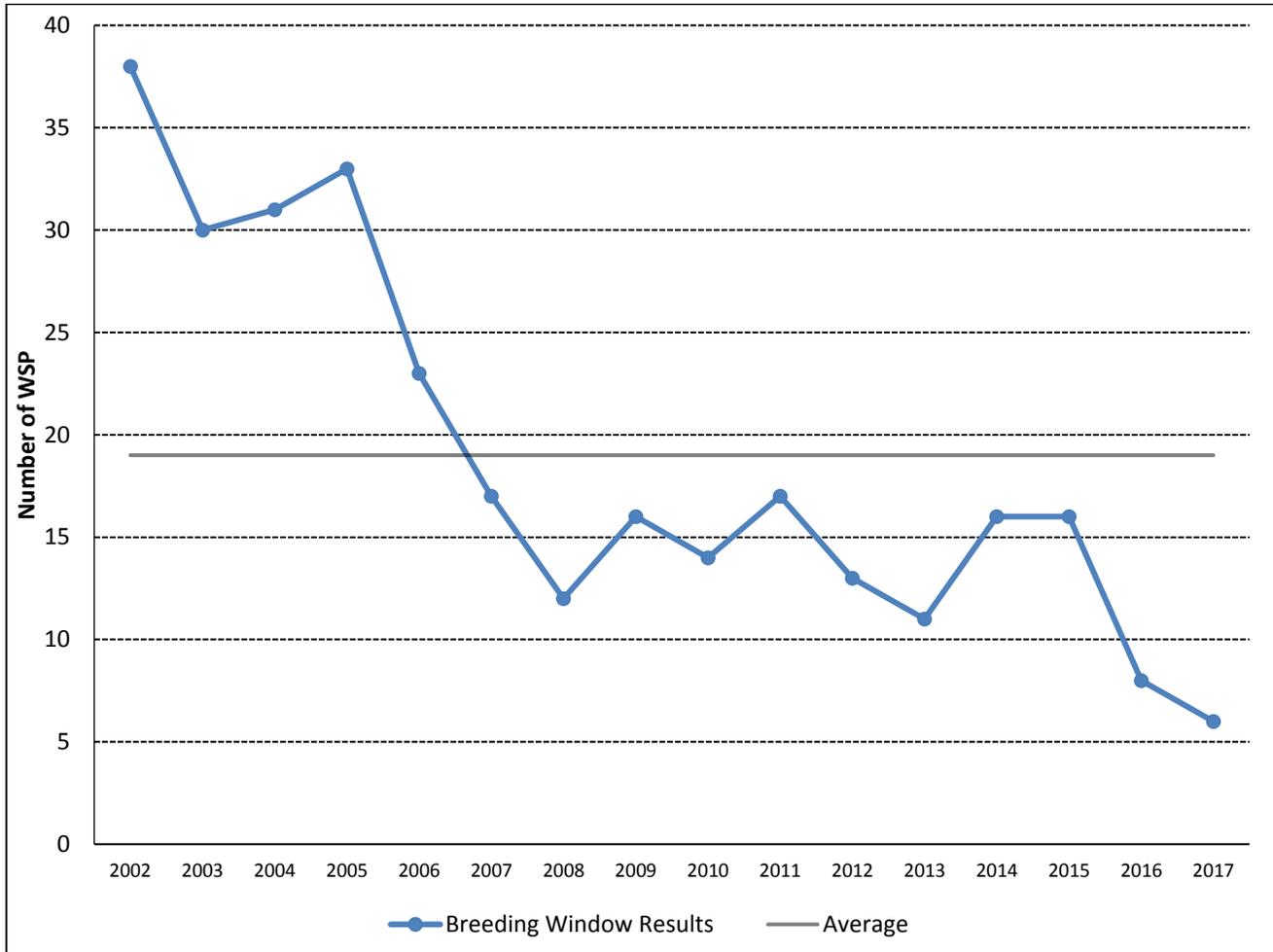
2. BBMP = Breeding Bird Management Potential

3. 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).

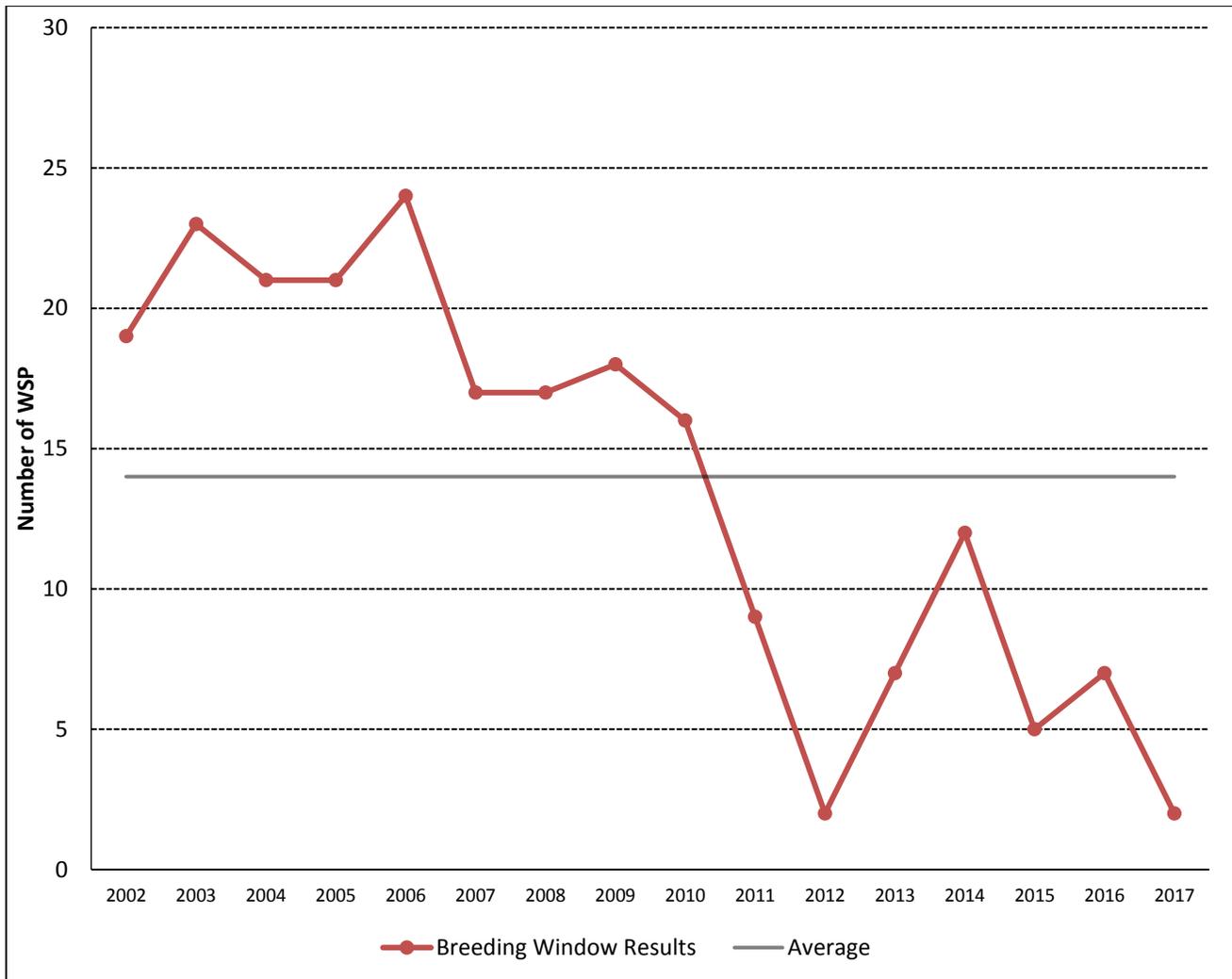
While the breeding WSP population on HSSSP beaches has historically been low and remains so, Villa Creek Beach has seen a steady decline since 2002, when the beach was first made publicly accessible (Figure 1).

Figure 1: Breeding Window Survey Results at Villa Creek Beach from 2002-2017.



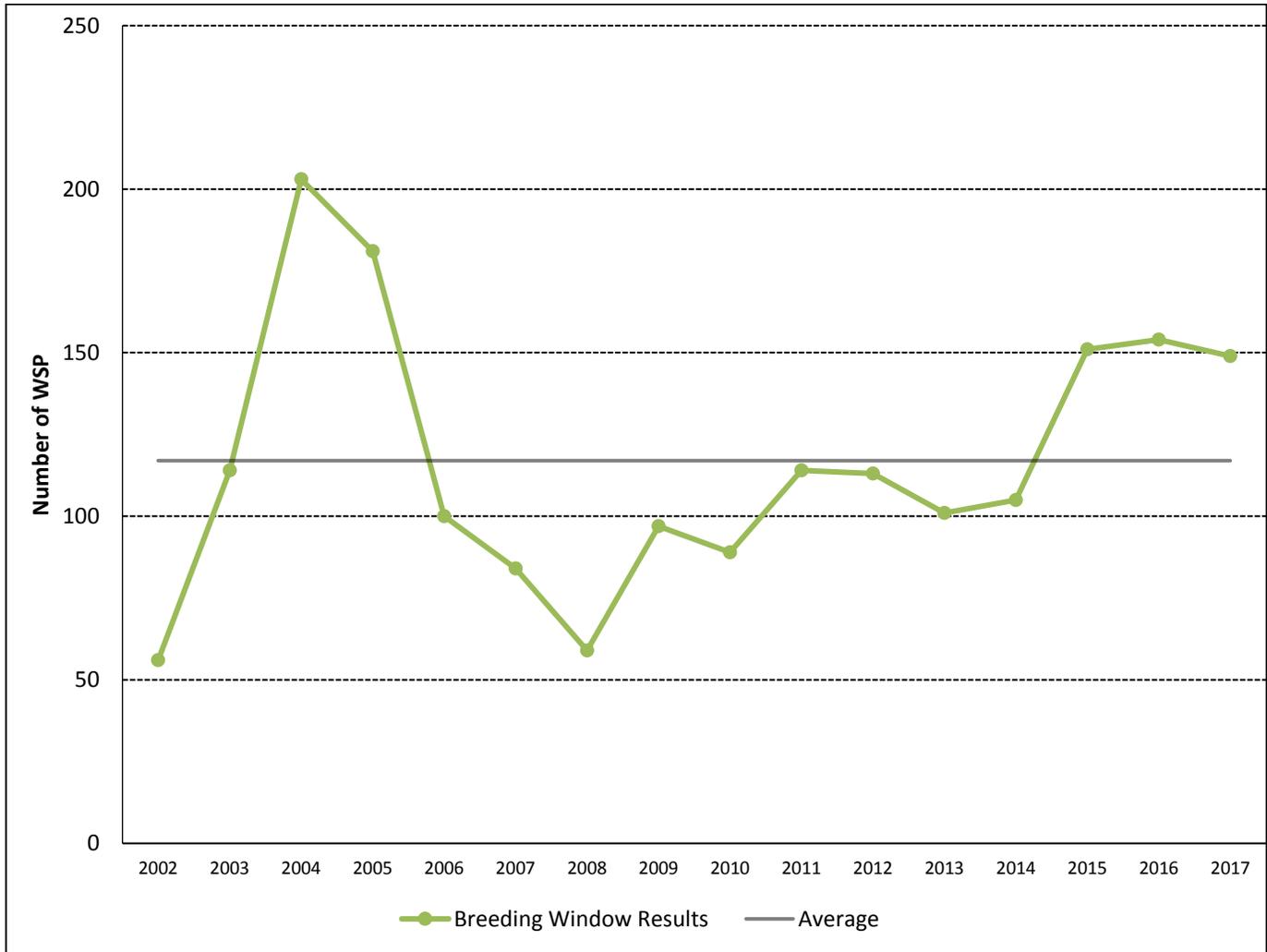
Morro Strand has also seen a decline in breeding WSP since 2002 (Figure 2).

Figure 2: Breeding Window Survey Results at Morro Strand from 2002-2017.



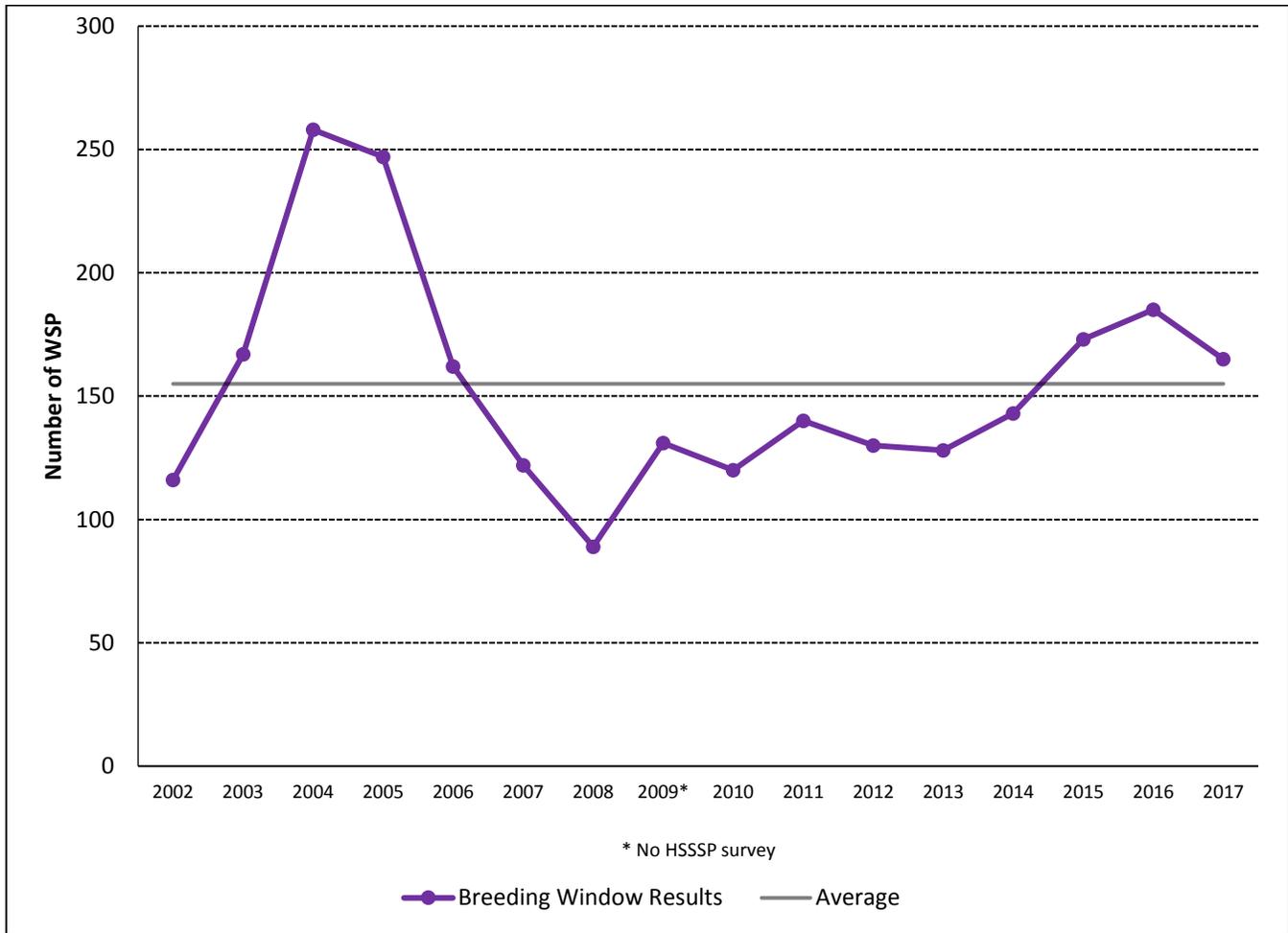
In contrast to the population declines at Villa Creek Beach and Morro Strand, the Sandspit has seen a general increase in its breeding WSP population since 2008 (Figure 3).

Figure 3: Breeding Window Survey Results at the Sandspit from 2002-2017.



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).

Figure 4: Cumulative Breeding Window Survey Results on District Beaches from 2002-2017.



Districtwide breeding window survey results from 2017 show an overall slight decrease in breeding WSP compared to the previous two years. However, this number (165) still sits above the Districtwide average from the previous 15 years (155).

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 second year that banded WSP sightings from eBird were included in the District’s banded bird database. From October 2016 through September 2017, banded WSP with confirmed band combinations were observed on 1,644 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 1,644 sightings, 110 unique band combinations were observed. Seventy-seven unique combinations were sighted over the winter season (October 2016 through February 2017), and 80 were seen during the breeding season (March through September 2017). Forty-seven of the 110 banded WSP were seen during both the winter and breeding seasons. The banding locations of WSP observed on District beaches during the 2017 season are located in Table 4.

Table 4: Banding Locations of WSP Observed on District Beaches October 2016-September 2017.

Banding Location	# of WSP
Oceano Dunes State Vehicular Recreation Area (ODSVRA)	42
Vandenberg Air Force Base (VAFB)	30
Fort Ord State Park (SP)	7
Marina State Beach (SB)	6
Oregon	6
Salinas National Wildlife Refuge (NWR)	5
Pajaro Spit	4
Zmudowski SB	2
Coronado Naval Air Station, Sea World, San Diego	1
Humboldt Bay	1
Monterey SB	1
Moss Landing SB	1
Moss Landing Salt Ponds	1
Pajaro Dunes	1
Salinas SB	1
San Francisco Bay	1

Twenty-seven of the banded WSP seen between March 1st and September 30th had the potential to breed on District beaches. These banded WSP accounted for 16% of the District’s adult breeding population. This percentage was found by taking the number of banded WSP with breeding potential and dividing by the District total of WSP during the breeding window survey.

Forty-one banded fledges were recorded on District beaches. The banding locations of WSP fledges observed on District beaches between October 2016 and September 2017 are located in Table 5.

Table 5: Banding Locations of WSP Fledges Observed on District Beaches October 2016-September 2017.

Banding Location	# of WSP Fledges
ODSVRA	16
VAFB	14
Marina SB	3
Fort Ord SP	2
Oregon	2
Pajaro Spit	2
Salinas NWR	1
Salinas SB	1

Banded WSP were observed frequently on District beaches between October 2016 and September 2017. The most frequently observed were gg:og (92 sightings), ow:wr (77 sightings), rr:ww (70 sightings), wa:ga (69 sightings), gg:pb (68 sightings), oa:ya (57 sightings), and bb:gb (56 sightings). Four of these WSP fledged from ODSVRA, two fledged from Pajaro Spit, and one from Fort Ord 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

Two WSP with unique band combinations were sighted at San Carpoforo Creek Beach. One was seen during the winter season, and one was seen during both the winter season and the breeding season. Rw:br was seen in the winter and breeding season and 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. Rw:br was with one of the two nests at San Carpoforo Creek Beach. One of the nests had an unknown fate, while the other failed to an unknown predator. Rw:br has nested successfully at San Carpoforo Creek Beach in prior years. The other banded WSP seen during the winter season fledged from Monterey SB in 2015.

Arroyo Laguna

A total of 31 WSP with unique band combinations were observed at Arroyo Laguna. Nineteen of these individuals were seen only during the winter season, four only during the breeding season, and eight during both seasons.

Between October 2016 and September 2017, a total of ten banded juveniles were sighted at Arroyo Laguna. Three of the juveniles fledged from ODSVRA, two from Pajaro Spit, and one each from Fort Ord SP, Marina SB, Salinas NWR, Salinas SB, and VAFB.

The most frequently observed banded WSP seen at Arroyo Laguna during the 2017 season were go:gb, no:wb, ro:yl, and w:ob (all with ten sightings each). These birds fledged from Fort Ord in 2015, Marina SB in 2016, and VAFB in 2013 and 2016.

Point Sierra Nevada

One unique band combination was seen at Point Sierra Nevada between October 2016 and September 2017. Banded WSP vg:yy was seen once in the winter season as a juvenile from ODSVRA.

Sidney's Lagoon

Three unique band combinations were seen at Sidney's Lagoon between October 2016 and September 2017. All three banded WSP were seen once during the winter season as juveniles and fledged from ODSVRA, Salinas SB, and VAFB.

San Simeon Creek Beach

A total of 18 unique band combinations were seen on San Simeon Creek Beach. Twelve of these individuals were seen only during the winter season and six during both seasons.

Four banded juveniles were sighted at San Simeon Creek Beach between October 2016 and September 2017. Two fledged from Pajaro Spit and two from VAFB.

The most frequently observed banded WSP seen at San Simeon Creek Beach were an:yy (five sightings), an adult that fledged from VAFB in 2015; and aw:ll (five sightings), which was first seen as a juvenile during the winter season and fledged from Pajaro Spit.

Other Hearst San Simeon State Park Beaches

Arroyo de la Cruz, Piedras Blancas, and Santa Rosa Creek Beach were all monitored during the 2017 season but had no banded WSP present.

Villa Creek Beach

A total of 16 unique band combinations were observed on Villa Creek Beach. Ten of these 16 banded WSP were seen only during the winter season, five only during the breeding season, and one during both seasons.

The most frequently observed banded WSP during the 2017 season on Villa Creek Beach was ow:wr (77 sightings). A female who fledged from Fort Ord SP in 2015, ow:wr, was the only banded WSP on Villa Creek Beach to be confirmed as actively nesting. She had three nests on Villa Creek Beach during the 2017 season. Of these nests, one hatched, one failed due to an unknown predator, and the other failed to abandonment.

Between October 2016 and September 2017, a total of nine banded juveniles were seen at Villa Creek Beach. Three fledged from ODSVRA, three fledged from VAFB, and one each fledged from Fort Ord SP, Marina SB, and Pajaro Spit.

Morro Strand

A total of 52 unique band combinations were observed at Morro Strand. Ten of these WSP were seen only during the winter months, 31 were seen only during the breeding season, and 11 were seen during both seasons.

The most frequently observed banded WSP at Morro Strand during the 2017 season was vv:or (48 sightings). An adult male, vv:or fledged from ODSVRA in 2015 and had one successful nest at Morro Strand this year. He may have been associated with one other nest on the Morro Strand that failed to an

unknown predator. In addition to this failed nest, vv:or was with a nest located on private property to the north of Morro Strand that also failed and with a nest on the Sandspit that failed to coyote (*Canis latrans*) depredation.

The second most frequently observed banded WSP at Morro Strand was v:w (36 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 since 2009. During the 2017 breeding season he nested successfully once at Morro Strand. He had another nest that failed to striped skunk (*Mephitis mephitis*) depredation and was possibly associated with two other nests that failed to predators. He was paired with a banded female (b:or) for both confirmed nests.

A female who fledged from VAFB in 2013, b:or, was seen 29 times at Morro Strand during the 2017 season. As previously stated, b:or was paired with v:w and successfully hatched one nest at Morro Strand and had one nest that failed to striped skunk.

Another female who fledged from VAFB in 2014, ny:ry, was seen 11 times at Morro Strand this season. During the 2017 season, ny:ry had one nest at Morro Strand that failed due to American Crow (*Corvus brachyrhynchos*) depredation. She also had a nest on the City property of the Sandspit that successfully hatched.

Between October 2016 and September 2017, a total of 16 banded juveniles were observed at Morro Strand. Seven of these juveniles fledged from ODSVRA, six from VAFB, two from Marina SB, and one from Fort Ord SP. One additional banded WSP from ODSVRA could not be confirmed as being a juvenile due to the use of the same band combination in two consecutive years.

Sandspit

A total of 67 unique band combinations were observed on the Sandspit this year. Seventeen were seen only during the winter months, 25 were seen only during the breeding season, and 25 were seen during both seasons.

The most frequently observed banded individual at both the Sandspit and all District beaches during the 2017 season was gg:og (92 sightings). A 2014 fledge from ODSVRA, gg:og was seen exclusively on the Sandspit during the 2017 season. He successfully hatched two nests this season, one of which produced two fledges. He potentially had one more nest on the Sandspit.

The next most frequently observed banded WSP on the Sandspit this season was rr:ww (69 sightings). A fledge from ODSVRA in 2010, rr:ww is a male and successfully hatched two nests and lost another nest due to tide on the Sandspit. He also potentially had an additional nest that hatched on the Sandspit.

A fledge from Pajaro Spit in 2014, wa:ga (68 sightings) is a male that successfully hatched one nest on the Sandspit this season from which two chicks fledged. He lost an additional two nests to coyote depredation and one to tidal wash.

A fledge from ODSVRA in 2014, gg:pb, a female, was seen 60 times and successfully hatched two nests on the Sandspit this year. One additional nest failed to American Crow.

A 2015 ODSVRA fledge, bb:gb, a male, was seen 56 times on the Sandspit and had one successful nest with one confirmed fledge. He potentially had three additional nests, which all failed – two to tidal wash and one to coyote.

Eleven other banded WSP, several of which were among the most frequently observed birds on the Sandspit, also successfully hatched nests on the Sandspit this year. Three of these banded WSP also had nests that failed on the Sandspit. Two WSP lost nests to coyote depredation, and another lost a nest to tide.

Twenty-four banded juveniles were observed on the Sandspit between October 2016 and September 2017. These juveniles included 11 from ODSVRA, eight from VAFB, two from Pajaro Spit, two from Oregon, and one from Marina SB. One additional banded WSP from ODSVRA could not be confirmed as being a juvenile due to the use of the same band combination in two consecutive years.

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 adult female, one unbanded adult male, one unbanded adult with an unknown sex, and one unbanded WSP with an unknown sex and age were reported as injured on District beaches during the 2017 season. Three dead WSP chicks were found. See Appendix 7 for a summary of the injured WSP on District beaches from October 2016 through September 2017.

Hearst San Simeon State Park

No injured or dead WSP were observed in HSSSP during the 2017 season.

Villa Creek Beach

No injured or dead WSP were observed on Villa Creek Beach during the 2017 season.

Morro Strand

One injured WSP and one dead WSP were observed on Morro Strand during the 2017 season.

On March 14th, an adult WSP of unknown sex without bands was observed never lowering one leg. The WSP appeared to be moving around without difficulty, so no action was taken to capture it.

On July 31st, a WSP chick was found dead in the nest bowl of nest MS13 after hatching five days later than the other two chicks. Adult WSP were no longer attending the nest. USFWS was notified and the incident was documented with photographs. The carcass was collected for deposition at Santa Barbara Natural History Museum (SBNHM).

Sandspit

Between October 2016 and September 2017, three injured WSP and two dead WSP were observed on the Sandspit.

The first injured bird was observed on October 5th. This unbanded WSP of unknown sex and unknown age was noted as missing a leg. This WSP was able to move without difficulty, so no action was taken to capture it.

On November 6th, an adult female WSP, banded rb:bg, was noted as having tar on the rb bands on the left leg. The tar was not seen on November 29th or other subsequent sightings.

The third injured WSP was observed on July 12th. This unbanded adult male WSP was seen with its right foot curled back under its leg. No substances were seen on the foot or leg. This WSP was seen three subsequent times in July, behaving normally during each observation. No action was taken to capture this WSP.

The first dead WSP was found on May 12th. This unbanded chick was found within 100 feet of nests SSS010 and SSS026 inside the symbolically fenced habitat. USFWS was notified, and the incident was documented with photographs and a GPS point. The carcass was collected and sent for necropsy. Necropsy results revealed signs of trauma from an unknown cause.

The second dead WSP was found on July 31st. This unbanded chick was found desiccated inside the symbolically fenced habitat. USFWS was notified, and the incident was documented with photographs and a GPS point. No cause of death was apparent. The carcass was collected for deposition at SBNHM.

Nest and Egg Numbers

There were 258 nests with 692 eggs found on District beaches in 2017 (Table 6).

Table 6: Number of Nests Found by Year at District Beaches 2004-2017.

Location	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HSSSP	0	5	11	6	2	2	0	0	3	0	0	1	1	2
Villa Creek Beach	66	37	40	30	16	38	26	21	31	20	23	24	10	14
Morro Strand	38	27	34	19	33	26	24	25	12	12	17	13	16	16
Sandspit	272	225	141	109	96	144	179	213	174	157	201	272	238	226
Total	376	294	226	164	147	210	229	259	220	189	241	310	265	258

Appendix 11 depicts the number of nests found by month on all District beaches from 2004 through 2017. In 2017, the month with the greatest number of nests found was May (91), followed by June (68), April (59), July (20), March (19), and August (1).

Tables in Appendix 11a provide a summary of nest initiation and last hatch dates for all District beaches from 2002 through 2017. The first nest in 2017 was discovered on March 15th, and the last hatch was on August 9th. The length of the 2017 nesting season for the entire District was 176 days, as calculated from the date of the first nest's discovery to the date of the last known fledge.

Appendix 11b includes a graphic presentation of the number of active nests as of Friday of each week of the breeding season for all District beaches. The 2017 season began slowly, with minor fluctuations until a significant increase the second week of April. There was a second significant increase during the week of May 5th, followed by a decrease in number of nests during the week of May 19th. Nest numbers peaked again during the week of June 9th, followed by a significant decrease during the week of June 23rd, where nest numbers nearly halved. There was one more increase in nest activity, peaking the week of July 14th and then decreasing until the end of the breeding season. During the peak active nesting period (April through July), the weekly average of total active nests throughout all beaches was 44. The peak period for nesting in the District occurred during the weeks of May 12th and June 9th, with 61 active nests both weeks. During the week of May 12th, 55 of these nests were on the Sandspit. During the week of June 9th, 58 of these nests were on the Sandspit.

A total of 122 nests failed on all District beaches in 2017. Appendix 11c depicts the timing of nest failures on District beaches at the end of each week during the breeding season. Compared to other weeks of the breeding season, an exceptionally high rate of nest failure occurred during the week ending on June 23rd, when 18 nests were lost. Losses were also high during the week ending on May 19th with 15 nests lost.

In addition to the 122 failed nests on District beaches in 2017, 132 nests hatched (for a hatch rate of 52%), and four nests had unknown fates. Appendix 11d shows nest fates for all District beaches from 2001 through 2017, while Appendix 11e provides a graph depicting the number of nests hatched each year from 2001 through 2017 on all District beaches. The average number of nests hatched for all beaches throughout the years is 108. Appendix 11f provides a graph depicting the number of nests hatched by month each year from 2005 through 2017 on all District beaches. July saw the highest number of hatches in 2017 with 45 nests hatching across the District. The average number of nests hatched per month in 2017 was 26.

During the 2017 nesting season, dead WSP, abandoned, tide washed, dropped, or unhatched eggs were collected on District beaches for SBNHM as authorized by the Ventura Fish and Wildlife Office (Appendix 12). The embryonic development of 63 eggs was analyzed. Forty-five eggs had no evidence of fertilization (9% of analyzed and hatched eggs), four eggs had one week or less of development, two eggs had two weeks of development, 11 eggs had three weeks of development, and one egg had a fully developed chick.

Hearst San Simeon State Park

The eight beaches comprising HSSSP showed varying levels of nesting activity throughout the 2017 breeding season. Two beaches, Arroyo de la Cruz and Piedras Blancas, hosted neither WSP nor nesting 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. Some degree of nesting activity was observed at the following three beaches: San Carpoforo Creek Beach, Arroyo Laguna, and San Simeon Creek Beach.

San Carpoforo Creek Beach

Adult WSP were observed on three censuses at San Carpoforo Creek Beach during the breeding season. WSP were seen in April, May, and September. Two nests were found on May 5th. One nest failed to an

unknown predator, however, dog or coyote tracks were seen within three feet of the nest bowl. The second nest had an unknown fate, as the predicted hatch date was May 28th, but the nest was first observed empty on June 1st. The nest bowl was intact, but no WSP or chicks were seen nearby, so the fate of the nest was inconclusive. See Appendix 13 for a nest location map.

Arroyo Laguna

Adult WSP were seen on four censuses at Arroyo Laguna during the breeding season, however, neither scrapes nor nests were discovered in 2017.

San Simeon Creek Beach

The area utilized for breeding in previous years was symbolically fenced in 2017. Adult WSP were spotted on four censuses throughout the breeding season, however, no evidence of nesting activity was found.

Villa Creek Beach

A total of 14 nests were found at Villa Creek Beach during the 2017 breeding season (Table 7). The first nest was initiated on April 12th, and the last nest was found on July 12th. The first nest hatched on May 13th, and the last nest hatched on August 9th. The weeks with the greatest number of active nests on Villa Creek Beach ended on July 7th and July 14th with five active nests.

Table 7: Number of Nests Found by Month at Villa Creek Beach 2004-2017.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
March	3	2	2	3	2	7	0	0	0	0	2	2	0	0
April	23	14	10	7	4	13	5	7	5	4	6	6	4	3
May	21	9	15	12	3	8	7	6	10	5	9	11	4	4
June	18	12	8	5	5	7	13	4	10	5	4	5	1	4
July	1	0	3	3	2	3	1	4	6	6	2	0	1	3
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	66	37	38	30	16	38	26	21	31	20	23	24	10	14

Fates were determined for all 14 nests (Table 8). Ten nests hatched successfully (71%) and four failed (29%). Two of the failed nests were lost to abandonment, one to tide, and one to an unknown predator. The abandoned eggs were analyzed to determine embryonic development at SBNMH. (Appendix 12) Both abandoned nests had no evidence of fertilization. See the Depredation section for more information on nest lost to a predator.

Table 8: Nest Fates and Percentages for Villa Creek Beach in 2017.

Total Nests	14	% Total	
Unknown Fate	0	0%	
Total With Known Fate	14	100%	
Hatch	10	71%	
Fail	4	29%	% Failed
Abandoned	2	14.3%	50%
Depredated	1	7.1%	25%
Tide	1	7.1%	25%

The 14 Villa Creek Beach nests in 2017 produced a total of 34 eggs. Nine nests had a clutch size of three, two had a clutch size of two, and one had a clutch size of one. Two nests had an unknown clutch size. One nest experienced a reduction in clutch size from three eggs to one egg. The same nest experienced a change in egg location where one egg moved approximately four inches out of the nest bowl after the reduction in clutch size. Out of the 34 total eggs, 25 eggs (74%) hatched. Monitors also found one dropped egg on the beach that was not attributed to any active nests and not included in the total number of eggs.

Table 9 shows the distribution of nests and their fates at Villa Creek Beach for the 2017 breeding season. The most common WSP nest locations were in the middle and northern sections of the beach, including the back area.

Table 9: Nest Distribution and Fate at Villa Creek Beach in 2017.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests
Back Area¹	2	14%	1	10%	1	25%
West of Villa Creek²	1	7%	0	0%	1	25%
Main Beach: North	2	14%	1	10%	1	25%
Main Beach: Middle	6	43%	5	50%	1	25%
Main Beach: South	3	21%	3	30%	0	0%
Pocket Beaches	0	0%	0	0%	0	0%
Total	14	100%	10	100%	4	100%

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 2017. 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 2017, the majority of the nests (79%) were located on the main beach. See Appendix 1 for a map with area distinctions and Appendix 13 for nest locations.

Table 10: Distribution of Nests at Estero Bluffs State Park 2001-2017.

Year	West of Villa Creek ¹	Back Area ²	Main Beach	Pocket Beaches	Cayucos Point ³	Total
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 16 nests were found at Morro Strand during the 2017 breeding season (Table 11). The months of April and June were the most prolific in terms of the number of new nests (six each). The first nest was found on March 27th, and the last nest was found on July 7th. The first hatch occurred July 18th, and the last hatch occurred on August 1st. In 2017, the two weeks with the greatest number of active nests on Morro Strand (5) ended on July 7th and July 14th.

Table 11: Number of Nests Found by Month on Morro Strand 2004-2017.

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

Fates were determined for all 16 nests (Table 12). Five nests hatched successfully (31%), and 11 nests failed (69%). Of the nests that failed, nine nests were depredated, one was abandoned, and one failed due to an unknown cause. See the “Depredation” section for information on the nests lost to predators.

Table 12: Nest Fates and Percentages for Morro Strand in 2017.

Total Nests	16	% Total	
Unknown Fate	0	0%	
Total With Known Fate	16	100%	
Hatch	5	31%	
Fail	11	69%	% Failed
Abandoned	1	6.3%	9%
Depredated	9	56.3%	82%
Unknown Fail	1	6.3%	9%

The 16 Morro Strand nests in 2017 produced a total of 41 eggs. Eleven nests had a clutch size of three, three had a clutch size of two, and two had a clutch size of one. One nest experienced a reduction in clutch size from two eggs to one. Out of the 41 total eggs, 15 eggs (37%) hatched. Monitors did not find any dropped eggs on Morro Strand.

The distribution of nests and their fates within each beach segment in 2017 is shown in Table 13. The section with the highest number of nests (9 of the 16 known nests) was between Azure and Boardwalk Corridors. The two northernmost nests of the season were found between the Hatteras and Easter Street Corridors. Only one of these two nests hatched.

Table 13: Nest Distribution and Fate at Morro Strand in 2017.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests
Campground-Hatteras	0	0%	0	0%	0	0%
Hatteras-Azure	4	25%	2	40%	2	18%
Azure- Boardwalk	9	56%	2	40%	7	64%
Boardwalk-Hwy 41	3	19%	1	20%	2	18%
Total	16	100%	5	100%	11	100%

WSP nest distribution among Morro Strand beach segments from 1993 through 2017 is shown in Table 14. The number of WSP nests in 2017 was relatively low, continuing an overall trend of fewer nests on Morro Strand. However, the distribution of nests was consistent with the trend of most nests occurring between the Azure and Boardwalk Corridors.

Table 14: Distribution of Nests at Morro Strand 1993-2017.

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

See Appendix 1 for a map with area distinctions and Appendix 13 for nest locations.

Sandspit

A total of 226 nests were found on the Sandspit this year (Table 15). Eighty-four nests were found in the month of May, comprising 37% of the season total – the highest monthly rate of nest initiation. One hundred thirty-seven nests were found on the northern half of the Sandspit, and 89 were found on the southern half. The first nest was found on March 15th, and the last nest was found on July 19th. One additional nest was not found until a chick was seen being attended by an adult on the beach on August 15th. The first hatch occurred on April 19th, and the last hatch occurred on August 8th. The week with the maximum number of active nests on the Sandspit ended on June 9th with 58 active nests.

Table 15: Number of Nests Found by Month at the Sandspit 2004-2017.

Month	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
March	18	2	0	2	10	14	8	10	4	21	39	31	5	17
April	77	44	33	23	18	40	57	54	39	39	32	62	51	50
May	90	48	41	41	27	32	47	63	42	34	60	81	55	84
June	81	100	44	30	27	39	53	69	57	46	48	68	77	58
July	6	29	22	11	14	19	14	14	27	17	22	29	50	16
August	0	2	1	2	0	0	0	3	5	0	0	1	0	1
Total	272	225	141	109	96	144	179	213	174	157	201	272	238	226

A summary of nest fates for this season on the Sandspit can be found in Table 16. Of the 226 nests found, fates were determined for 223 nests. One-hundred seventeen nests hatched successfully (52%). Two successful nests were found on the day they hatched.

Table 16: Nest Fates and Percentages for the Sandspit in 2017.

Total Nests	226	% Total	
Unknown Fate	3	1%	
Total With Known Fate	223	99%	
Hatch	117	52%	
Fail	106	48%	% Failed
Abandoned	18	8%	17%
Depredated	63	28%	59%
Tide	18	8%	17%
Wind	6	3%	6%
Other	0	0%	0%
Unknown Fail	1	<1%	1%

Of the 617 eggs produced a total of 307 (50%) hatched. In one instance, it was unknown whether two or three eggs hatched from a three-egg clutch. The number of eggs hatched (307) presumes that only two of these eggs hatched. One hundred eighty-three nests had a clutch size of three, 25 had a clutch size of two, and 18 had a clutch size of one. Ten dropped eggs were never attributed to any active nests and were not included in the total egg or nest numbers.

Of the 226 nests found, 63 nests were depredated (28%). See the “Depredation” section for information on nests lost to predators.

Eighteen nests (8%) failed due to abandonment on the Sandspit. Of the 18 nests abandoned; eight nests had three eggs; three nests had two eggs; and seven nests had one egg. All abandoned nests were monitored for WSP tracks or other signs of activity for at least one week after the first indication of inactivity. Nesting activity never resumed at any of these nests. The abandoned eggs were analyzed to determine embryonic development at SBNHM. All seven one egg clutches had no evidence of fertilization. Two of the two egg clutches also had no evidence of fertilization. The other two egg

clutches had three week old embryos. Four of the three egg clutches had no evidence of fertilization. Three of the three egg clutches had three week old embryos. The final abandoned three egg clutch had two eggs with one week old embryos and one egg with no evidence of fertilization.

Eighteen nests failed due to high tides (8%) and high winds claimed six nests (3%). One nest (<1%) failed for an unknown reason. This nest was lost either to wind or a predator.

Three nests were classified as having an unknown fate this season (1%). All three nests were two egg nests. There was no evidence of pips or chicks to confirm a hatch at any location. There was also no evidence of predator tracks. A single egg was found buried at one nest location three weeks later and collected. Embryonic development analysis later revealed that the egg had no evidence of fertilization. One other egg was collected at another nest location. Egg processing later revealed that a chick was fully developed inside the egg. The decision was made to leave the fate as unknown because the fate of the other egg in the clutch could not be determined. The nest bowl had been blown over, and the remaining egg found three feet away.

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. Ten nests, all starting with three eggs, experienced clutch size reductions in 2017. Five of these nests hatched despite losing an egg, and the other five eventually failed. Six nests were reduced to two eggs, while four nests were reduced to one egg.

Causes of clutch size reduction include events such as high tide, high wind, and egg depredation. This year, three nests lost eggs after high tide events and one was depredated by a coyote. Two additional nests likely also lost an egg to coyote depredation based on evidence of nearby tracks. The remaining four nests had their clutches reduced by unknown causes. Of the nests that eventually failed, two were abandoned, one was depredated by a coyote, one was washed by tide, and one failed due to an unknown cause.

There were 17 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 one to ten feet. Three of these nests experienced a reduction in clutch size in conjunction with the movement of the nest bowl. Six of these nests were moved during periods of high surf, and another nest was likely moved due to high winds. Of the 17 nests that moved, 11 hatched and six failed. Of the nests that failed, four failed due to tidal wash, one was abandoned, and one failed to an unknown cause.

In 2017, the highest number of Sandspit nests occurred between RM 5 and RM 4 (46). The area between RM 6 and RM 5 had almost as many nests (45). RM 5 to RM 4 had the most number of hatches (19). The area between RM 6 and RM 5 had the highest number of failed nests (33). Two WSP nests were also found within a section of habitat south of American Canyon Trail, an area approximately one half mile long known as South Hazards. In addition, a WSP chick was seen in South Hazards, but the nest was not found by monitors. 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 2017 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 2017.

Area	# of Nests	% of Total Nests	Hatch	% of Hatched Nests	Fail	% of Failed Nests	Unknown Fate	% of Unknown Fates
SPB-RM6	17	8%	10	9%	6	6%	1	33%
RM6-RM5	45	20%	12	10%	33	31%	0	0%
RM5-RM4	46	20%	19	16%	27	25%	0	0%
RM4-RM3	37	16%	17	15%	18	17%	2	67%
RM3-RM2	18	8%	11	9%	7	7%	0	0%
RM2-RM1	28	12%	18	15%	10	9%	0	0%
RM1-SST	20	9%	18	15%	2	2%	0	0%
SST-HAZ	12	5%	10	9%	2	2%	0	0%
SOUTH HAZ	3	1%	2	2%	1	1%	0	0%
Total	226	100%	117	100%	106	100%	3	100%

WSP nest distribution among beach segments from 2000 through 2017 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 2000-2017.

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

See Appendix 1 for a map with area distinctions and Appendix 13 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 2017, there were 71 Sandspit nests with verifiable incubation periods. Sixty-four of the nests hatched within the expected range, and seven hatched outside of this range. The range of verified incubation periods for successfully hatching nests was between 24 and 32 days. Table 19 provides a summary of incubation duration data for successful nests with known clutch initiation dates on the Sandpit in 2017.

Table 19: Number of Nests Hatched by Days Incubated at the Sandspit in 2017.

	Early			Average					Late
Days Incubated	24	25	26	27	28	29	30	31	32
# of Nests Hatched	1	5	19	27	7	6	3	2	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 2017, 72 nests were floated to determine an EHD. See Appendix 8 for float data.

Hearst San Simeon State Park

In 2017, one nest was discovered at three eggs in HSSSP and floated to determine an EHD. This nest, located at San Carpoforo Creek Beach, was eventually determined to have an unknown fate. The nest was discovered empty four days after the EHD, with no evidence to indicate a nest failure but also with no sign of chick or pip presence.

Villa Creek Beach

This season, four nests were found at three eggs at Villa Creek Beach. All four nests were floated and an EHD was determined for each. All of these nests hatched. One nest was found at two eggs with a third egg never being produced. An EHD was determined after being floated, and the nest hatched successfully. One additional nest was found at one egg with a second egg never being produced. It was also floated to determine an EHD, but this nest failed to hatch and was considered abandoned.

Morro Strand

In 2017, three nests were found at three eggs. Two of these nests were floated to determine an EHD. One of these nests was depredated by an American Crow, and the other hatched inside an enclosure, which was constructed shortly after floating the nest. Two additional nests were found at two eggs with a third egg never being produced. These nests were never floated, and both failed to striped skunk.

Sandspit

During the 2017 breeding season, 59 nests were found at three eggs on the Sandspit. Fifty-three of these nests were able to be floated, and an EHD projected for each. Fates were determined for the other six nests prior to being able to float the nests. Of the 53 floated three egg nests, 37 hatched and 16 failed. Out of the 16 failed nests, 11 were depredated by coyote within a range of 3 to 17 days after being floated. Of the other five failed nests, four failed due to high tides, and one failed due to abandonment.

This season 12 nests were found at two eggs with third eggs never being produced. Seven of these nests were floated, and four of these nests hatched. Of the failed nests, one was lost to tide, one was abandoned, and the remaining nest was determined to have an unknown fate.

An additional 17 nests were found and remained at one egg with a second egg never being produced. Two of these nests were floated to determine an EHD and neither hatched with one failing to tide and the other was abandoned.

Of the 175 eggs floated on the Sandspit, a total of 108 eggs hatched (62%) from 41 successful nests.

Chick/Fledgling Fate

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

Hearst San Simeon State Park

No chicks were seen or known to have fledged from any beaches in HSSSP in 2017.

Villa Creek Beach

Twenty-five chicks hatched from ten successful nests at Villa Creek Beach in 2017. The first chicks to be seen on Villa Creek Beach were observed on May 15th following the first hatch. The highest number of chicks observed on one day at Villa Creek Beach was six. Ten confirmed fledges from six nests were observed at Villa Creek Beach. Being a relatively small beach, it is fairly certain there were no other fledges. The length of the breeding period at Villa Creek Beach was 134 days. The length of the breeding period was calculated from the day the first nest was found to the last day a chick was observed.

Morro Strand

Fifteen chicks hatched from five successful nests at Morro Strand in 2017. These five successful nests all had exclosures built around them to prevent depredation. Chicks were first observed on July 22nd and last observed on August 4th. The highest number of chicks observed in one day at Morro Strand was four. No chicks were found to have fledged from Morro Strand in 2017. It is possible that chicks and fledges were missed due to the high number of juveniles arriving from other beaches to Morro Strand around the same time. The length of Morro Strand's breeding period was 131 days.

Sandspit

Three hundred-seven chicks hatched from the 117 successful nests on the Sandspit in 2017. Broods with chicks of varying ages were seen throughout the season after the first hatch on April 19th, also the day the first chicks were seen. The last chick seen was on August 28th. The highest number of chicks observed during one day at the Sandspit occurred on July 31st with 17 chicks observed.

Twenty-two WSP were confirmed to have fledged from the Sandspit in 2017. The highest number of fledges seen during one day occurred on June 30th with four fledges observed. Five banded males (ay:aa, bb:gb, gg:og, p:y/g, and wa:ga) were associated with seven 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. Including both dispersed and local Sandspit WSP, the highest number of juveniles seen during one day occurred on September 12th with 17 individuals. The first dispersed juvenile known to reach the Sandspit from another beach arrived on June 28th. This juvenile, banded rr:wb, fledged from ODSVRA. On August 28th, the final chick fledged making the length of the breeding season 167 days long.

Depredation

A summary of nest depredation on District beaches from 2001 through 2017 is shown in Appendix 14.

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 2017. 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 2017.

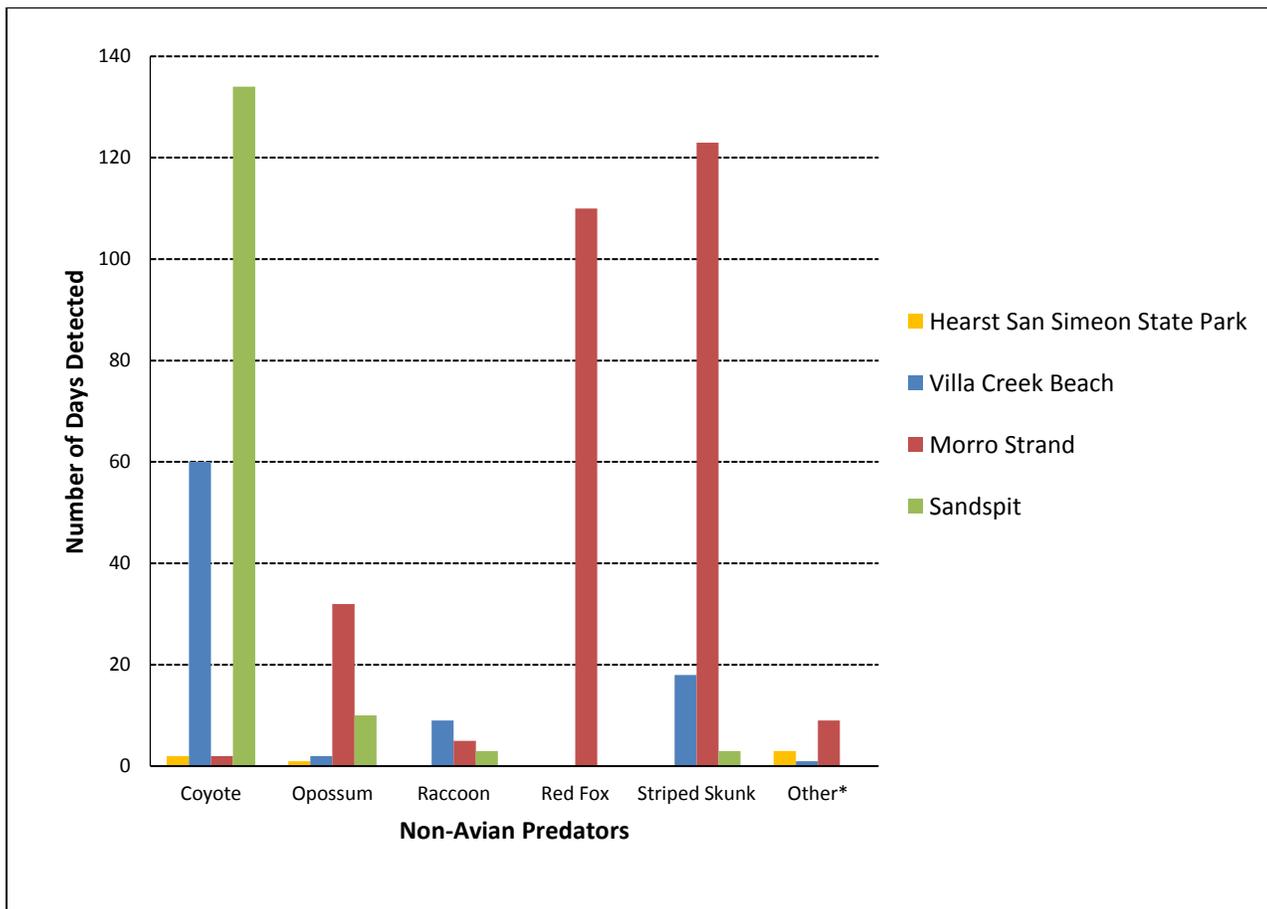
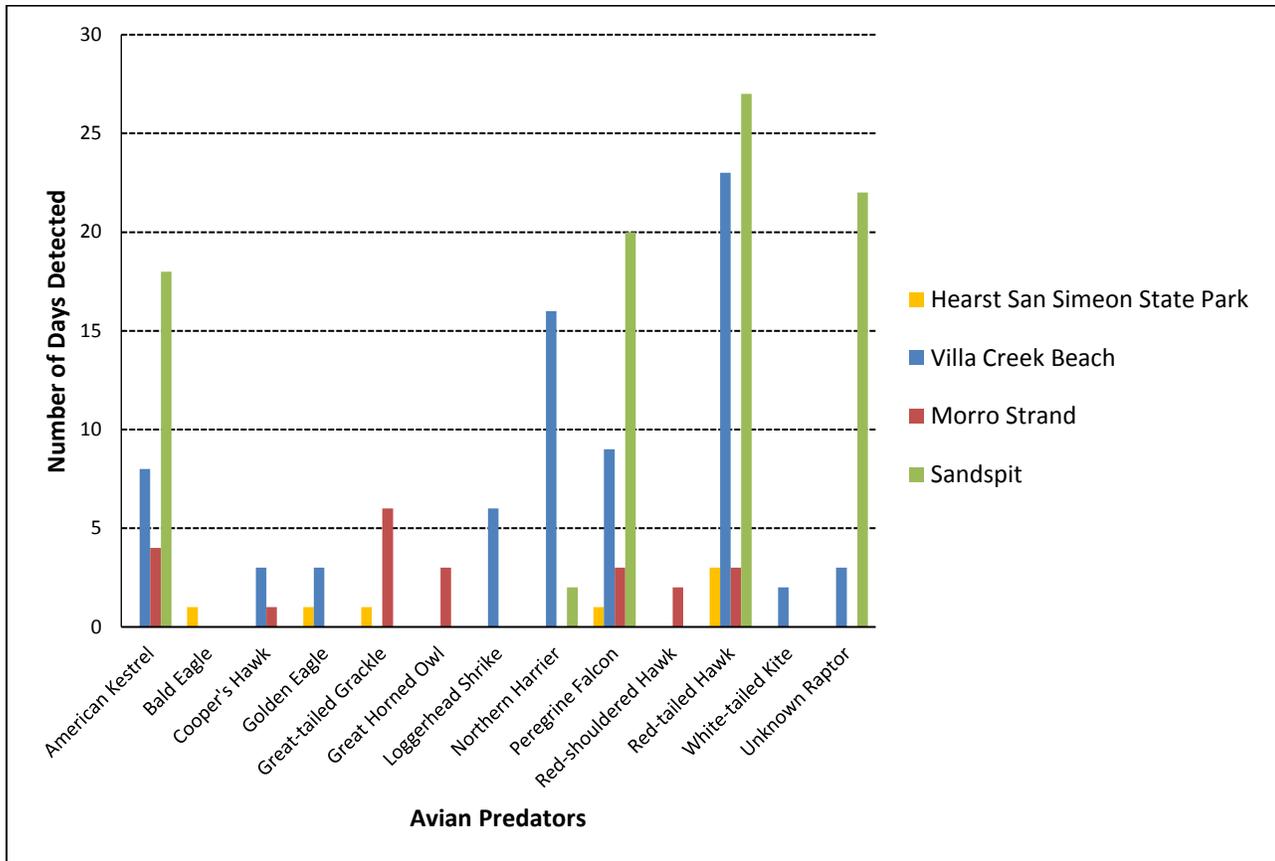


Figure 6 provides a graphical representation of the number of days avian predators were detected across District beaches by observation or tracks in 2017.

Figure 6: Number of Days Avian Predators Detected Across District Beaches in 2017.



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

Predator Management across District Beaches

Predator removal activity took place between April 18th and June 30th by USDA Wildlife Services. USDA Wildlife Services spent 158 hours on predator removal activities within the District. Individuals removed from District beaches this year included eight American Crows, four coyotes, one striped skunk, and one red fox (*Vulpes vulpes*).

Hearst San Simeon State Park

One nest failed to an unknown predator at San Carpoforo Creek Beach. Coyote or dog tracks were observed within three feet of the nest bowl. 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 13 different surveys. All other avian species were seen much less frequently (≤ 3 times) and included Bald Eagles (*Haliaeetus leucocephalus*), Golden Eagles (*Aquila chrysaetos*), Great-tailed Grackles (*Quiscalus mexicanus*), Peregrine Falcons (*Falco peregrinus*), and

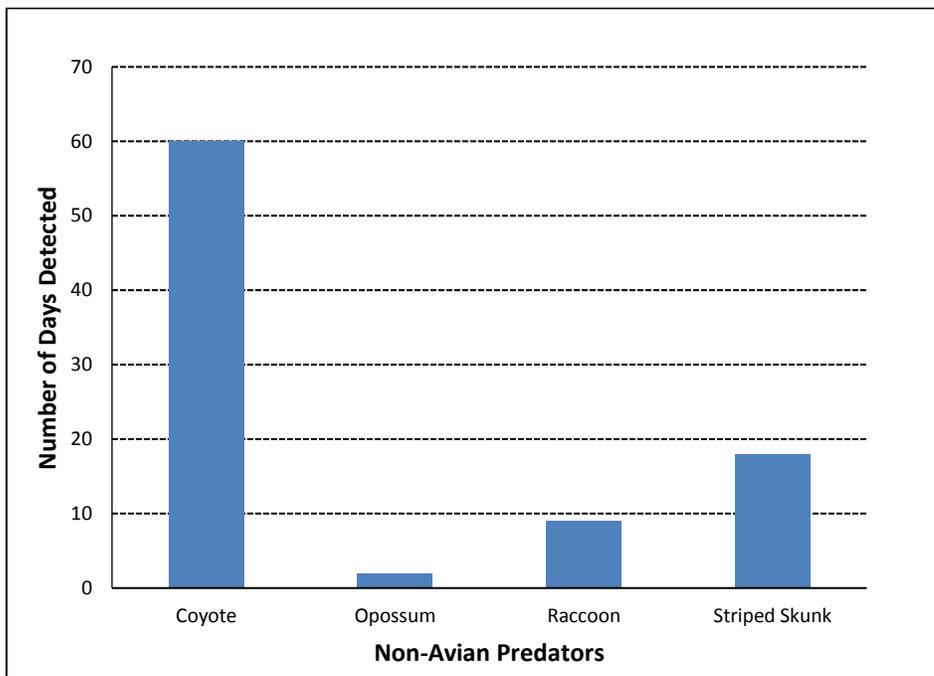
Red-tailed Hawks (*Buteo jamaicensis*). The most frequently observed non-avian predator at HSSSP was the California ground squirrel (*Otospermophilus beecheyi*).

Villa Creek Beach

There were 14 nests with known fates this year at Villa Creek Beach. An unknown predator was responsible for the only depredated nest. The depredated nest was in the back area, and the closest set of coyote tracks were ten feet away. A coyote or an avian predator was suspected but neither could be confirmed.

Figure 7 provides a graphical representation of the number of days non-avian predators were detected on Villa Creek Beach in 2017. 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 2017.

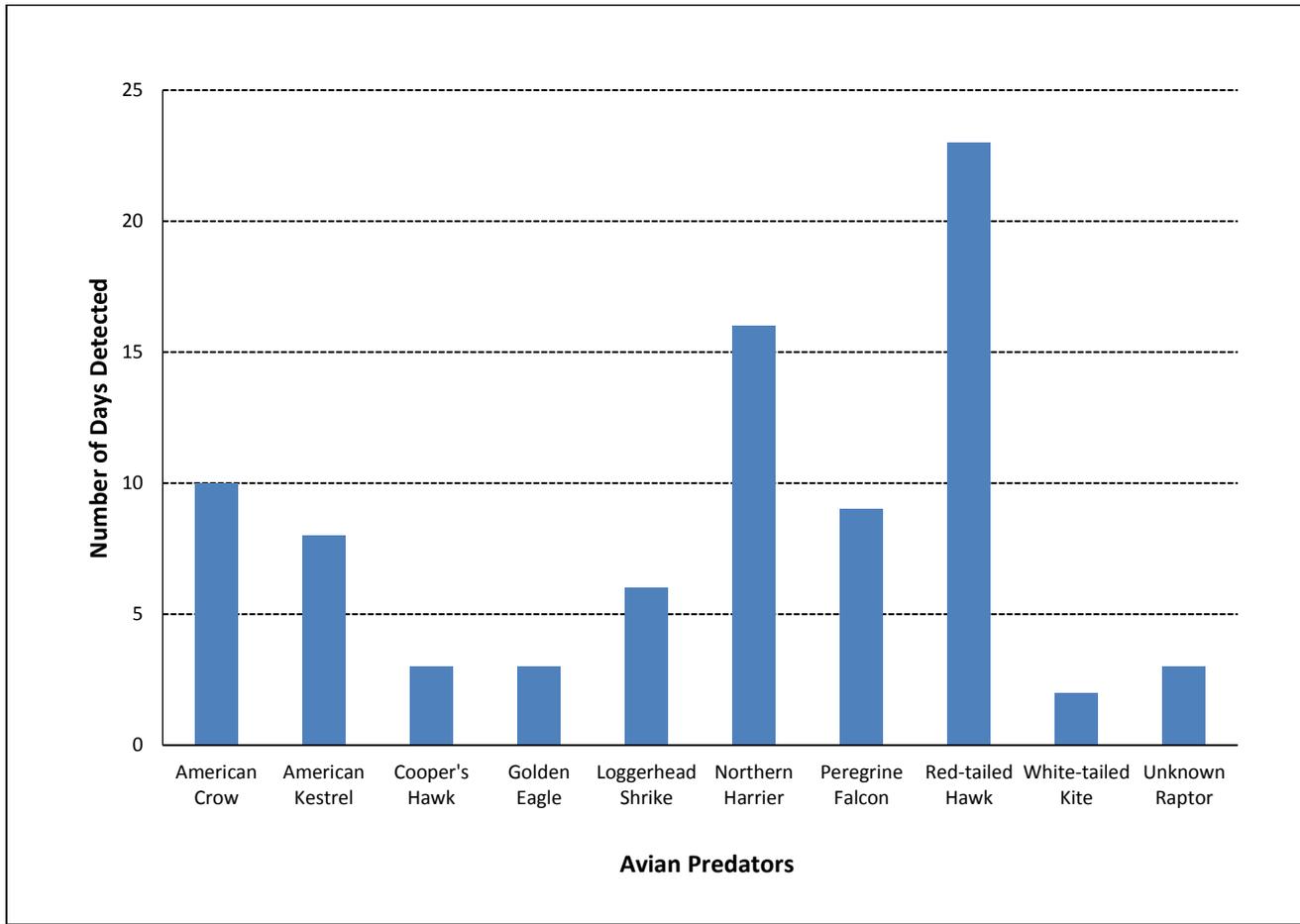
Figure 7: Number of Days Non-Avian Predators Detected at Villa Creek Beach in 2017.



Note: Gopher snake detected one time but not included in chart.

Avian predators seen at Villa Creek Beach during the 2017 breeding season were American Crow, American Kestrel (*Falco sparverius*), Cooper’s Hawk (*Accipiter cooperii*), Golden Eagle, Loggerhead Shrike (*Lanius ludovicianus*), Northern Harrier (*Circus cyaneus*), Peregrine Falcon, Red-tailed Hawk, and White-tailed Kite (*Elanus leucurus*). Figure 8 provides a graphical representation of the number of days each of these were detected on Villa Creek Beach in 2017.

Figure 8: Number of Days Avian Predators Detected at Villa Creek Beach in 2017.



Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: California Gull (*Larus californicus*), Great Egret (*Ardea alba*), Heermann’s Gull (*Larus heermanni*), Ring-billed Gull (*Larus delawarensis*), and Western Gull (*Larus occidentalis*).

Morro Strand

Predators destroyed nine of the 16 nests this year at Morro Strand. Three of the depredations were committed by American Crow, three by an unknown avian, two by striped skunk, and one by an unknown predator. A summary of nest depredations can be found in Table 20.

Table 20: Nest Depredations by Predator on Morro Strand in 2017.

Total Nests	16		
Depredated Nests	9	% Depredated	% Total
American Crow	3	33.3%	18.8%
Unknown Avian	3	33.3%	18.8%
Striped Skunk	2	22.2%	12.5%
Unknown Predator	1	11.1%	6.3%

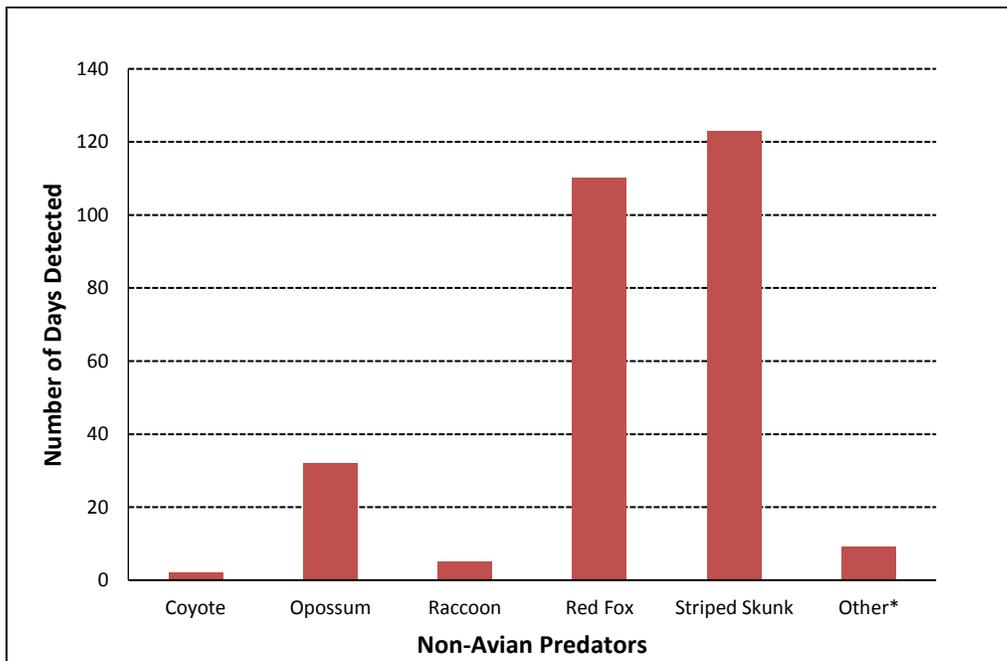
Table 21 lists the nest depredations according to predator among beach segments for Morro Strand in 2017.

Table 21: Distribution of Nest Depredations by Predator on Morro Strand in 2017.

Area	Predators				Total Depredated	Total Nests
	American Crow	Unknown Avian	Striped Skunk	Unknown Predator		
Campground-Hatteras	0	0	0	0	0	0
Hatteras-Azure	0	1	0	0	1	4
Azure-Boardwalk	2	1	2	1	6	9
Boardwalk-Hwy 41	1	1	0	0	2	3
Total	3	3	2	1	9	16

Figure 9 provides a graphical representation of the number of days non-avian predators were detected on Morro Strand in 2017. Combining sightings of live animals and their signs (i.e. tracks, scat, etc.), the most commonly observed mammal was striped skunk, which was observed on 123 days during the breeding season. The second most commonly observed predator was red fox, seen 110 times. With the exception of Virginia opossum (*Didelphis virginiana*), seen 32 times, all other mammalian predators were observed on less than ten occasions each during the breeding season.

Figure 9: Number of Days Non-Avian Predators Detected on Morro Strand in 2017.



*domestic cat, ground squirrel, unidentified canid, weasel sp.

USDA Wildlife Services performed predator removal activities between the Azure Street parking lot and the Highway 41 beach access corridor in areas behind the foredunes. In total, the efforts of three trap days and 12 trap nights resulted in the removal of one striped skunk and one red fox from Morro Strand in 2017. See “Predator Management” for information on predator removal methodology.

American Crows were again observed foraging the entire length of Morro Strand throughout the breeding season in 2017. These corvids were the most detrimental known predator to WSP on Morro Strand in 2017. American Crows were seen on 151 days of the breeding season in murders of up to 21 individuals. Of the depredated nests, American Crows were identified as the predator for a minimum of 33% of nests and was the leading candidate for the depredation of three additional nests.

Other potential predators of WSP eggs, chicks, or adults identified on site by observation or tracks included: American Kestrel, Great Horned Owl (*Bubo virginianus*), California Gull, Cooper’s Hawk, deer mouse (*Peromyscus maniculatus*), Great Blue Heron (*Ardea herodias*), Great-tailed Grackle, Heermann’s Gull, Peregrine Falcon, Red-Shouldered Hawk (*Buteo lineatus*), Red-tailed Hawk, Ring-billed Gull, unidentified rodent, and Western Gull.

Sandspit

Predators took 63 of the 226 nests this year on the Sandspit (Table 22). Coyotes were responsible for the majority (87%) of all the nest depredations by consuming 55 nests. The additional eight nest depredations were attributed to unknown predators (4), unknown avian predators (2), and American Crow (2).

Table 22: Nest Depredations by Predator on the Sandspit in 2017.

Total Nests	226		
Depredated Nests	63	% Depredated	% Total
American Crow	2	3.2%	<1%
Coyote	55	87.3%	25%
Unknown Avian	2	3.2%	<1%
Unknown Predator	4	6.3%	2%
Unknown Fate	3	-	1%

A summary of nest locations and depredations on the Sandspit in 2017 can be found in Table 23.

Table 23: Distribution of Nest Depredations by Predator on the Sandspit in 2017.

Area	Predators				Total Depredated	Total Nests
	Coyote	American Crow	Unknown Avian	Unknown Predator		
SPB-RM 6	2	0	0	0	2	17
RM 6-RM 5	20	0	0	1	21	45
RM 5-RM 4	13	0	0	1	14	46
RM 4-RM 3	11	0	0	0	11	37
RM 3-RM 2	6	0	0	0	6	18
RM 2-RM 1	3	0	1	1	5	28
RM 1-SST	0	0	1	1	2	20
SST-HAZ	0	2	0	0	2	12
South HAZ	0	0	0	0	0	3
Total	55	2	2	4	63	226

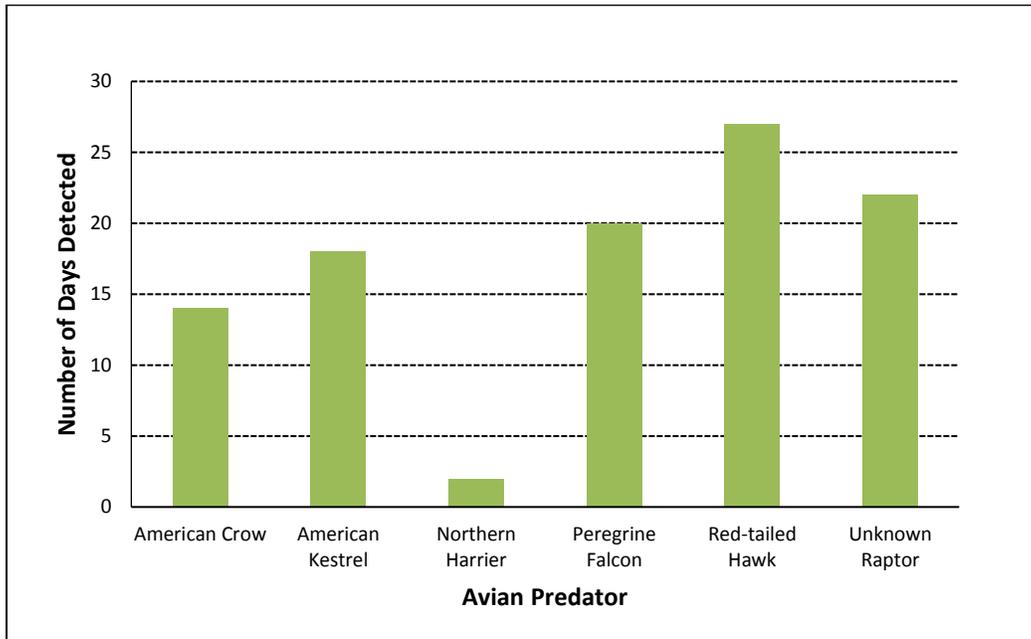
USDA Wildlife Services was hired in an effort to remove WSP predators. Since the vast majority of depredation events on the Sandspit were due to coyotes, removal efforts targeted these canids. Three methods were employed to remove coyotes: padded leg traps, calling, and spotlighting. The combined efforts of 350 trap nights, 35 trap days, and ten call stands resulted in the removal of four coyotes from the Sandspit. All four were caught by padded leg traps. During these efforts, a total of eight American Crows were removed as a result of shooting. See “Predator Management” for information on predator removal methodology.

This season, the highest incidents of coyote depredation occurred during the weeks ending on May 19th and June 23rd, when eight nests were lost to coyote depredation during each week. During the week of May 19th, six nests were lost to coyotes in the northern section of the Sandspit, and two were lost in the south. The week of June 23rd had seven nests lost to coyotes in the northern Sandspit and one 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 134 days during the monitoring season. The only other mammalian predators observed on the Sandspit during the 2017 breeding season were Virginia opossum, raccoon (*Procyon lotor*), and striped skunk. Opossums were observed on ten days, and both raccoons and skunks were observed on three days.

In 2017, monitors sighted individuals or tracks of five species of avian predators on the Sandspit: American Crow, American Kestrel, Northern Harrier, Peregrine Falcon, and Red-tailed Hawk. The majority of avian predators sighted by monitors appeared to be causing no distress to the WSP. They were, however, recorded as being seen perched within 100 yards of WSP adults or chicks a handful of times.

Figure 10 provides a graphical representation of the number of days avian predators were detected on the Sandspit in 2017.

Figure 10: Number of Days Avian Predators Detected on the Sandspit in 2017.



Other predatory species identified by observation or tracks on the Sandspit in 2017 included: Black-crowned Night Heron (*Nycticorax nycticorax*), California Gull, Great Blue Heron, Great Egret, Heermann’s Gull, and Western Gull.

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 were not permitted on District WSP beaches in 2017, 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 extraordinarily difficult. Due to this challenge, CSP does not to enforce the restriction.

On all other beaches, however, visitors seen with dogs were contacted and advised 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 2017. As in previous years, Arroyo Laguna, San Simeon Creek Beach, and Santa Rosa Creek Beach remained more popular with visitors in 2017 than other HSSSP beaches. Furthermore, the ongoing Highway One road closure in the neighboring Big Sur region, due to winter road washouts, affected visitation at San Carpoforo Creek Beach in 2017. Having no option to continue traveling north on Highway One, many area visitors, including overnight campers and visitors with dogs, chose to visit San Carpoforo Creek Beach. Consequently, this beach received much higher visitation in 2017 than in previous years.

There were 19 public contacts by WSP monitors at HSSSP beaches involving 28 people. All 19 contacts were classified as positive. WSP monitors answered questions on topics related to WSP, as well as additional topics such as local construction and elephant seals.

Monitors contacted two illegal dog walkers in 2017: one at San Simeon Creek Beach, and one at Point Sierra Nevada. Four further instances of illegal dog walking were recorded, however, the monitor did not contact the dog owners on these occasions. In addition to these contacts, 13 sets of dog tracks were also recorded on HSSSP beaches, where dogs were not allowed.

San Simeon Creek Beach and San Carpoforo Creek Beach were the only beaches at HSSSP to have a symbolically fenced area in 2017. Thirty-two sets of foot traffic were recorded within the fenced area at San Simeon Creek Beach, while an additional 13 sets were observed at San Carpoforo Creek Beach.

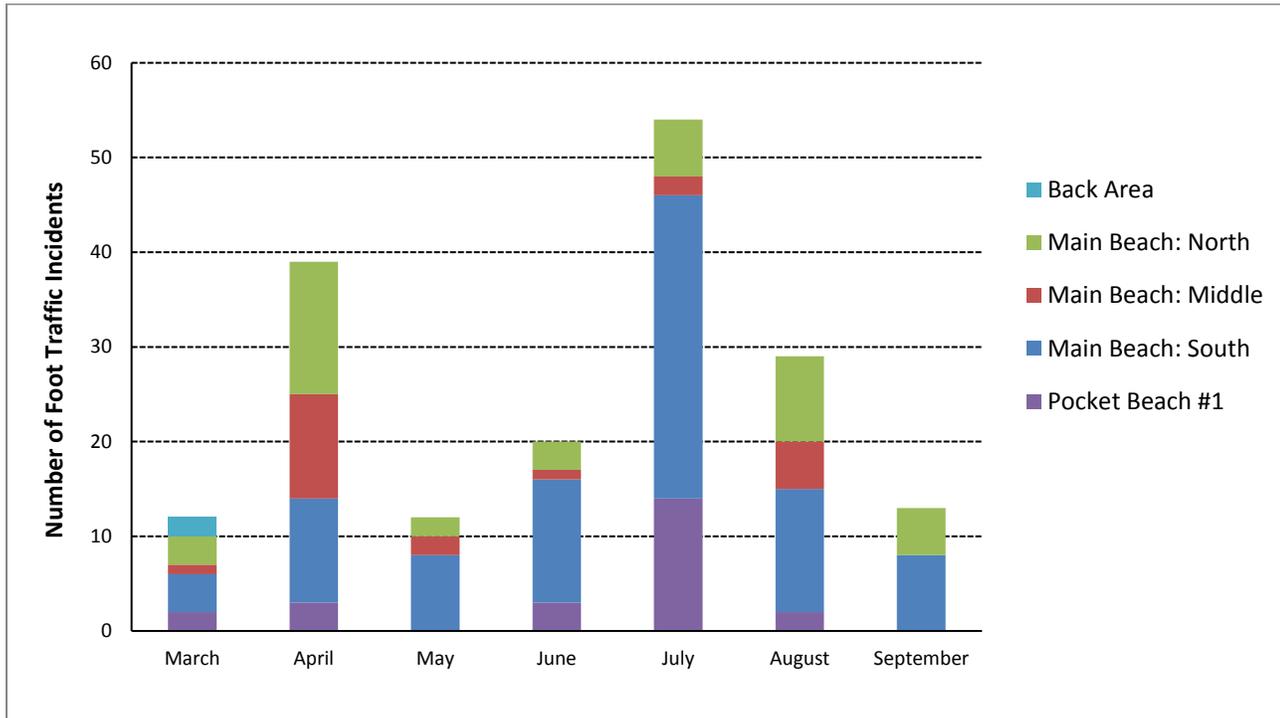
Several acts of vandalism were observed in 2017 at HSSSP beaches. These included four defaced signs at Arroyo de la Cruz, eight fire pits at San Carpoforo Creek Beach, and one fort that was inside the symbolically fenced area at San Simeon Creek Beach.

Villa Creek Beach

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

There were 179 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 July (Figure 11). The largest amount (50% of all foot traffic) was recorded on the south end of the main beach. In 2016, there were 80 incidents of foot traffic inside the habitat.

Figure 11: Distribution of Foot Traffic by Month at Villa Creek Beach in 2017.



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 (16 individuals) of trespassing inside the fenced off areas. Six of the contacts were recorded as positive, two as neutral, and one as negative.

During the negative incident, the trespasser proceeded to ignore the regulations after the monitor notified them. Furthermore, the trespasser was verbally abusive and hostile towards the contacting monitor. The monitor contacted a Ranger, but contact was not made between the Ranger and the trespasser.

Monitors made 13 contacts in 2017 for illegal dog walking. Due to the distance between the monitor and the perpetrators, three of the contacts were visual and the other ten were personal. The ten personal contacts were recorded as positive. In addition to contacts for illegal dog walking, 40 sets of dog tracks were observed on Villa Creek Beach in 2017. Fourteen of these occurred inside the fenced habitat, and 26 occurred outside. In 2016, six contacts were made for illegal dog walking.

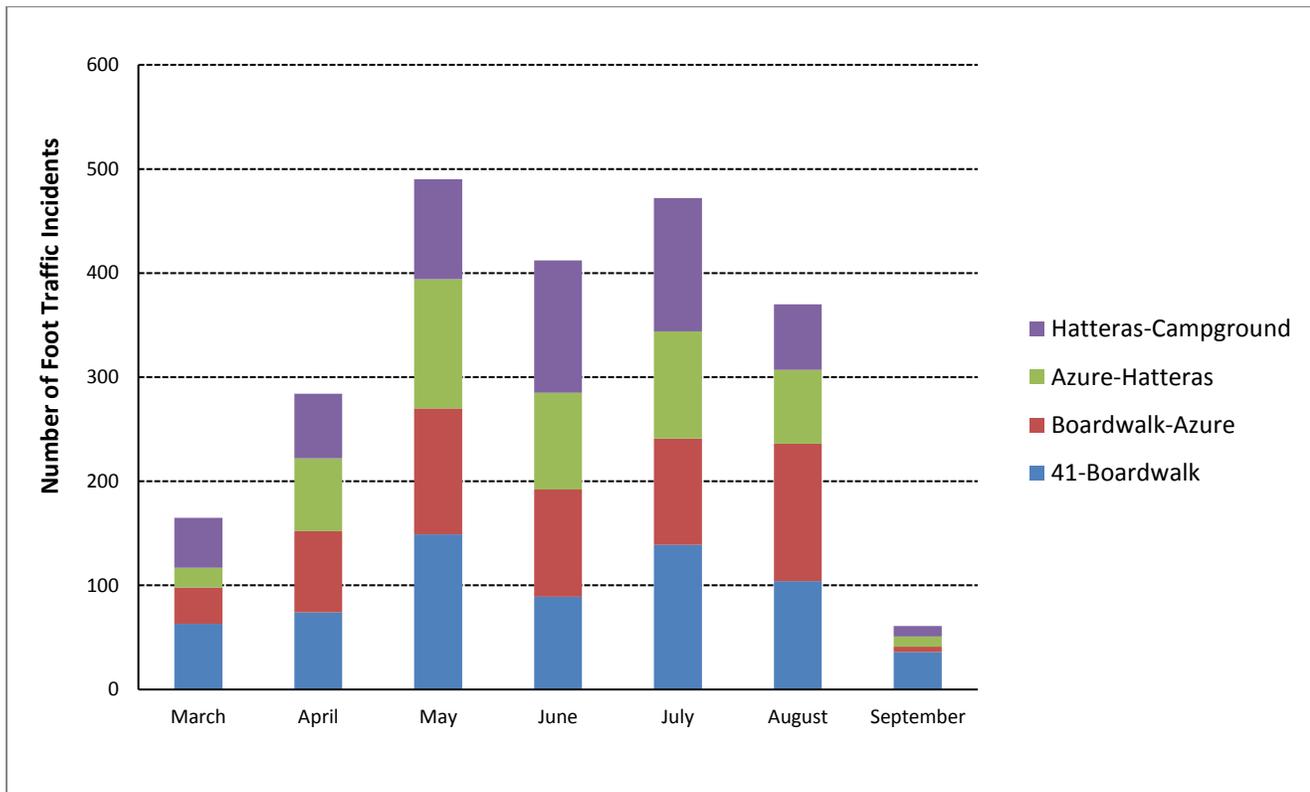
One hundred additional public contacts were made throughout the year at Villa Creek Beach. In most instances, the visitor approached the monitor with various questions or comments. All except two were positive contacts.

Acts of vandalism on Villa Creek Beach in 2017 rarely occurred. “Vandalism” found inside the habitat included driftwood structures three times, the remains of an illegal fire pit once, and one bent pole.

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 2017, there were a total of 2,254 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. May (490 incidents) had the greatest amount of foot traffic (Figure 12), followed closely by July (472 incidents). The foot traffic recorded in May was distributed fairly evenly though more concentrated in the southern portion of the beach between the 41 and Boardwalk Corridors. In July, the foot traffic was also mostly evenly distributed with the most foot traffic occurring on the north and south ends of the beach. In 2016, there were 978 incidents of foot traffic inside the habitat.

Figure 12: Distribution of Foot Traffic by Month at Morro Strand in 2017.



Throughout the season, multiple 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. Rangers made efforts to clear out these camps within several days of their discovery and several individuals received citations. The presence of homeless camps was a recurring issue throughout the season.

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. The path was found to be still in use at the beginning of the 2017 breeding season. On several occasions during the 2017 season, the path was found with freshly cut vegetation; evidence that the path continued to be used. The path was closed off by monitors multiple times.

In 2017, monitors witnessed 118 individuals trespassing inside the WSP habitat during 43 incidents. Thirty of the contacts were recorded as positive, 13 as neutral, and three as negative. Nine of the 13 neutral contacts were out of the habitat prior to a monitor being able to make contact. Two of the negative contacts involved children playing inside the habitat. The other negative contact involved a young adult.

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 14 kite flying incidents; all were personally contacted with positive results. WSP monitors also observed four incidents of drones and two incidents of para-motors in violation of the posted order. Only one of the drone operators was able to be contacted.

A sandwich board with a "No Dogs on Beach" sign was placed at CSP boundaries near the high tide line on Morro Strand. Since the signs are not permanent installations, their condition was checked on a daily basis throughout the breeding season. These signs established a more visible City/CSP boundary marker to lessen confusion about the change in regulations (dogs are allowed on-leash on City beaches). Permanent "No Dogs on Beach" signs cannot be positioned closer to the water due to the fluctuating tides. Another sandwich board sign is in place near the entrance to the beach at the Highway 41 Corridor. This sign illustrated with arrows the City/CSP boundary and in which direction dogs on-leash are allowed. Maps were also placed at the kiosks at the north and south ends of Morro Strand, which differentiated areas where dogs are and are not allowed.

Despite the posted signs, there were 247 dog contacts involving 484 people and 313 dogs. During these 247 contacts, dogs were observed as being off-leash in 88 of them. Of the total contacts, 195 were recorded positive, 50 as neutral, and two as negative. Monitors made personal contact with 215 of these dog walkers. 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 for illegal dog walkers, 418 sets of dog tracks were observed along the beach (outside the fenced habitat), and 250 sets were recorded within the habitat. In 2016, there were 94 dog contacts.

An additional 229 public contacts were made throughout the year at Morro Strand. In most instances, the visitor approached the monitor with various questions or comments. Most of the contacts were positive.

Morro Strand was monitored on all days before and after the July 4th holiday. Three CSP employees were on the beach on the 4th of July from approximately 3 pm until 9 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 four dog contacts, eight public contacts, and three trespassing contacts. Fireworks being set off at Morro Strand were witnessed twice on July 4th. It was also recorded on the day following the holiday that evidence of three other incidents of fireworks being set off had occurred.

Vandalism was discovered by monitors on 77 occasions this season. The most frequently recorded form of vandalism was sand or rock art created inside the habitat a total of 21 times. Additional incidents involved missing or damaged signs (15), bent or removed poles (13), and cut rope (9). Monitors also observed 14 incidents of illegal camping and the remains of four fires.

In 2017, three organized runs involving thousands of participants occurred within Morro Strand during the WSP breeding season. These runs were the “Miracle Miles for Kids”, “Brian Waterbury Memorial Rock to Pier Fun Run and Rock’n Around the Pier Half Marathon”, and “Morro Bay High School Cross Country Invitational” occurring on May 13th, July 15th and September 9th, respectively. Races were observed by WSP monitors to ensure compliance with beach regulations, such as the ban on dogs 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. The highest number of violations occurred during the Morro Bay High School Cross Country Invitational, a multi-county cross country race involving 32 high schools, where monitors witnessed several groups of spectators duck under symbolic fencing to make space for other spectators or to obtain a better vantage point for the race. CSP has communicated with race officials to move the date of the race until after the breeding season next year.

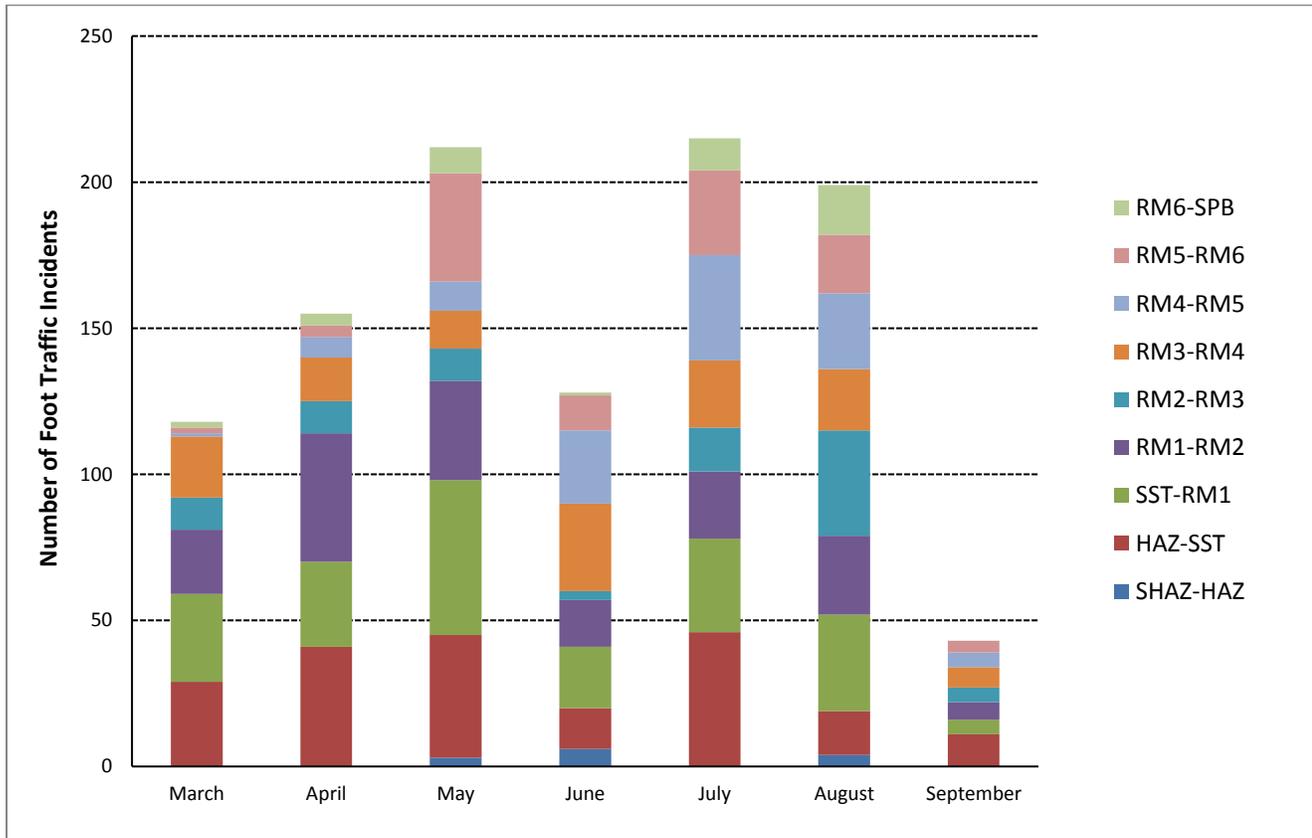
Sandspit

The Sandspit experiences a lower intensity of human activity compared to other District beaches. 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 2017, WSP monitors witnessed 30 trespass violations involving 58 violators. Twenty-eight of these trespass incidents occurred on the southern half of the Sandspit. When possible, trespassers were contacted by WSP monitors. All but ten 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 1,070 incidents of foot traffic inside the WSP habitat with 67% 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 one foot of an active nest. On 13 other occasions trespassers were within seven feet of a nest. Three of these incidents included bike track or drag marks, as well. May and July had the greatest amount of foot traffic with 215 and 212 tracks recorded, respectively (Figure 13). In 2016, there were 509 incidents of foot traffic inside the habitat.

Figure 13: Distribution of Foot Traffic by Month at the Sandspit in 2017.



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 37 contacts of illegal dog walkers (40 total dogs) on the Sandspit in 2017. Three dog contacts occurred on the north half of the Sandspit, and 34 occurred on the south half. Monitors were able to personally contact the owner of the dogs on 26 occasions. Of the 11 instances where dog owners were not contacted, ten were due to the distance between the dog owner and monitor. In addition to contacts with illegal dog walkers, dog tracks were observed 35 times inside the fenced habitat and 63 times outside the habitat. In 2016, 25 illegal dog walkers were contacted.

Five violations of the kite restriction rule were observed this year. These five violations occurred in one period of time when five paragliders flew within 300 feet of the southern end of the WSP habitat. A Ranger was requested and successfully contacted the violators informing them of the issue.

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

Several forms of vandalism occurred on the Sandspit in 2017. These included 18 incidents of fence poles being removed or bent; seven incidents of driftwood structures built inside the habitat; two incidents where the symbolic fencing rope was deliberately cut and two signs removed. Monitors also observed evidence of five illegal campfires and five illegal campsites. In addition, there were five incidents of sand/rock art built inside the habitat.

CONCLUSIONS

In 2017, 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 165 adult WSP were observed, including 77 males, 78 females, and 10 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 met its recovery potential in 2017. It is important to note, however, that while the overall quota was met, not every individual beach within the District met its designated recovery potential. Some beaches, like Morro Strand, failed to meet recovery standards while other beaches, such as the Sandspit, exceeded population potentials.

Appendix 11 depicts the number of nests found by month on all District beaches. Data is included for the years 2004 through 2017 for comparison. Across the District, the highest number of nests found in a year occurred in 2004. After 2004, the total number of nests steadily decreased until 2008. After 2008, the number of nests fluctuated year to year, with an overall increasing trend. The number of District nests decreased by 52 between 2015 and 2017. However, the number of District nests in 2017 (258) was still above the average number of nests in the District during the previous 12 years (240).

Tables in Appendix 11a provide a summary of nest initiation dates for all District beaches from 2002 through 2017. Nests on District beaches have been initiated as early as March 9th. In 2017, the first nest for the District was found on the Sandspit on March 15th, which is thirteen days earlier than the District's first 2016 nest. The last chicks fledged on September 6th, which is only one day earlier than last fledge of the 2016 season. The 2017 nesting season was 13 days longer than the 2016 season (176 vs. 163 days).

District beaches had a hatch rate of 52% in 2017 (Appendix 11d). This hatch rate was above the average of 47% (years 2001-2016), and represents an increase of 14% since 2016. The number of nests hatched in 2017 (132) was well above the average of 107 (2001-2016). There were 33 more nests hatched in 2017 across the District than in the previous year.

Nesting success has varied on District beaches between 2001 and 2017 (Appended 11e). The overall trend for Villa Creek Beach has been a steady decline in the hatch number, although 2017 recorded an improved hatch number (10) over the hatch number of 2016 (2). At Morro Strand, there was a peak in

successful hatches in 2005 followed by very variable years until 2012, after which all years had relatively low nest success. At the Sandspit, there was a peak in 2004, followed by a rapid drop through 2007. There has been a slow but steady increase since 2007. The number of Sandspit hatches in 2017, 117, was above the average of 86 between 2001 and 2016.

Seventy-four nests were depredated in 2017, representing a 29% depredation rate across District beaches (Appendix 14). Throughout the previous 16 years, the average depredation rate has been 30%. Villa Creek Beach only had one nest depredation this year, while Morro Strand had an above average number with nine, and the Sandspit had an average depredation year at 63. An unknown predator was the only cause of nest depredation at Villa Creek Beach, while Morro Strand was mostly impacted by American Crows and striped skunks. The most prevalent predator on the Sandspit continued to be coyote in 2017.

Nesting activity across District beaches was analyzed between 2001 and 2017 to determine beach productivity (Appendix 15). The Sandspit has historically hatched 51% of 3,011 nests. Next in productivity is Villa Creek Beach (38% of 514 nests), which has been more productive than Morro Strand (32% of 408 nests). HSSSP has had very few nests historically but has been productive (67% of 35 nests) within its small sample size.

Examination of nest failures (Appendix 15) 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 (18%) 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%.

There were 32 confirmed fledges on District beaches in 2017. 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 2017 WSP season was provided by CSP Natural Resources Maintenance funding, MDO mitigation funds, and District Home Base funding. Approximately, \$90,800 was spent on the WSP program this season. This amount included a part-time predator control specialist but did not include the WSP Coordinator's time. In addition, the Morro Bay National Estuary Program awarded the District a grant to purchase 200 durable WSP "Do Not Enter" signs for \$3,500.

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 the District currently performs. The District would like to continue:

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. 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.
5. Utilizing nest exclosures at appropriate time to increase hatching success.
6. Annual WSP training for CSP staff and volunteers.
7. 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.
8. Ensuring all corridors, facilities, and actions are compliant with Americans with Disabilities Act and California Environmental Quality Act guidelines.
9. Maintaining involvement with range-wide and Recovery Unit Five recovery efforts for the WSP.
10. Including CSP Ranger staff in weekly WSP meetings to increase communication and coordination within the District for achieving our WSP recovery potential.
11. Visiting other WSP areas to learn about how other programs are managed and monitored.
12. 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).
13. Exotic plant removal program to create more WSP habitat.
14. Investigating remedies with the City for the removal of American Crows from Morro Strand.
15. Developing an outreach and education program.

16. Maintaining communications with Morro Bay High School regarding beach use restrictions and project objectives during the WSP nesting season.
17. Increased staff and volunteer presence on July 4th to prevent disturbance to nesting WSP and to educate visitors.
18. Providing WSP informational binder at the campground kiosks to aid in educating the campers.
19. 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.
20. 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.
21. Providing training to monitors on how to operate wildlife cameras near WSP nests with minimal disturbance to WSP.
22. Partnering with the City in assisting them with their fence installation and removal.

The following, in non-prioritized order, are goals for the improvement of the District’s management program. These objectives may change and be prioritized depending on available funding.

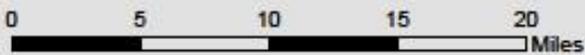
23. Complete the Predator Management Plan for the District.
24. Expand the volunteer outreach program to target beach users before they enter the beach. People are more likely to cooperate with closures if they are informed.
25. Provide WSP informational flyers to equestrians.

Appendix 1 — Site Maps



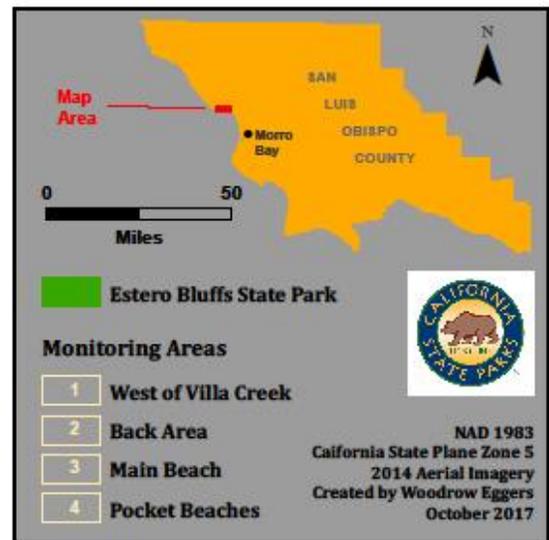
San Luis Obispo Coast District

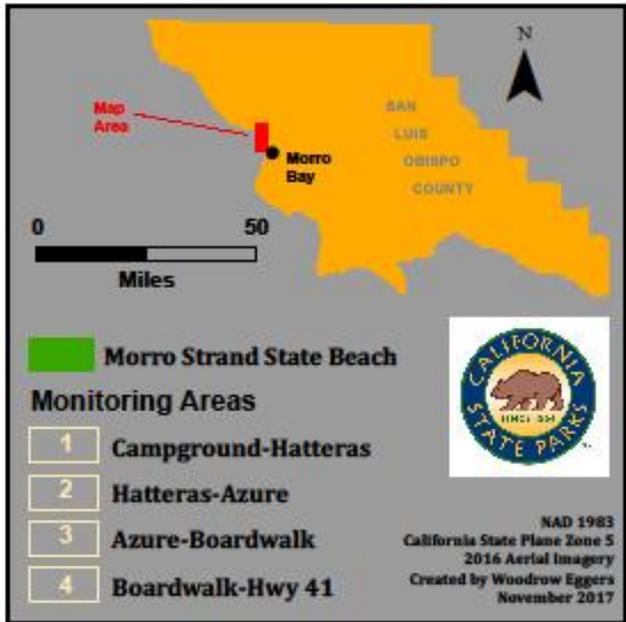
Western Snowy Plover Sites



-  CSP Properties
-  Populated Areas

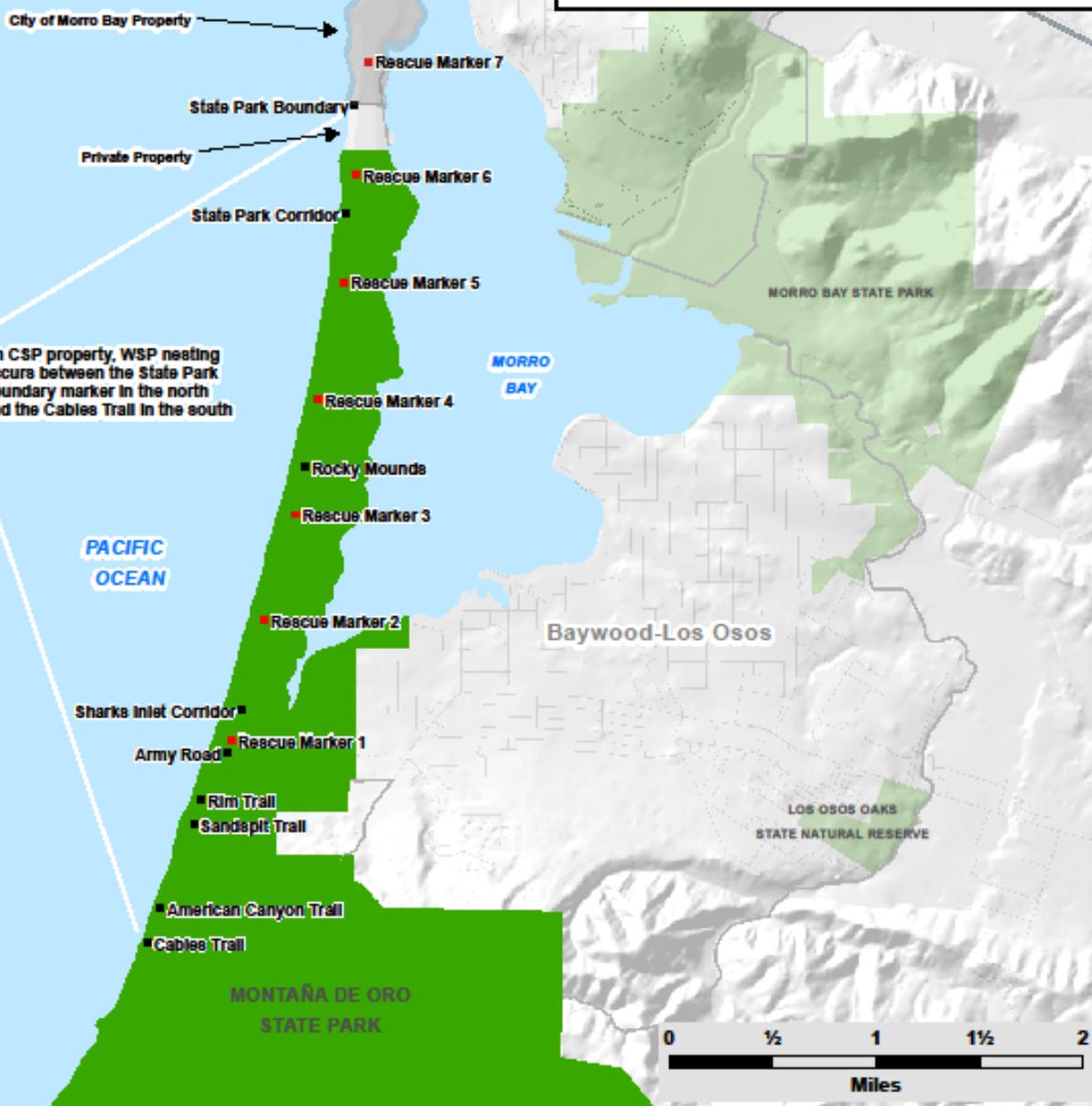
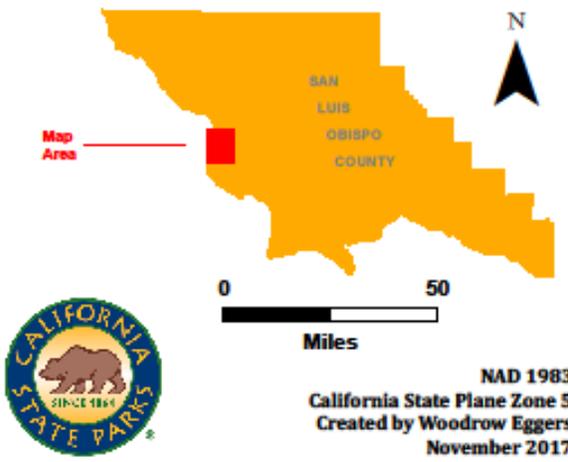
NAD 1983
California State Plane Zone 5
Created by Woodrow Eggers
October 2017





Montaña de Oro State Park

Western Snowy Plover Sites



Appendix 2 – Nest Card Example

Nest card from nest number SSS018 on the south half of the Sandspit between Rescue Marker Three and Rocky Mounds.

Hatch

RM3 - Rkym

SSS018



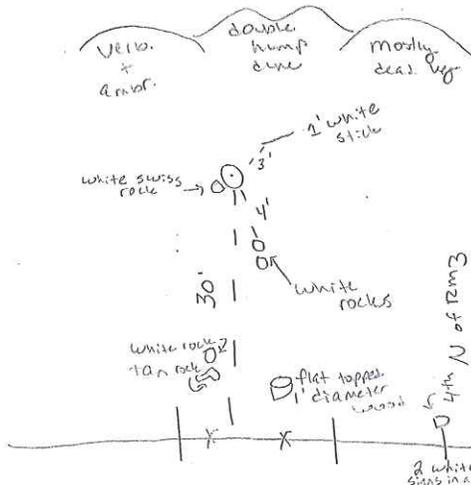
4-26 1E, active	5/2 3E, BOW	5/9 3E	5/16 3E, active	5/23 BOW 3E	5/30 NB empty, 3 pips found
4/27 1E	5/3 BOW	5/10 BOW 3E	5/17 3E, BNB	5/24 BOW	in NB, BOW w/ BOW -
4/28 1E, active, BNB	5/4 3E	5/11 3E	5/18 3E, active	5/25 3E, BNB, BWD	Hatch confirmed 5/28
4/29 2E, BNB	5/5 BOW	5/12 BOW	5/19 BOW	5/26 BOW	
	5/6 BOW, 3E	5/13 BOW, 3E	5/20 BOW, 3E	5/27 3E	

RM3 - Rkym

SSS018

Hatch

Nest Map



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

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

Appendix 3 — Winter Window Survey Results on District Beaches 2002 - 2017

Year	<i>San Carpofo 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>	Hearst San Simeon State Park Total	Villa Creek Beach Total	<i>Morro Strand North (Old Creek)</i>	<i>Morro Strand South</i>	Morro Strand Total	Sandspit Total	District Total
2002	-	-	-	-	-	-	98	-	98	24	-	50	50	74	246
2003	-	-	-	-	-	0	99	-	99	77	-	0	0	0	176
2004	26	-	-	-	-	0	143	-	169	32	-	249	249	103	553
2005	46	-	-	-	-	-	54	-	100	45	-	44	44	3	192
2006	52	-	0	0	-	0	38	0	90	84	-	8	8	41	223
2007	11	0	-	8	-	0	0	-	19	106	-	10	10	30	165
2008	-	-	-	-	-	-	-	-	-	10	0	1	1	55	66
2009	-	-	-	-	-	-	-	-	-	63	0	0	0	19	82
2010	-	-	-	-	-	-	-	-	-	112	0	105	105	40	257
2011	0	-	0	0	-	31	0	18	49	52	0	24	24	0	125
2012	16	-	2	0	0	27	46	0	91	28	0	1	1	0	120
2013	1	0	-	0	-	0	33	0	34	33	0	81	81	50	198
2014	26	0	0	0	-	0	93	0	119	0	-	141	141	76	336
2015	0	0	0	0	0	0	144	0	144	35	0	106	106	130	415
2016	0	0	0	0	-	0	193	0	193	0	0	5	5	123	321
2017	14	0	0	0	0	6	0	0	20	0	-	55	55	201	276
Average	17	0	0	1	0	6	72	2	94	44	0	55	55	59	234

Appendix 4 — Breeding Window Survey Results on District Beaches 2002 - 2017

Year	San Carpoforo 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	Villa Creek Beach Total	Morro Strand Total	Sandspit Total	District Total
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
Average	1	0	0	1	0	2	2	0	6	19	14	117	155

Appendix 5 — Banded WSP with Known Origins Observed on District Beaches October 2016 - February 2017

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
a/y/a:v	F	11/06/16	11/06/16	1	Oregon, '14	Sandspit	
a:g/w	U	10/05/16	02/01/17	6	VAFB, '15	Villa Creek Beach, Morro Strand, Sandspit	
a:w/r/w	U	10/05/16	10/05/16	1	VAFB, '15	Sandspit	
ab:go	U	10/12/16	01/06/17	9	Salinas NWR, '11	Arroyo Laguna, San Simeon Creek Beach	
an:ww	U	10/12/16	01/24/17	7	VAFB, '15	Arroyo Laguna, Sandspit	
an:yy	U	10/05/16	02/13/17	6	VAFB, '15	Arroyo Laguna, San Simeon Creek Beach	
aw:ll	J	10/14/16	02/13/17	7	Pajaro Spit, '16	Arroyo Laguna, San Simeon Creek Beach, Sandspit	
ay:aa	M	10/05/16	10/05/16	1	Marina SB, '14	Sandspit	
ay:bl	J	10/12/16	11/30/16	3	Fort Ord, '16	Arroyo Laguna	
b/a/b:g	F	10/05/16	01/24/17	8	Oregon, '15	Sandspit	
b:or	F	10/05/16	01/24/17	8	VAFB, '13	Morro Strand, Sandspit	Formerly nb:or
Ba:wy	F	10/18/16	01/25/17	4	Moss Landing Salt Ponds, '14	Morro Strand, Sandspit	Banded as an adult
bb:gb	M	10/05/16	12/17/16	9	ODSVRA, '15	Sandspit	
bb:ob	J	10/05/16	02/23/17	12	ODSVRA, '16	Sandspit	
bb:rr	J	10/08/16	10/08/16	1	ODSVRA, '16	Villa Creek Beach	
bb:vy	J	10/05/16	02/07/17	8	ODSVRA, '16	Villa Creek Beach, Morro Strand, Sandspit	
bw:ol	J	10/12/16	10/12/16	1	Salinas NWR, '16	Arroyo Laguna	
by:oa	U	12/09/16	12/09/16	1	Salinas NWR, '14	San Simeon Creek Beach	
By:rb	M	10/05/16	02/23/17	5	Marina SB, '15	Sandspit	Banded as an adult
g:g/y/g	J	10/05/16	02/01/17	14	VAFB, '16	Morro Strand, Sandspit	
ga:gr	U	11/15/16	02/06/17	3	ODSVRA, '15	Villa Creek Beach, Morro Strand	
ga:pr	U	02/13/17	02/13/17	1	ODSVRA, '16	San Simeon Creek Beach	
gg:ag	F	10/05/16	11/09/16	5	ODSVRA, '13 or '14	Arroyo Laguna	
gg:og	M	10/05/16	01/10/17	11	ODSVRA, '14	Sandspit	
gg:pb	F	10/05/16	11/09/16	6	ODSVRA, '12	Arroyo Laguna	
gg:wb	M	10/05/16	01/25/17	9	ODSVRA, '13	Morro Strand, Sandspit	
gl:yl	J	10/12/16	12/06/16	5	Pajaro Spit, '16	Arroyo Laguna, San Simeon Creek Beach, Villa Creek Beach, Sandspit	
go:gb	U	10/05/16	12/04/16	9	Fort Ord, '15	Arroyo Laguna	
ka:gr	U	10/19/16	12/16/16	7	San Francisco Bay, '15	Arroyo Laguna	
lw:aw	J	10/12/16	02/13/17	3	Salinas SB, '16	Sidney's Lagoon, Arroyo Laguna, San Simeon Creek Beach	
no:by	U	10/09/16	11/09/16	5	VAFB, '13	Arroyo Laguna	
no:nr	U	10/12/16	01/08/17	5	VAFB, '15	Arroyo Laguna, San Simeon Creek Beach	
no:ny	J	10/05/16	01/03/17	9	VAFB, '16	Sandspit	
no:or	J	10/08/16	01/26/17	17	VAFB, '16	Villa Creek Beach, Morro Strand, Sandspit	
no:pb	F	10/25/16	01/03/17	2	VAFB, '14	San Simeon Creek Beach	
no:wb	J	10/05/16	02/13/17	12	VAFB, '16	Sidney's Lagoon, Arroyo Laguna, San Simeon Creek Beach	
nr:gg	M	10/05/16	01/24/17	10	VAFB, '15	Sandspit	
nr:nr	J	12/13/16	12/13/16	1	VAFB, '16	San Simeon Creek Beach	
nw:gb	J	10/05/16	01/24/17	6	VAFB, '16	Sandspit	
ny:ry	F	10/05/16	02/06/17	5	VAFB, '14	Morro Strand, Sandspit	
ny:wb	J	10/05/16	10/05/16	1	VAFB, '16	Sandspit	
o/w/o:g	U	10/12/16	10/12/16	1	Oregon, '15	Arroyo Laguna	
oa:ya	M	10/05/16	01/10/17	8	Pajaro Spit, '14	Sandspit	
ow:wr	F	10/02/16	02/06/17	17	Fort Ord, '15	Villa Creek Beach, Morro Strand, Sandspit	

Appendix 5 — Banded WSP with Known Origins Observed on District Beaches October 2016 - February 2017

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
Oy:br	M	10/05/16	01/24/17	7	Fort Ord, '16	Sandspit	Banded as an adult
oy:rl	J	10/05/16	01/25/17	13	Fort Ord, '16	Villa Creek Beach, Morro Strand, Sandspit	
py:g	M	10/03/16	02/13/17	14	VAFB, '12	Sandspit	
pg:bw	M	10/03/16	10/05/16	2	ODSVRA, '14	Sandspit	
pg:ob	F	10/05/16	02/23/17	12	ODSVRA, '14	Sandspit	
pg:og	M	10/03/16	10/03/16	1	ODSVRA, '15	Morro Strand	
pv:gg	U	10/05/16	01/10/17	6	ODSVRA, '14	Morro Strand, Sandspit	
pv:pb	F	10/29/16	01/24/17	5	ODSVRA, '15	Sandspit	
pv:ry	F	10/19/16	12/16/16	7	ODSVRA, '15	Arroyo Laguna, San Simeon Creek Beach	
ra:gy	F	10/05/16	11/09/16	5	Salinas NWR, '14	Arroyo Laguna	
ra:wr	F	10/18/16	02/06/17	5	Moss Landing SB, '15	Morro Strand, Sandspit	
rb:bg	F	10/05/16	01/14/17	9	Fort Ord, '15	Morro Strand, Sandspit	
rb:ol	J	10/05/16	12/02/16	7	Marina SB, '16	Villa Creek Beach, Morro Strand, Sandspit	
rg:yb	M	10/05/16	02/06/17	6	Oregon, '11	Morro Strand, Sandspit	
ro:bo	U	10/09/16	10/27/16	2	Salinas NWR, '15	Arroyo Laguna, San Simeon Creek Beach	
ro:yl	J	10/05/16	12/04/16	10	Marina SB, '16	Arroyo Laguna	
rr:bb	J	10/18/16	10/18/16	1	ODSVRA, '16	Sandspit	
rr:ww	M	10/05/16	02/23/17	9	ODSVRA, '10	Sandspit	
Rw:br	M	01/03/17	01/03/17	1	Zmudowski SB, '09	San Carpoforo Creek Beach	Banded as an adult
s:rr	F	10/05/16	01/24/17	9	VAFB, '12	Sandspit	Formerly ns:rr
v:g/w	J	10/25/16	01/10/17	3	VAFB, '16	Villa Creek Beach, Sandspit	
v:w	M	01/25/17	01/25/17	1	ODSVRA, '08	Morro Strand	Formerly pv:w
v:w/b/w	J	11/01/16	01/24/17	3	VAFB, '16	Villa Creek Beach, Morro Strand, Sandspit	
vg:yy	J	10/05/16	02/13/17	6	ODSVRA, '16	Point Sierra Nevada, Sidney's Lagoon, Arroyo Laguna, San Simeon Creek Beach	
vv:gw	U	10/05/16	01/27/17	8	ODSVRA, '15	Arroyo Laguna, San Simeon Creek Beach	
vv:ry	U	10/05/16	11/30/16	8	ODSVRA, '15	Arroyo Laguna, San Simeon Creek Beach, Morro Strand	
w:ob	U	10/05/16	02/13/17	8	VAFB, '13	Arroyo Laguna, San Simeon Creek Beach	Formerly nw:ob
wa:ga	M	10/11/16	01/26/17	9	Pajaro Spit, '14	Morro Strand, Sandspit	
wo:gg	U	10/05/16	10/05/16	1	Zmudowski SB, '15	Arroyo Laguna	
wr:gg	U	11/01/16	11/01/16	1	Fort Ord, '15	Arroyo Laguna	
wy:ga	F	10/05/16	02/25/17	7	Pajaro Dunes, '14	Arroyo Laguna, San Simeon Creek Beach	
yg:wl	J	10/05/16	10/05/16	1	Marina SB, '16	Morro Strand	
Yr:wg	M	01/03/17	01/03/17	1	Monterey SB, '15	San Carpoforo Creek Beach	Banded as an adult

Appendix 6 — Banded WSP with Known Origins Observed on District Beaches March-September 2017

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
a:g/w	F	03/08/17	04/20/17	9	VAFB, '15	Morro Strand, Sandspit	One potential nest failed to coyote
ab:go	U	07/12/17	09/24/17	2	Salinas NWR, '11	Arroyo Laguna, Sandspit	
an:ab	J	08/17/17	08/27/17	4	VAFB, '17	Morro Strand	
an:ww	U	07/10/17	09/21/17	12	VAFB, '15	Morro Strand, Sandspit	
an:yy	U	08/09/17	08/09/17	1	VAFB, '15	San Simeon Creek Beach	
aw:ll	U	04/11/17	04/11/17	1	Pajaro Spit, '16	San Simeon Creek Beach	
ay:aa	M	03/21/17	08/24/17	38	Marina SB, '14	Sandspit	Two nests hatched with at least one chick fledged
b/a/b:g	F	03/13/17	09/12/17	9	Oregon, '15	Sandspit	
b:or	F	03/07/17	09/19/17	41	VAFB, '13	Villa Creek Beach, Morro Strand, Sandspit	Formerly nb:or; paired with v:w; one nest failed to skunk; one nest hatched
Ba:wy	F	03/09/17	09/21/17	21	Moss Landing Salt Ponds, '14	Morro Strand, Sandspit	Banded as an adult; one nest hatched
bb:gb	M	03/06/17	09/21/17	47	ODSVRA, '15	Sandspit	One confirmed nest hatched with at least one chick fledged; three potential additional nests -- two failed to tide, one failed to coyote
bb:gr	U	07/18/17	09/07/17	3	ODSVRA, '15	Arroyo Laguna, Sandspit	
bb:ob	M	03/02/17	09/26/17	18	ODSVRA, '16	Sandspit	
bb:ow	F	04/05/17	04/06/17	2	ODSVRA, '16	Morro Strand	
bb:vy	F	03/06/17	09/21/17	3	ODSVRA, '16	Morro Strand	
bg:yl	F	07/18/17	08/25/17	13	Marina SB, '16	Sandspit	
By:rb	M	03/06/17	09/21/17	6	Marina SB, '15	Morro Strand, Sandspit	Banded as an adult
g:g/y/g	F	03/02/17	09/21/17	30	VAFB, '16	Morro Strand, Sandspit	Two potential nests -- one failed to coyote and one hatched
ga:br	U	03/14/17	07/06/17	19	ODSVRA, '16	Sandspit	One potential nest hatched
ga:gr	U	03/08/17	09/21/17	2	ODSVRA, '15	Morro Strand	
ga:pb	U	07/18/17	09/19/17	11	ODSVRA, '16 or '17	Morro Strand, Sandspit	
ga:vb	J	07/22/17	07/22/17	1	OSDVRA, '17	Morro Strand	
gg:og	M	03/02/17	09/12/17	81	ODSVRA, '14	Sandspit	Two nests hatched with two fledges; one additional potential nest
gg:pb	F	03/10/17	09/28/17	62	ODSVRA, '12	Arroyo Laguna, Sandspit	Two nests hatched; one nest failed to American Crow
gg:pr	U	08/22/17	08/31/17	3	ODSVRA, '16	Arroyo Laguna, Morro Strand	
gg:wb	M	07/27/17	09/19/17	10	ODSVRA, '13	Sandspit	
go:gb	U	07/26/17	09/21/17	9	Fort Ord, '15	Arroyo Laguna, Morro Strand	
l/y/l:k	J	09/19/17	09/19/17	1	Oregon, '17	Sandspit	
nb:ar	J	08/22/17	09/21/17	6	VAFB, '17	Morro Strand, Sandspit	
nb:bw	U	08/06/17	09/21/17	5	VAFB, '16	Morro Strand	
no:nr	U	09/19/17	09/19/17	1	VAFB, '15	Sandspit	
no:ny	M	03/08/17	09/21/17	7	VAFB, '16	Morro Strand, Sandspit	

Appendix 6 — Banded WSP with Known Origins Observed on District Beaches March-September 2017

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
no:pb	F	04/11/17	04/27/17	3	VAFB, '14	San Simeon Creek Beach, Villa Creek Beach, Morro Strand	Paired with Sk:u
no:wb	F	05/01/17	09/21/17	16	VAFB, '16	Arroyo Laguna, Sandspit	Two potential nests hatched
nr:aw	J	08/27/17	08/27/17	1	VAFB, '17	Morro Strand	
nr:gg	M	03/07/17	09/21/17	44	VAFB, '15	Sandspit	Two nests hatched
nr:nr	F	03/21/17	04/05/17	4	VAFB, '16	Morro Strand	
nw:gw	J	09/19/17	09/19/17	1	VAFB, '17	Morro Strand	
ny:nr	F	03/13/17	03/13/17	1	VAFB, '15	Morro Strand	
ny:ry	F	03/01/17	05/16/17	21	VAFB, '14	Morro Strand, Sandspit	One nest hatched; one nest failed to American Crow
o/y:k	J	09/21/17	09/21/17	1	Oregon, '17	Sandspit	
o:by	U	08/04/17	09/21/17	2	VAFB, '13	Arroyo Laguna	Formerly no:by
o:w/r/w	J	09/21/17	09/21/17	1	VAFB, '17	Morro Strand	
oa:ya	M	03/02/17	09/19/17	49	Pajaro Spit '14	Sandspit	One nest hatched; one nest failed to coyote
or:ay	M	08/10/17	09/21/17	9	Humboldt Bay, '17	Morro Strand	Banded as adult
ow:wr	F	03/07/17	09/21/17	70	Fort Ord, '15	Villa Creek Beach, Morro Strand	One nest hatched; one nest failed to unknown predator; one nest failed due to abandonment
Oy:br	M	08/08/17	09/12/17	9	Fort Ord, '16	Sandspit	Banded as adult
p:y/g	M	03/02/17	08/22/17	34	VAFB, '12	Sandspit	One nest hatched with one fledgling
pg:ob	F	03/06/17	09/12/17	41	ODSVRA, '14	Sandspit	Two nests hatched; one nest failed to tide; one potential additional nest hatched
pv:aw	J	08/30/17	09/28/17	5	ODSVRA, '17	Arroyo Laguna, Morro Strand, Sandspit	
pv:gb	F	03/24/17	03/24/17	1	ODSVRA, '16	Sandspit	One potential nest failed to abandonment
pv:gg	U	07/25/17	07/25/17	1	ODSVRA, '14	Sandspit	
pv:gr	J	07/11/17	07/11/17	1	ODSVRA, '17	Sandspit	
pv:gw	J	08/09/17	09/21/17	2	ODSVRA, '17	Arroyo Laguna	
pv:ob	J	09/07/17	09/07/17	1	ODSVRA, '17	Sandspit	
pv:pb	F	03/21/17	08/04/17	26	ODSVRA, '15	Sandspit	Two nests hatched
pv:rb	U	07/11/17	07/11/17	1	ODSVRA, '16	Sandspit	
pv:rg	J	07/07/17	07/14/17	5	ODSVRA, '17	Morro Strand, Sandspit	
pv:ry	F	03/13/17	04/24/17	14	ODSVRA, '15	Villa Creek Beach, Morro Strand	Paired
pv:yg	U	03/15/17	03/15/17	1	ODSVRA, '15	Morro Strand	
pv:yw	J	07/22/17	08/20/17	10	ODSVRA, '17	Morro Strand, Sandspit	
ra:gy	F	05/11/17	09/12/17	9	Salinas NWR, '14	Sandspit	
rb:bg	M	03/09/17	09/12/17	43	Fort Ord, '15	Sandspit	One nest hatched; one nest failed to coyote
rg:yb	M	03/01/17	09/19/17	3	Oregon, '11	Morro Strand	
rr:bb	U	03/22/17	09/19/17	27	ODSVRA, '16	Morro Strand, Sandspit	
rr:wb	J	06/28/17	06/29/17	2	ODSVRA, '17	Villa Creek Beach, Sandspit	

Appendix 6 — Banded WSP with Known Origins Observed on District Beaches March-September 2017

Band Combination	Sex	First Seen	Last Seen	# Times Seen	History	Location	Notes
rr:ww	M	03/07/17	09/21/17	61	ODSVRA, '10	Morro Strand, Sandspit	Two nests hatched; one nest failed to tide; one potential additional nest hatched
Rw:br	M	04/11/17	09/02/17	7	Zmudowski SB, '09	San Carpoforo Creek Beach	Banded as an adult; one nest either failed to unknown predator or had an unknown fate
Sk:u	M	04/20/17	08/09/17	13	Coronado NAS, Sea World '15	Morro Strand, Sandspit	Formerly Sk:k/a k/l; one nest hatched; one nest failed to coyote
v:w	M	03/08/17	08/26/17	37	ODSVRA, '08	Villa Creek Beach, Morro Strand, Sandspit	Formerly pv:pw; paired with b:or for two out of four nests; one nest hatched; one nest failed to unknown avian; one nest failed to skunk; one potential nest failed to unknown predator
v:w/b/w	F	03/10/17	03/10/17	1	VAFB, '16	Morro Strand	
vg:bw	J	07/18/17	07/18/17	1	ODSVRA, '17	Sandspit	
vv:ab	J	07/23/17	07/26/17	2	ODSVRA, '17	Morro Strand, Sandspit	
vv:gw	F	03/28/17	09/24/17	2	ODSVRA, '15	Arroyo Laguna, Morro Strand	
vv:or	M	03/07/17	09/19/17	54	ODSVRA, '15	Toro Creek, Morro Strand, Sandspit	One nest hatched; one nest failed to coyote; one nest failed to unknown cause; one potential nest failed to unknown predator
vv:ry	U	04/11/17	04/11/17	1	ODSVRA, '15	San Simeon Creek Beach	
vv:yy	J	08/20/17	08/20/17	1	ODSVRA, '17	Morro Strand	
w:ob	U	08/04/17	08/31/17	4	VAFB, '13	San Simeon Creek Beach, Arroyo Laguna	Formerly nw:ob
wa:ga	M	03/07/17	09/21/17	60	Pajaro Spit, '14	Sandspit	One nest hatched with two fledges; two nests failed to coyote; one nest failed to tide
wy:ga	F	08/26/17	09/24/17	5	Pajaro Dunes, '14	San Simeon Creek Beach, Arroyo Laguna	

Appendix 7 – Injured and Dead WSP on District Beaches October 2016 - September 2017

Date	Location	Sex	Age	Band Combination	Nest	Description of Injury	Actions Taken	Comments
10/05/16	Sandspit	U	Unknown			Missing one leg	None	Moved around without difficulty. No bands on leg.
11/06/16	Sandspit	F	Adult	rb:bg		Tar on rb (left leg) bands	None	Tar not observed on subsequent sightings. Next sighting was on 11/29/16.
03/14/17	Morro Strand	U	Adult			Did not lower one leg	None	Moved around without difficulty.
05/12/17	Sandspit	U	Chick		SSS010 or SSS026	Dead	Notified USFWS. Documented with photographs and GPS location. Carcass collected and sent in for necropsy.	Hatched either 5/11/17 or 5/12/17. Found dead within 100 feet of nest bowls inside symbolically fenced habitat. Necropsy revealed signs of trauma from an unknown cause.
07/12/17	Sandspit	M	Adult			Right foot curled back under leg	None	No substances seen on foot/leg. Resighted on three subsequent dates in July. Behaving normally during each observation.
07/31/17	Morro Strand	U	Chick		MS13	Dead	Notified USFWS. Documented with photographs. Carcass collected and deposited at SBNHM.	Died in nest bowl after hatching five days later than other two chicks. Adults were no longer attending nest.
07/31/17	Sandspit	U	Chick			Dead	Notified USFWS. Documented with photographs and GPS location. Collected carcass and deposited at SBNHM.	Found dessicated inside symbolically fenced habitat. No apparent cause of death.

Appendix 8 – 2017 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
HSSSP -- San Carpoforo Creek Beach										
SC02	60°, 80°, 85°	05/08/17	20	05/28/17			Unknown Fate	6/1/2017		J Ebner
Villa Creek Beach										
VC03	90°, 7 mm, 12 mm	04/27/17	15	05/12/17	19	05/16/17				W Eggers
VC08	16 mm, 16 mm, 16 mm	06/07/17	5	06/12/17	6	06/13/17				R Orr
VC09	90°, 10 mm, 11 mm	06/22/17	16	07/08/17	18	07/10/17				W Eggers
VC11	60°, 90°, cracked	06/29/17	22	07/21/17	20	07/19/17				W Eggers
VC12	80°	07/13/17	19	08/01/17			Abandoned	08/04/17	22	W Eggers
VC13	50°, 60°	07/18/17	21	08/08/17	22	08/09/17				R Orr
Morro Strand										
MS02	30°, 30°, 30°	03/29/17	26	04/24/17			American Crow	03/30/17	1	R Orr
MS16	85°, 90°, 8 mm	07/13/17	15	07/28/17	19	08/01/17				W Eggers
Sandspit North										
NSS006	25°, 30°, 45°	03/23/17	25	04/17/17			Tide	03/27/17	4	W Eggers
NSS023	45°, 60°	04/21/17	21	05/12/17			Unknown Fate	05/10/17		W Eggers
NSS027	45°, 70°, 80°	04/21/17	22	05/13/17	22	05/13/17				W Eggers
NSS028	15°, 40°, 40°	04/21/17	25	05/16/17			Coyote	04/26/17	5	W Eggers
NSS030	20°, 30°, 40°	04/21/17	25	05/16/17	26	05/17/17				W Eggers
NSS034	90°, 4 mm, 7 mm	05/02/17	16	05/18/17	14	05/16/17				W Eggers
NSS035	80°, 85°, 90°	05/02/17	18	05/20/17	18	05/20/17				W Eggers
NSS036	85°, 90°, 90°	05/02/17	18	05/20/17			Abandoned	05/15/17	13	W Eggers
NSS037	2 NBs - 1E: 60°, 2E: 40°, 45°	05/02/17	23	05/25/17			Coyote	05/05/17	3	W Eggers
NSS042	30°, 40°, 45°	05/03/17	24	05/27/17	26	05/29/17				W Eggers
NSS043	30°, 45°, 60°	05/03/17	23	05/26/17	22	05/25/17				W Eggers
NSS046	6 mm, 9 mm, 12 mm	05/19/17	12	05/31/17	11	05/30/17				W Eggers
NSS058	70°	05/19/17	18	06/06/17	11	05/30/17				W Eggers
NSS062	30°, 35°, 60°	05/19/17	23	06/11/17	24	06/12/17				W Eggers
NSS067	40°, 40°, 45°	05/19/17	24	06/12/17			Coyote	05/24/17	5	W Eggers
NSS074	45°	06/01/17	22	06/23/17			Tide	06/22/17	21	R Orr
NSS080	10 mm, 11 mm, 15 mm	06/01/17	11	06/12/17			Coyote	06/18/17	17	R Orr
NSS081	75°, 80°, 90°	06/01/17	19	06/20/17	19	06/20/17				R Orr
NSS087	25°, 30°, 30°	06/01/17	26	06/27/17			Coyote	06/09/17	8	R Orr

Appendix 8 – 2017 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
NSS091	90°, 90°, 8 mm	06/05/17	14	06/19/17	11	06/16/17				R Orr
NSS101	4 mm	06/21/17	16	07/07/17			Abandoned	07/10/17		W Eggers
NSS102	45°, 50°, 60°	06/16/17	22	07/08/17			Tide	06/22/17	6	W Eggers
NSS103	85°, 85°, 11 mm	06/16/17	15	07/01/17			Tide	06/22/17	6	W Eggers
NSS104	35°, 70°, 85°	06/16/17	21	07/07/17			Coyote	06/22/17	6	W Eggers
NSS106	0°, 35°, 45°	06/16/17	26	07/12/17	26	07/12/17				W Eggers
NSS108	70°, 85°, 85°	06/21/17	19	07/10/17			Tide	06/23/17	2	W Eggers
NSS111	10°, 15°, 30°	06/23/17	26	07/19/17			Coyote	06/30/17	7	W Eggers
NSS116	8 mm, 12 mm, 12 mm	07/04/17	10	07/14/17	12	07/16/17				W Eggers
NSS118	40°, 75°, 90°	07/04/17	20	07/24/17	20	07/24/17				W Eggers
NSS127	70°, 70°	07/10/17	20	07/30/17	20	07/30/17				R Orr
NSS128	45°, 60°, 60°	07/04/17	21	07/25/17	24	07/28/17				W Eggers
NSS129	10°, 20°, 30°	07/10/17	27	08/06/17	25	08/04/17				R Orr
NSS130	20°, 40°, 40°	07/10/17	26	08/05/17	25	08/04/17				R Orr
NSS131	85°, 90°, 8 mm	07/12/17	15	07/27/17	17	07/29/17				W Eggers
NSS133	85°, 90°, 90°	07/12/17	18	07/30/17			Coyote	07/24/17	12	W Eggers
NSS134	55°, 75°, 80°	07/14/17	20	08/03/17			Coyote	07/24/17	10	W Eggers
NSS135	45°, 65°, 85°	07/14/17	20	08/03/17			Coyote	07/29/17	15	W Eggers
NSS136	85°, 90°	07/28/17	18	08/15/17			Abandoned	08/11/17	14	W Eggers
NSS137	13 mm, 14 mm, 14 mm	07/21/17	9	07/30/17	7	07/28/17				W Eggers
South										
SSS007	10°, 10°, 30°	04/06/17	27	05/03/17			Abandoned	04/24/17	18	R Orr
SSS019	30°, 40°, 40°	04/14/17	24	05/08/17	26	05/10/17				W Eggers
SSS023	8 mm, 9 mm, 11 mm	05/03/17	14	05/17/17	12	05/15/17				R Orr
SSS025	90°, 90°, 8 mm	05/03/17	16	05/19/17	14	05/17/17				R Orr
SSS026	14 mm, 16 mm, 16 mm	05/03/17	7	05/10/17	8	05/11/17				W Eggers
SSS027	10 mm, 11 mm, 16 mm	05/03/17	10	05/13/17	12	05/15/17				R Orr
SSS042	2E cracked	05/26/17	1	05/27/17	1	05/27/17				W Eggers
SSS043	20°, 30°, 40°	05/24/17	26	06/19/17	26	06/19/17				W Eggers
SSS054	60°, 75°, 80°	05/24/17	20	06/13/17	22	06/15/17				W Eggers
SSS059	50°, 70°, 80°	06/01/17	21	06/22/17	20	06/21/17				R Orr
SSS061	10 mm, 13 mm	06/08/17	12	06/20/17	8	06/16/17				J Sayers
SSS063	45°, 50°, 65°	06/01/17	23	06/24/17	22	06/23/17				R Orr
SSS064	90°, 14 mm	06/08/17	16	06/24/17			Tide	06/22/17	12	J Sayers
SSS065	30°, 45°, 50°	06/03/17	23	06/26/17	23	06/26/17				W Eggers
SSS069	30°, 30°, 30°	06/08/17	25	07/03/17	25	07/03/17				R Orr

Appendix 8 – 2017 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
SSS070	85°, 90°, 90°	06/10/17	17	06/27/17			Coyote	06/13/17	17	W Eggers
SSS077	40°, 60°, 90°	06/28/17	22	07/20/17	19	07/17/17				R Orr
SSS079	60°, 80°, 90°	06/28/17	21	07/19/17	20	07/18/17				R Orr
SSS083	90°, 90°	07/10/17	16	07/26/17	11	07/21/17				R Orr
SSS084	30°, 40°, 50°	07/04/17	24	07/28/17	23	07/27/17				W Eggers
SSS085	30°, 40°, 50°	07/04/17	24	07/28/17	24	07/28/17				W Eggers
SSS086	9 mm, 10 mm, 13 mm	07/10/17	12	07/22/17	14	07/24/17				R Orr
SSS087	9 mm, 11 mm, 15 mm	07/12/17	11	07/23/17	12	07/24/17				R Orr
SSS088	14 mm, 15 mm, 15 mm	07/21/17	8	07/29/17	6	07/27/17				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.

Appendix 9 — Exclosed vs. Unexclosed Nest Fates at Morro Strand 2003-2017

	2017		2016		2015		2014 ²		2013		2012		2011		2010		2009		2008		2007 ³		2006 ⁴		2005 ⁵		2004 ⁶		2003	
Exclosure Type: Large (> 10 ft. diameter)																														
# of nests exclosed, % of total nests	5	31%	0	0%	0	0%	7	41%	7	58%	5	42%	14	56%	14	58%	16	62%	11	33%	7	37%	31	91%	25	93%	22	58%	0	0%
Nests hatched ¹	5		0		0		1		3		2		10		8		14		6		2		7		19		8		0	
Nests depredated	0		0		0		3		0		0		0		1		0		0		0		1		1		3		0	
Failed, adult mortality	0		0		0		1		0		0		0		0		0		0		0		3		0		0		0	
Failed, abandoned	0		0		0		3		2		2		2		2		2		3		5		18		3		6		0	
Failed, other causes	0		0		0		2		2		1		2		2		0		2		0		1		2		5		0	
Unknown fate	0		0		0		0		0		0		0		1		0		0		0		1		0		0		0	
Number adults depredated in/near nest	0		0		0		1		0		0		0		0		0		0		0		3		1		0		0	
Number adults entangled in net top	0		0		0		0		0		0		0		0		0		0		0		0		1		2		0	
Exclosure Type: None																														
# of nests unexclosed, % of total nests	11	69%	16	100%	13	100%	10	59%	5	42%	7	58%	11	44%	10	42%	10	38%	22	67%	12	63%	3	9%	2	7%	16	42%	45	100%
Nests hatched ¹	0		3		5		4		1		0		0		0		0		0		5		2		0		0		3	
Nests depredated	9		10		5		3		3		6		9		5		6		8		5		1		2		11		33	
Failed, abandoned	1		2		1		1		1		0		0		3		1		3		1		0		0		0		1	
Failed, other causes	1		1		2		1		0		1		2		2		3		9		1		0		0		5		8	
Unknown fate	0		0		0		1		0		0		0		0		0		2		0		0		0		0		0	

NOTES

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

Appendix 10 — WSP Population Census Data on District Beaches October 2016 - September 2017

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
10/05/16	-	1	-	2	-	92	4	0	99
10/12/16	-	1	0	18	-	80	13	-	112
10/19/16	-	0	-	4	-	66	33	-	103
10/25/16	-	0	-	4	-	98	31	0	133
10/27/16	-	2	-	-	-	-	-	-	2
11/01/16	-	-	0	0	5	117	41	-	163
11/09/16	-	-	-	-	0	138	0	-	138
11/15/16	-	-	-	-	-	-	32	0	32
11/21/16	-	-	-	-	-	59	69	-	128
11/22/16	-	-	0	0	0	-	-	0	0
11/29/16	-	-	-	-	-	-	56	0	56
11/30/16	-	0	-	-	-	77	-	-	77
12/13/16	-	-	-	-	-	-	18	0	18
12/16/16	6	0	0	0	0	34	147	-	187
01/03/17	24	-	-	-	-	22	112	-	158
01/12/17	-	-	-	-	-	-	128	-	128
01/24/17 ²	14	0	0	0	0	6	0	0	20
01/31/17	-	-	-	-	-	-	32	0	32
02/01/17	4	-	-	0	-	0	-	-	4
02/07/17	-	-	-	-	-	-	-	2	2
02/13/17	16	0	-	-	-	0	157	0	173
04/11/17	3	1	0	0	0	0	17	0	21
05/24/17 ³	3	0	0	0	0	5	0	0	8
06/15/17	0	-	0	-	-	0	0	-	0
07/13/17	0	-	-	-	-	1	4	-	5
08/09/17	-	-	-	-	-	49	11	8	68
09/21/17	16	0	0	11	-	57	18	10	112

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

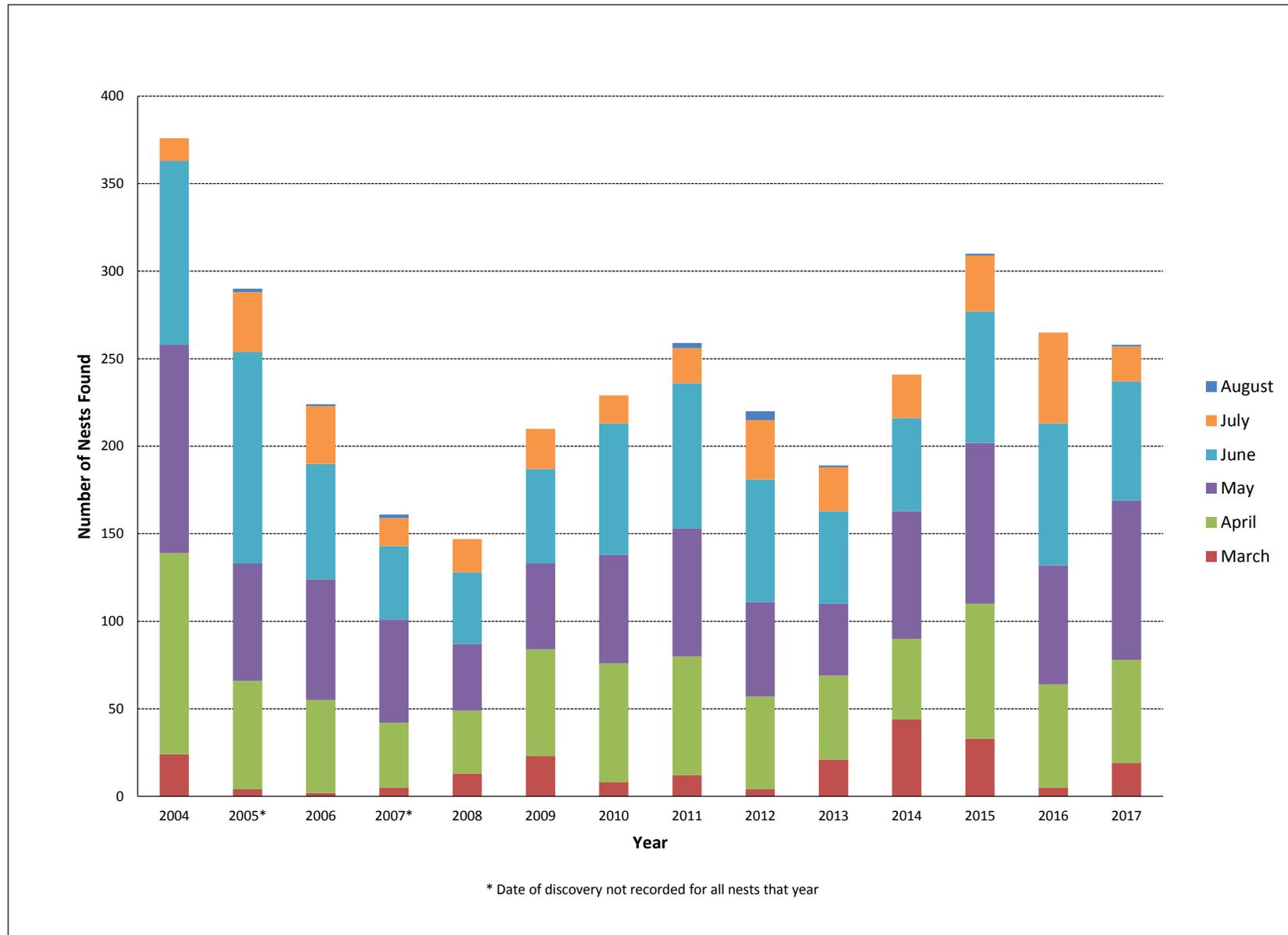
NOTES

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

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 ¹	Male	Female	Unknown	Juvenile	Chick
10/05/16	36			36			0	81	81			81			187			187		
10/11/16	27			27			0	94	94			94			97			97		
10/15/16	-						5	-	5			5			-			-		
10/18/16	48			48			0	20	20			20			166			166		
10/25/16	24			24			0	5	5			5			158			158		
11/01/16	-						-	-	-			-			156			156		
11/03/16	45			45			-	0	0			-			-			-		
11/08/16	52			52			-	0	0			-			59			59		
11/15/16	46			46			0	0	0			-			77			77		
11/22/16	40			40			0	0	0			-			36			36		
11/29/16	55			55			0	19	19			19			135			135		
12/06/16	48			48			-	44	44			44			45			45		
12/13/16	75			75			-	0	0			-			148			148		
12/20/16	42			42			-	50	50			50			88			88		
12/30/16	-						22	-	22			22			-			-		
01/03/17	25			25			-	94	94			94			117			117		
01/05/17	-						-	81	81			81			-			-		
01/10/17	2			2			0	21	21			21			195			195		
01/17/17	3			3			-	24	24			24			233			233		
01/24/17 ²	0						-	55	55			55			201			201		
01/31/17	31			31			-	0	0			-			-			-		
02/01/17	-						-	30	30			30			-			-		
02/06/17	-						-	145	145			145			-			-		
02/13/17	48			48			0	50	50			50			99			99		
03/21/17	0						-	135	135	45	59	31			120	56	59	5		
04/18/17	8	4	4				-	1	1	1	1				105	47	45	13		
05/16/17	10	5	5			2	-	2	2	1	1				146	66	70	10		3
05/23/17 ³	6	2	4				-	2	2	1	1				149	71	68	10		6
06/20/17	12	4	3	4	1		-	8	8	4	4				133	50	60	21	2	10
07/18/17	9	2	3	2	2		-	28	28	7	11	4	6		164	51	67	38	8	13
08/15/17	24	4	2	13	5	3	-	132	132	6	1	114	11		83	14	29	28	12	9
09/12/17	23		1	20	2		-	229	229	3		212	14		83	5	3	58	17	

Appendix 11 — Number of Nests Found by Month on District Beaches 2004-2017



Appendix 11a -- Nest Initiation and Last Hatch Dates Summary for District Beaches

Hearst San Simeon State Park		
Year	First Nest Initiation	Last Nest Hatched
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*

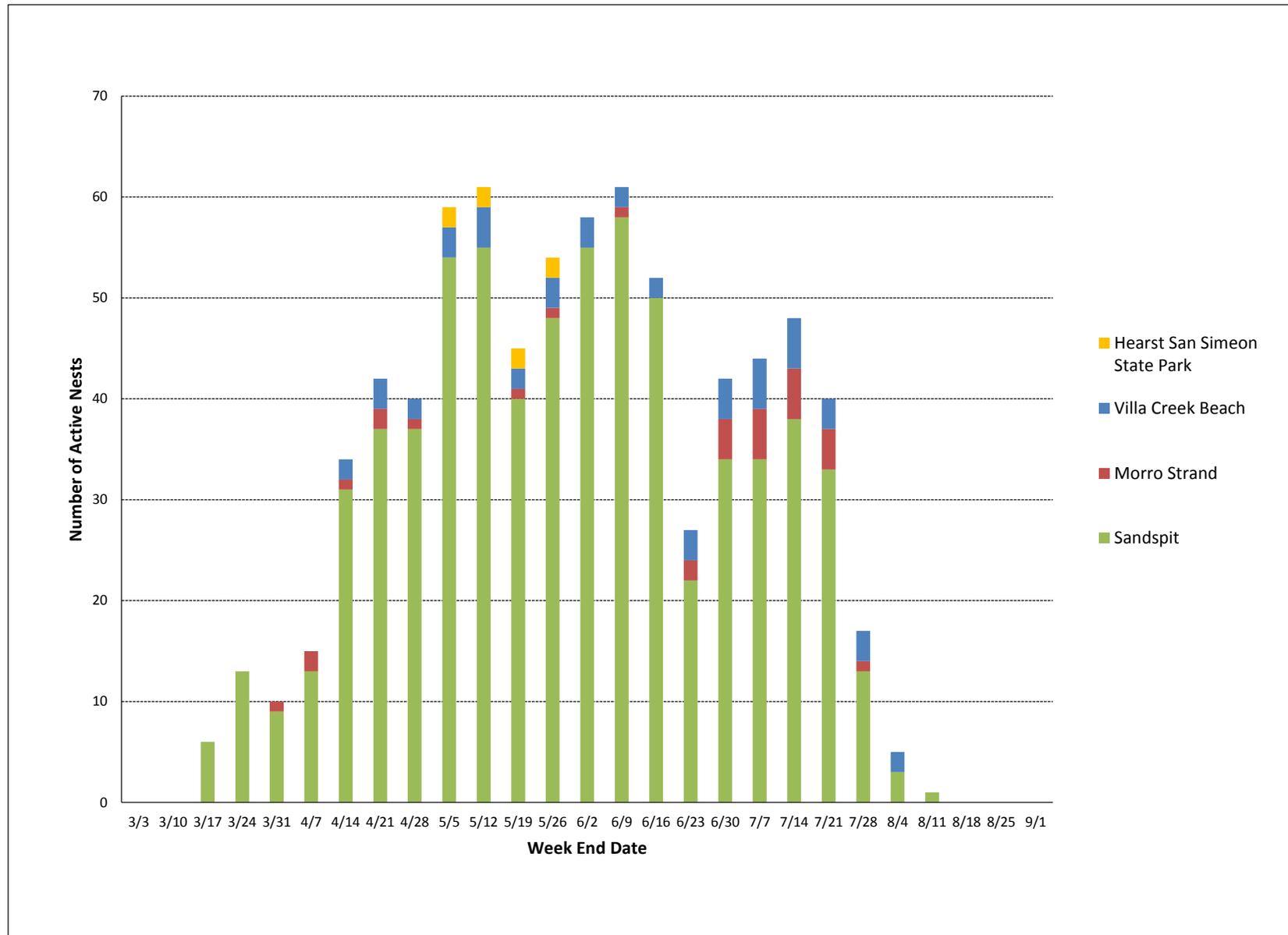
Villa Creek Beach		
Year	First Nest Initiation	Last Nest Hatched
2017	12-Apr	9-Aug
2016	13-Apr	14-Jul*
2015	25-Mar	22-Jul
2014	21-Mar	21-Jul*
2013	5-Apr	22-Jun
2012	9-Apr	14-Aug
2011	5-Apr	29-Jul
2010	31-Mar*	28-Jul
2009	9-Mar	29-Jun
2008	17-Mar	5-Aug
2007	9-Mar	1-Aug
2006	24-Mar	26-Jul
2005	30-Mar	22-Jul
2004	18-Mar	6-Aug
2003	21-Mar	31-Jul
2002	27-Mar	28-Aug
2001	28-Mar	30-Jul

Morro Strand		
Year	First Nest Initiation	Last Nest Hatched
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

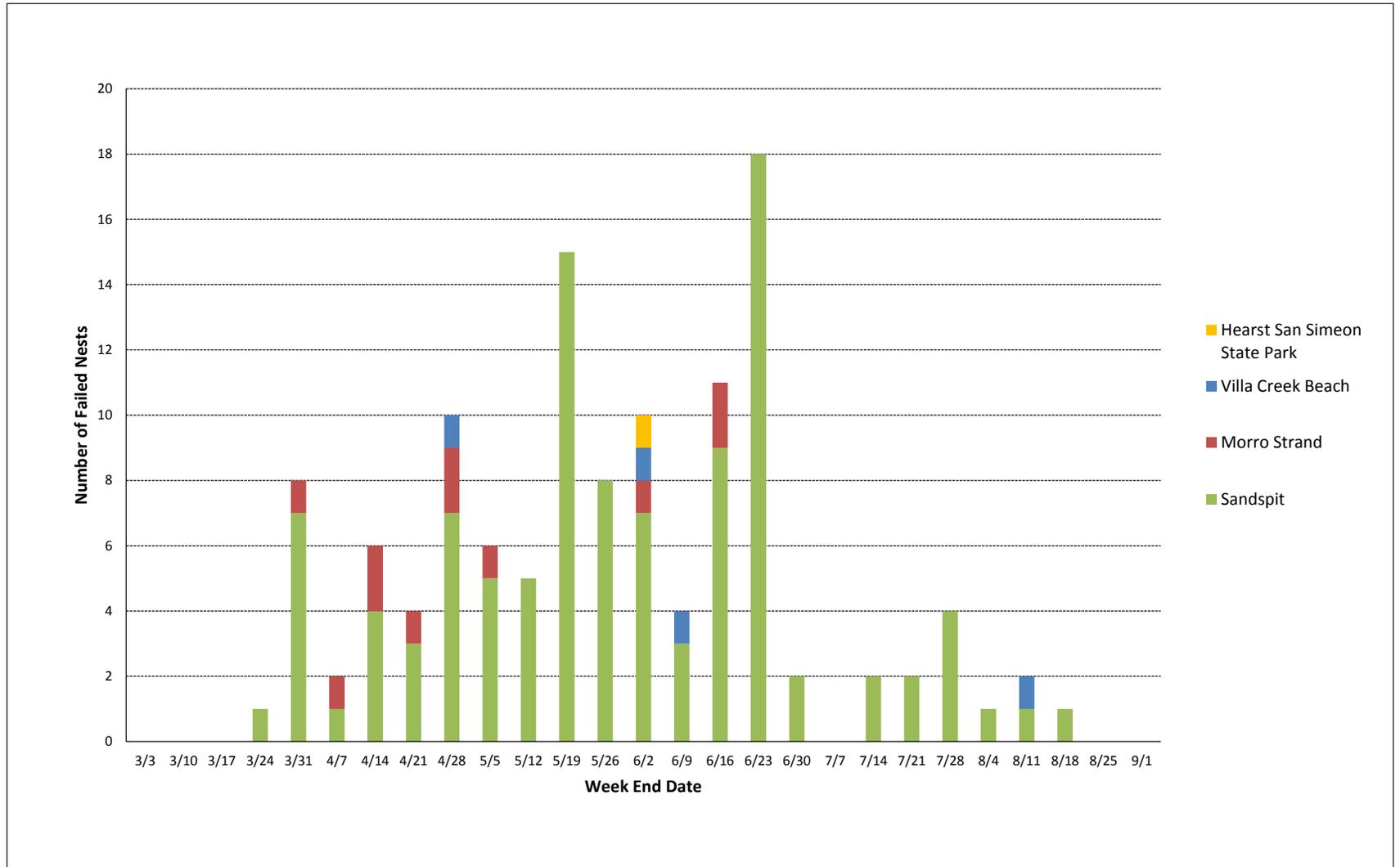
Sandspit		
Year	First Nest Initiation	Last Nest Hatched
2017	15-Mar	8-Aug
2016	28-Mar	13-Aug
2015	13-Mar	24-Aug
2014	12-Mar	18-Aug
2013	21-Mar	12-Aug
2012	14-Mar	18-Aug
2011	15-Mar	23-Aug
2010	19-Mar	8-Aug
2009	9-Mar	17-Aug
2008	18-Mar	18-Aug
2007	21-Mar	20-Aug
2006	7-Apr	15-Aug
2005	24-Mar	17-Aug
2004	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 11b — Number of Active Nests Through Progressive Weeks of the 2017 Breeding Season



Appendix 11c — Number of Failed Nests Through Progressive Weeks of the 2017 Breeding Season



Appendix 11d — Summary of Nest Fates at District Beaches 2001-2017

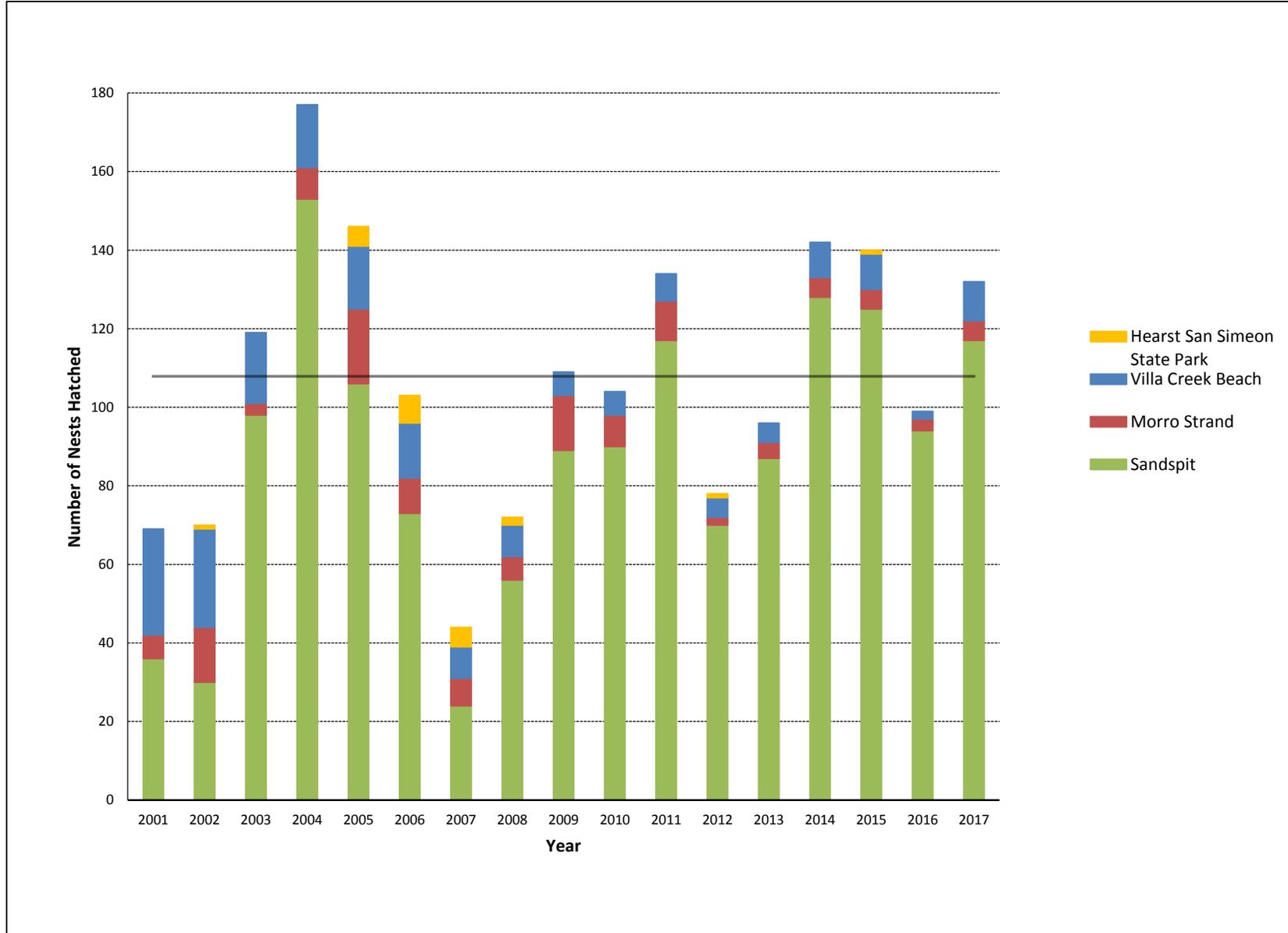
	2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004 ¹		2003 ¹		2002 ^{1,2}		2001 ^{1,2}	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Morro Strand																																		
Total # of nests	16		16		13		17		12		12		25		24		26		33		19		34		27		38		45		37		14	
# Nests hatched	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	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		2	13%	2	17%	2	17%	3	12%	2	9%	1	4%	6	19%	1	5%	0		1	4%	3	8%	0		0		0	
Failed abandoned	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		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		1	3%	0		1	3%	0		0		0	
Failed other	0		0		1	8%	0		0		0		0		0		0		0		0		0		0		2	5%	0		0		0	
Failed unknown	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	0		0		0		1		0		0		0		1		0		2		0		1		0		0		0		0		0	
Sandspit																																		
Total # of nests	226		238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109	
# Nests hatched	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	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	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	
Failed abandoned	18	8%	21	8%	17	6%	20	10%	11	7%	13	8%	26	12%	13	7%	6	4%	2	2%	8	7%	5	4%	11	5%	7	3%	5	4%	9	12%	7	7%
Failed tide	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		1	0%	0		0		0		0		0		0		0		2	3%	4	4%	0	
Failed other	0		1	<1%	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Failed unknown	1	<1%	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	
Unknown fate	3		1		6		7		3		5		3		2		2		1		0		5		7		0		12		34		2	
Total # of Nests-ALL BEACHES	258		265		310		241		189		220		259		229		210		147		164		226		294		376		227		191		162	
# Nests Hatched-ALL BEACHES	132	52%	99	38%	140	46%	142	61%	96	52%	78	36%	134	53%	104	46%	109	53%	72	51%	44	27%	103	47%	146	51%	177	47%	119	55%	70	45%	71	44%

All percentage calculations exclude nests with unknown fates

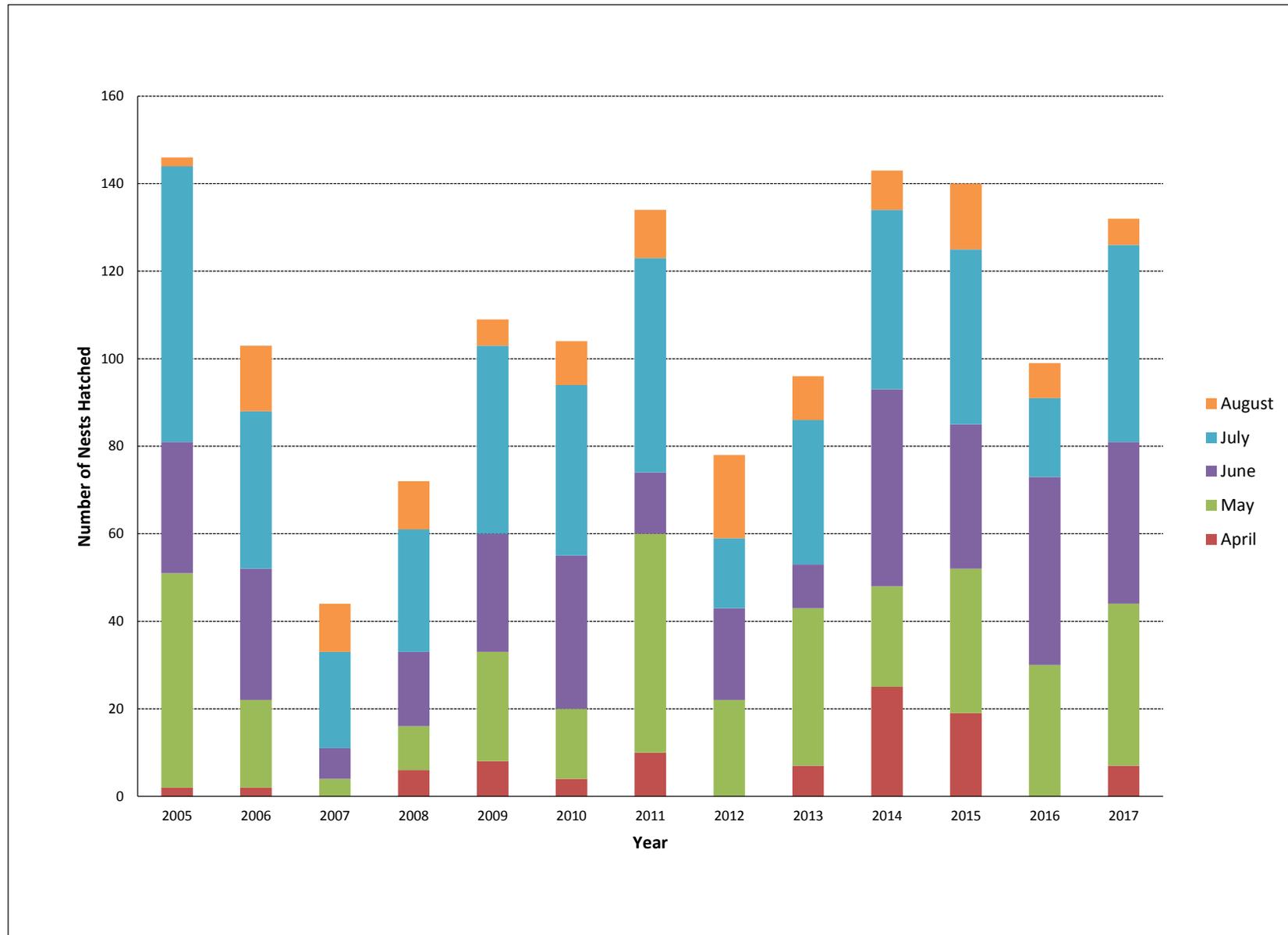
NOTES

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

Appendix 11e — Total Nests Hatched on District Beaches 2001-2017



Appendix 11f — Nests Hatched by Month on District Beaches 2005-2017



Appendix 12 — 2017 Salvaged WSP Eggs and Specimens

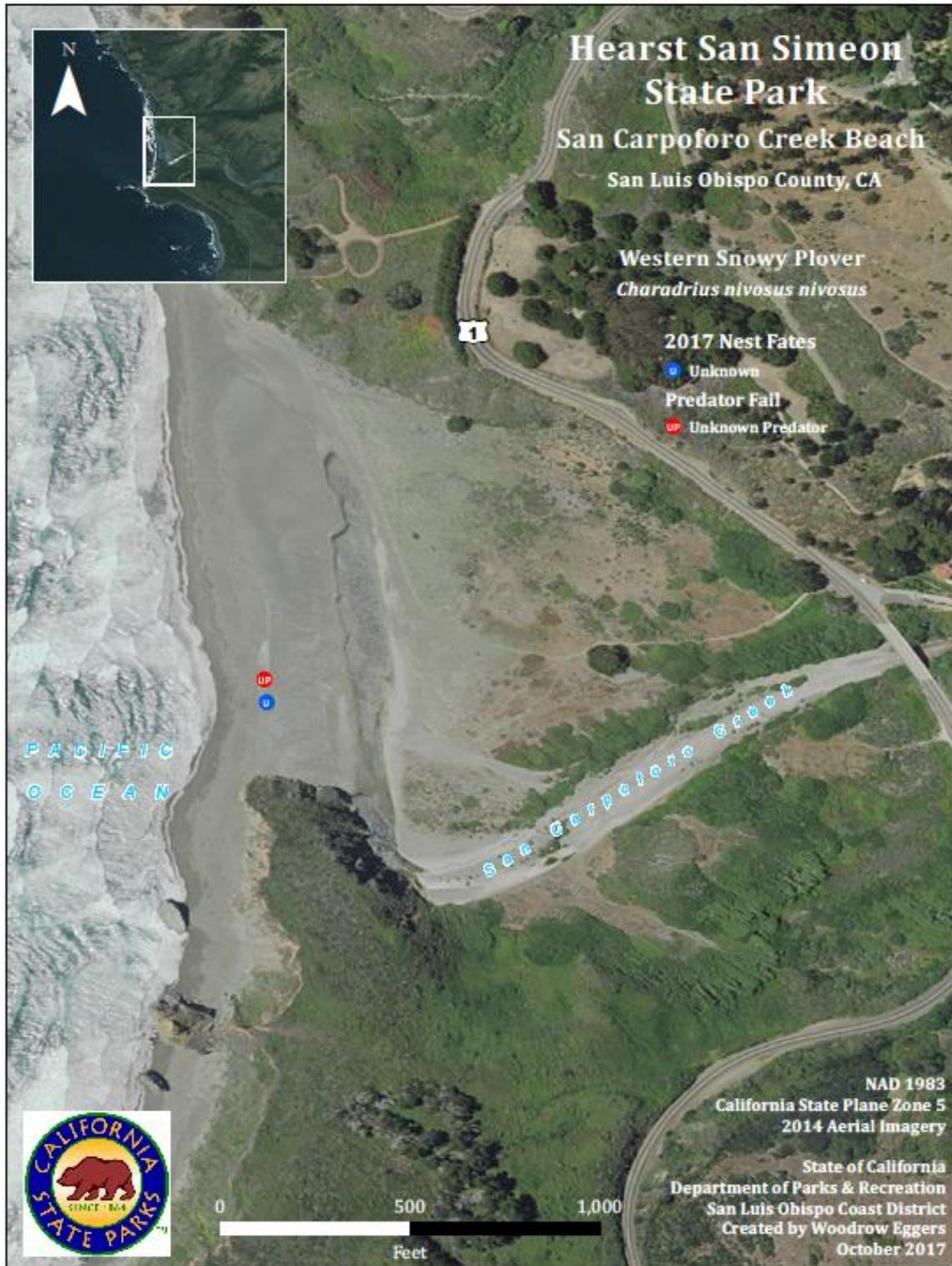
Collected Eggs										
Nest # ¹	UTM	Date Nest Found	Clutch Size	Nest Fate	Cause of Failure	Fate Date	# of Eggs Collected	Date Collected	Collected By	Embryonic Stage
Villa Creek Beach										
VC04	10 S 684354 3925961	05/01/17	3	Fail	Abandoned	06/07/17	1	06/07/17	R Orr	No evidence of fertilization
VC12	10 S 684496 3925920	07/05/17	1	Fail	Abandoned	08/07/17	1	08/07/17	R Orr	No evidence of fertilization
Sandspit										
North										
NSS001	10 S 694277 3913945	03/17/17	3	Hatch	N/A	04/22/17	1	04/25/17	R Orr	No evidence of fertilization
NSS008	10 S 694102 3912573	03/24/17	2	Fail	Tide	03/29/17	1	03/30/17	W Eggers	No evidence of fertilization
NSS011	10 S 694144 3912778	03/31/17	3	Fail	Tide	04/10/17	2	04/25/17	R Orr	(1) 2 week embryo and (1) No evidence of fertilization
NSS019	10 S 693984 3911873	04/12/17	3	Hatch	N/A	05/16/17	2	05/24/17	W Eggers	(1) 1 week embryo and (1) 2 week embryo
NSS020	10 S 694081 3911854	04/13/17	1	Fail	Abandoned	04/13/17	1	04/21/17	W Eggers	No evidence of fertilization
NSS023	10 S 694025 3911953	04/14/17	2	Unknown	N/A	05/08/17	1	06/02/17	W Eggers	No evidence of fertilization
NSS025	10 S 694258 3914029	04/19/17	3	Fail	Tide	05/01/17	1	05/02/17	W Eggers	No evidence of fertilization
NSS031	10 S 693968 3911705	04/21/17	3	Fail	Abandoned	04/21/17	2	04/26/17	W Eggers	No evidence of fertilization
NSS036	10 S 694234 3913647	05/01/17	3	Fail	Abandoned	05/15/17	3	05/17/17	W Eggers	(3) 3 week embryos
NSS042	10 S 694165 3912841	05/03/17	3	Hatch	N/A	05/29/17	1	06/02/17	W Eggers	No evidence of fertilization
NSS046	10 S 694163 3912923	05/05/17	3	Hatch	N/A	05/30/17	1	06/17/17	R Orr	No evidence of fertilization
NSS051	10 S 694267 3914021	05/08/17	3	Fail	Abandoned	05/15/17	1	05/17/17	W Eggers	No evidence of fertilization
NSS052	10 S 694244 3913730	05/08/17	3	Fail	Abandoned	06/05/17	1	06/16/17	W Eggers	3 week embryo
NSS054	10 S 694203 3913273	05/10/17	1	Fail	Abandoned	05/15/17	1	05/19/17	W Eggers	No evidence of fertilization
NSS060	10 S 694272 3914205	05/15/17	3	Hatch	N/A	06/18/17	1	06/21/17	W Eggers	3 week embryo
NSS062	10 S 694195 3913271	06/23/17	3	Hatch	N/A	06/12/17	1	06/30/17	W Eggers	No evidence of fertilization
NSS065	10 S 694228 3913694	05/18/17	2	Fail	Abandoned	06/01/17	2	06/01/17	R Orr	No evidence of fertilization
NSS069	10 S 694262 3913890	05/22/17	1	Fail	Abandoned	06/01/17	1	06/01/17	R Orr	No evidence of fertilization
NSS070	10 S 694215 3913349	05/22/17	3	Fail	Abandoned	06/12/17	1	06/16/17	W Eggers	No evidence of fertilization
NSS074	10 S 694170 3913092	05/23/17	1	Fail	Tide	06/22/17	1	06/28/17	W Eggers	3 week embryo
NSS076	10 S 694128 3912795	05/23/17	1	Fail	Tide	05/24/17	1	05/31/17	W Eggers	No evidence of fertilization
NSS078	10 S 693954 3911681	05/24/17	3	Hatch	N/A	06/23/17	1	06/28/17	W Eggers	No evidence of fertilization
NSS081	10 S 694086 3912478	05/26/17	3	Hatch	N/A	06/20/17	1	06/23/17	W Eggers	No evidence of fertilization
NSS082	10 S 694043 3912247	05/26/17	3	Hatch	N/A	06/25/17	1	06/28/17	W Eggers	No evidence of fertilization
NSS089	10 S 694043 3912357	06/01/17	3	Fail	Tide	06/22/17	2	06/28/17	W Eggers	(2) 3 week embryos
NSS095	10 S 694106 3912607	06/02/17	3	Fail	Abandoned	07/10/17	1	07/10/17	R Orr	3 week embryo
NSS096	10 S 694098 3912477	06/02/17	2	Fail	Abandoned	06/05/17	2	06/05/17	R Orr	No evidence of fertilization
NSS098	10 S 694229 3913478	06/05/17	3	Hatch	N/A	07/05/17	1	07/10/17	R Orr	No evidence of fertilization
NSS101	10 S 694117 3912638	06/09/17	1	Fail	Abandoned	07/10/17	1	07/12/17	W Eggers	No evidence of fertilization
NSS129	10 S 694262 3914217	07/10/17	3	Hatch	N/A	08/04/17	1	08/11/17	W Eggers	<1 week embryo
NSS130	10 S 694131 3912790	07/10/17	3	Hatch	N/A	08/04/17	1	08/16/17	W Eggers	No evidence of fertilization
NSS136	10 S 694199 3913353	07/19/17	2	Fail	Abandoned	08/11/17	2	08/23/17	W Eggers	(2) 3 week embryos
NSSDE01	10 S 694179 3913028	05/08/17	1	Dropped Egg	N/A	N/A	1	05/12/17	W Eggers	No evidence of fertilization
NSSDE02	10 S 693970 3911707	05/19/17	1	Dropped Egg	N/A	N/A	1	06/05/17	R Orr	No evidence of fertilization
NSSDE03	10 S 694257 3913847	05/26/17	1	Dropped Egg	N/A	N/A	1	05/31/17	W Eggers	No evidence of fertilization
NSSDE04	10 S 694077 3912498	06/14/17	1	Dropped Egg	N/A	N/A	1	06/20/17	R Orr	No evidence of fertilization

Appendix 12 — 2017 Salvaged WSP Eggs and Specimens

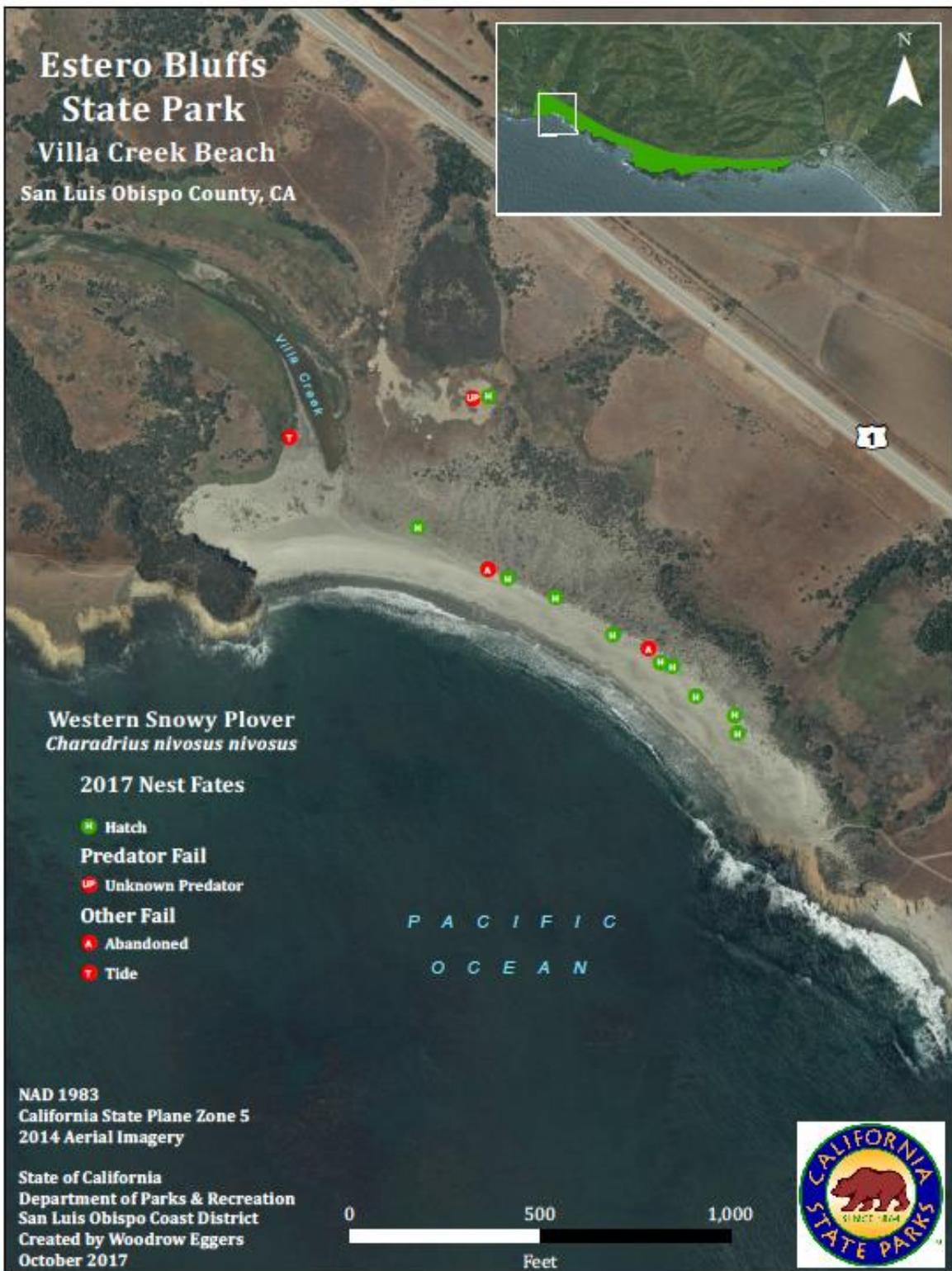
Nest # ¹	UTM	Date Nest Found	Clutch Size	Nest Fate	Cause of Failure	Fate Date	# of Eggs Collected	Date Collected	Collected By	Embryonic Stage
South										
SSS007	10 S 693599 3909731	04/06/17	3	Fail	Abandoned	04/24/17	3	05/03/17	R Orr	(2) 1 week embryo & (1) No evidence of fertilization
SSS008	10 S 693546 3909748	04/06/17	1	Fail	Abandoned	04/12/17	1	04/26/17	W Eggers	No evidence of fertilization
SSS016	10 S 693508 3909687	04/13/17	1	Fail	Abandoned	04/13/17	1	04/21/17	W Eggers	No evidence of fertilization
SSS028	10 S 693759 3910809	04/26/17	3	Hatch	N/A	05/29/17	1	06/08/17	J Sayers	No evidence of fertilization
SSS032	10 S 693258 3909042	04/28/17	3	Hatch	N/A	05/31/17	1	06/08/17	R Orr	No evidence of fertilization
SSS037	10 S 693923 3911243	05/04/17	2	Unknown	N/A	05/15/17	1	05/24/17	W Eggers	Fully developed chick
SSS046	10 S 693583 3909666	05/11/17	3	Hatch	N/A	06/12/17	1	06/16/17	W Eggers	No evidence of fertilization
SSS052	10 S 693272 3909056	05/22/17	3	Hatch	N/A	06/20/17	2	06/24/17	W Eggers	No evidence of fertilization
SSS054	10 S 693677 3910486	05/22/17	3	Hatch	N/A	06/15/17	1	06/20/17	R Orr	No evidence of fertilization
SSS061	10 S 693648 3910247	05/29/17	2	Hatch	N/A	06/16/17	1	06/20/17	R Orr	No evidence of fertilization
SSSDE03	10 S 693554 3909903	06/23/17	1	Dropped Egg	N/A	N/A	1	06/28/17	R Orr	No evidence of fertilization
SSSDE04	10 S 693472 3909605	06/28/17	1	Dropped Egg	N/A	N/A	1	06/28/17	R Orr	No evidence of fertilization
SSSDE05	10 S 693963 3911517	07/13/17	1	Dropped Egg	N/A	N/A	1	07/14/17	W Eggers	No evidence of fertilization

Salvaged WSP Specimens						
Nest Association	UTM	Descriptive Location	Age	Specimen Description	Date Collected	Collected By
SSS010 or SSS026	10 S 693409 3909459	Sandspit	Chick	Hatched either 5/11/17 or 5/12/17. Found dead within 100 feet of nest bowls inside symbolically fenced habitat. Necropsy revealed signs of trauma from an unknown cause.	5/12/2017	S Bauer
Unknown	10 S 693216 3908920	Sandspit	Chick	Found desiccated inside the symbolically fenced habitat. No apparent cause of death. Deposited at SBNHM.	7/31/2017	S Ontiveros
MS13	10 S 693716 3919073	Morro Strand	Chick	Found recently deceased in its nest bowl. This was one of three chicks to hatch from nest MS13, although the other two chicks hatched 7 days earlier on 7/24/17. Collected with eggshell. Deposited at SBNHM.	7/31/2017	J Sayers

Appendix 13 – 2017 Nest Location Maps



**Estero Bluffs
State Park**
Villa Creek Beach
San Luis Obispo County, CA



Western Snowy Plover
Charadrius nivosus nivosus

2017 Nest Fates

- Hatch
- Predator Fail**
- Unknown Predator
- Other Fail**
- Abandoned
- Tide

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

NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



Morro Strand State Beach

San Luis Obispo County, CA

Western Snowy Plover
Charadrius nivosus nivosus

2017 Nest Fates

Hatch

 10' x 10' Enclosure

Predator Fail

 American Crow

 Striped Skunk

 Unknown Avian

 Unknown Predator

Other Fail

 Abandoned

 Unknown Fail



PACIFIC

OCEAN

NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



Hatteras Street Corridor

Easter Street Corridor

Sienna Street Corridor

Azure Street Corridor

Boardwalk Corridor

Highway 41 Corridor



Montaña de Oro State Park Sandspit 1

San Luis Obispo County, CA

Western Snowy Plover
Charadrius nivosus nivosus

2017 Nest Fates

- H Hatch
- U Unknown

Predator Fail

- C Coyote
- UP Unknown Predator

Other Fail

- A Abandoned
- T Tide
- W Wind

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



NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



Montaña de Oro State Park Sandspit 2

San Luis Obispo County, CA

Western Snowy Plover *Charadrius nivosus nivosus*

2017 Nest Fates

- Hatch
- Unknown
- Predator Fail**
- C Coyote
- UP Unknown Predator
- Other Fail**
- A Abandoned
- T Tide
- UF Unknown Fail
- W Wind

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



NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



Montaña de Oro State Park Sandspit 3

San Luis Obispo County, CA

Western Snowy Plover
Charadrius nivosus nivosus

2017 Nest Fates

- Hatch
- Unknown
- Predator Fail**
- Coyote
- Other Fail**
- ▲ Abandoned
- Wind

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



NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



0 500 1,000
Feet



Montaña de Oro State Park

Sandspit 4

San Luis Obispo County, CA

Western Snowy Plover *Charadrius nivosus nivosus*

2017 Nest Fates

- Hatch
- Predator Fail**
 - Coyote
 - ▲ Unknown Avian
 - Unknown Predator
- Other Fail**
 - ▲ Abandoned
 - Wind

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



NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



Montaña de Oro State Park Sandspit 5

San Luis Obispo County, CA

Western Snowy Plover *Charadrius nivosus nivosus*

2017 Nest Fates

- Hatch
- Predator Fail**
 - Unknown Predator
 - Unknown Avian
 - American Crow
- Other Fail**
 - Tide

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



NAD 1983
California State Plane Zone 5
2014 Aerial Imagery

State of California
Department of Parks & Recreation
San Luis Obispo Coast District
Created by Woodrow Eggers
October 2017



0 500 1,000
Feet



Appendix 14 – Summary of WSP Nest Depredations on District Beaches 2001-2017

	2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004 ²		2003 ²		2002 ^{1,2}		2001 ^{1,2}	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Hearst San Simeon State Park																																		
Total # of nests	2		1		1		0		0		3		0		0		2		2		6		11		5		0		1		1		N/A	
Total Depredated	1		0		0		0		0		0		0		0		1		0		0		0		0		0		1		0			
Coyote	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Domestic Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
American Crow	0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	100%	0			
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Gull Species	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unknown Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unknown Avian	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Unknown Predator	1	100%	0		0		0		0		0		0		0		1	100%	0		0		0		0		0		0		0			
Other	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0			
Villa Creek Beach																																		
Total # of nests	14		10		24		23		20		31		21		26		38		16		30		40		37		66		35		44		39	
Total Depredated	1		5		10		10		13		24		10		13		25		3		16		21		14		29		13		8		6	
Coyote	0		0		0		1	10%	1	8%	0		0		3	23%	0		0		3	19%	0		0		1	3%	6	46%	0		1	17%
Red Fox	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Domestic Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Unknown Canid	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		2	25%	0	
Striped Skunk	0		0		2	20%	2	20%	4	31%	1	4%	0		0		2	8%	1	33%	0		0		6	43%	7	24%	0		1	13%	0	
American Crow	0		0		0		0		0		0		0		0		0		0		0		0		0		1	3%	0		0		0	
Raccoon	0		0		1	10%	0		0		0		0		1	8%	2	8%	0		0		0		0		0		0		2	25%	0	
Gull Species	0		1	20%	2	20%	1	10%	0		6	25%	0		2	15%	4	16%	2	67%	3	19%	7	33%	2	14%	2	7%	0		2	25%	2	33%
Ground Squirrel	0		0		0		0		2	8%	0		0		0		0		0		2	13%	0		0		0		0		0		0	
Unknown Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0		2	15%	0		3	50%
Unknown Avian	0		0		0		0		1	4%	0		0		0		0		0		0		0		0		0		0		0		0	
Unknown Predator	1	100%	4	80%	5	50%	6	60%	8	62%	14	58%	10	100%	7	54%	17	68%	0		8	50%	14	67%	0		18	62%	4	31%	1	13%	0	
Other	0		0		0		0		0		0		0		0		0		0		0		0		6	43%	0		1	8%	0		0	
Morro Strand																																		
Total # of nests	16		16		13		17		12		12		25		24		26		33		19		34		27		38		45		37		14	
Total Depredated	9		10		5		3		3		6		9		6		6		8		5		2		3		14		33		8		4	
Coyote	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Red Fox	0		0		2	40%	0		2	67%	0		0		0		2	25%	0		1	50%	2	67%	0		3	9%	1	13%	3	75%	0	
Domestic Dog	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Striped Skunk	2	22%	2	20%	0		0		0		0		0		0		0		0		0		0		0		0		0		0	75%	0	
American Crow	3	33%	5	50%	1	20%	0		1	33%	5	83%	4	44%	3	50%	5	83%	3	38%	2	40%	1	50%	0		11	85%	30	91%	6		0	
Raccoon	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1	25%
Gull Species	0		0		0		0		0		0		0		0		0		0		0		0		0		1	8%	0		1	13%	0	
Unknown Mammal	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Unknown Avian	3	33%	3	30%	1	20%	0		0		0		0		0		0		1	13%	0		0		0		0		0		0		0	
Unknown Predator	1	11%	0		1	20%	3	100%	0		1	17%	5	36%	3	50%	1	17%	2	25%	3	60%	0		1	33%	1	8%	0		0		0	
Other	0		0		0		0		0		0		0		0		0		0		0		0		0		1	8%	0		0		0	

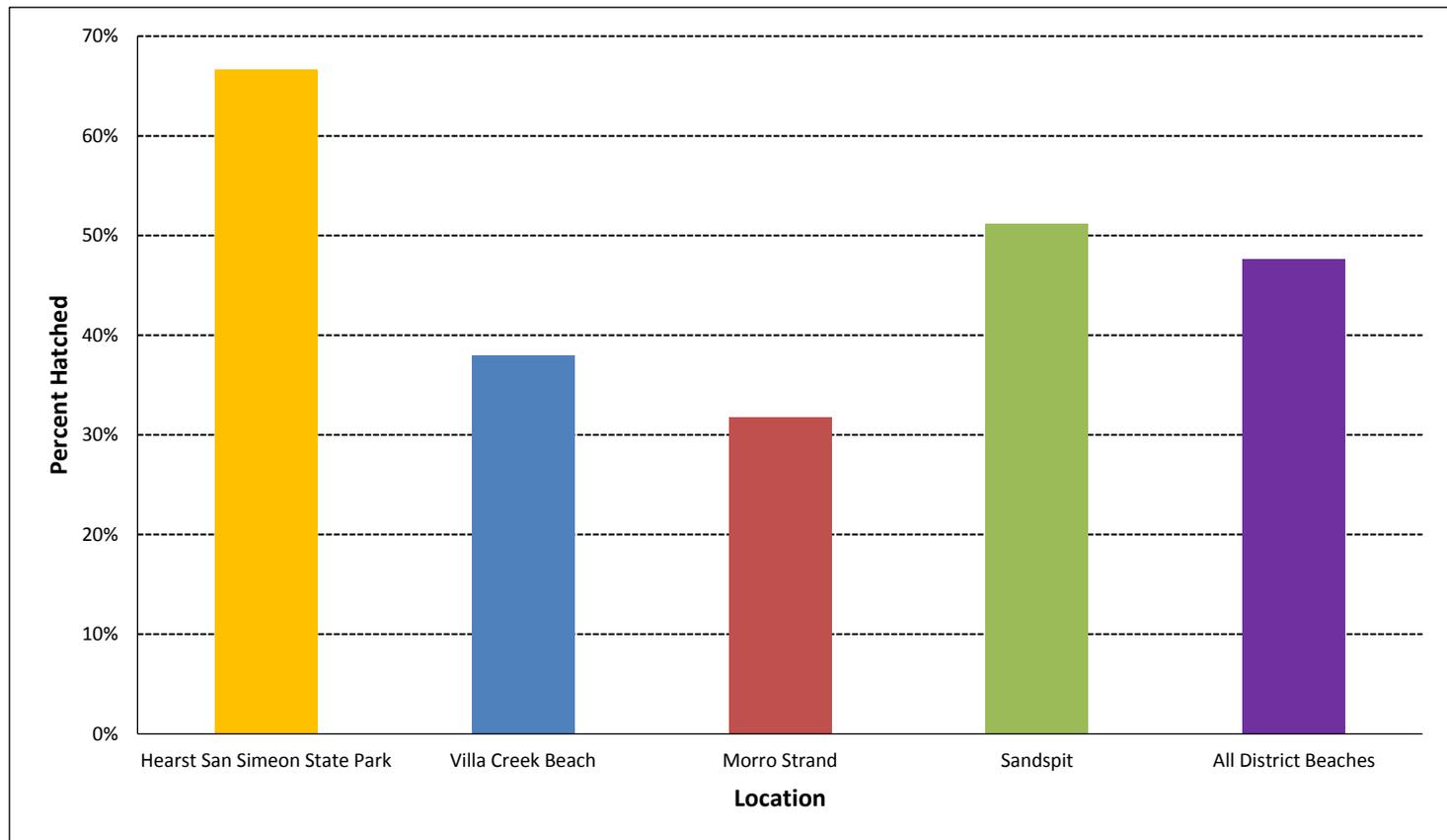
Appendix 14 – Summary of WSP Nest Depredations on District Beaches 2001-2017

	2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004 ²		2003 ²		2002 ^{1,2}		2001 ^{1,2}			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%		
Sandspit																																				
Total # of nests	226		238		272		201		157		174		213		179		144		96		109		141		225		272		146		109		109			
Total Depredated	63		98		108		24		30		74		51		35		23		20		59		46		69		48		9		29		50			
Coyote	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		0	
Red Fox	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		1	2%
Striped Skunk	0		0		0		0		0		0		0		0		0		0		0		0		0		30	63%	7	78%	27	93%	43	86%		
American Crow	2	3%	1	1%	0		1	4%	1	3%	0		15	30%	0		1	4%	0		0		0		5	7%	0		0		0		0		0	
Raccoon	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		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		1	2%	0		1	3%	2	4%		
Unknown Avian	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		0	
Unknown Predator	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		1	2%	0		0		0		0		0		0		1	2%	0		1	3%	0			
Total # of Nests- ALL BEACHES	258		265		310		241		189		220		259		229		210		147		164		226		294		376		227		191		162			
# Nests Depredated- ALL BEACHES	74	29%	113	43%	123	40%	37	15%	46	24%	104	47%	70	27%	54	24%	55	26%	31	21%	80	49%	69	31%	86	29%	91	24%	56	25%	45	24%	60	37%		

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 15 -- Cumulative Nests and Fates 2001-2017



Appendix 15 -- Cumulative Nests and Fates 2001-2017

