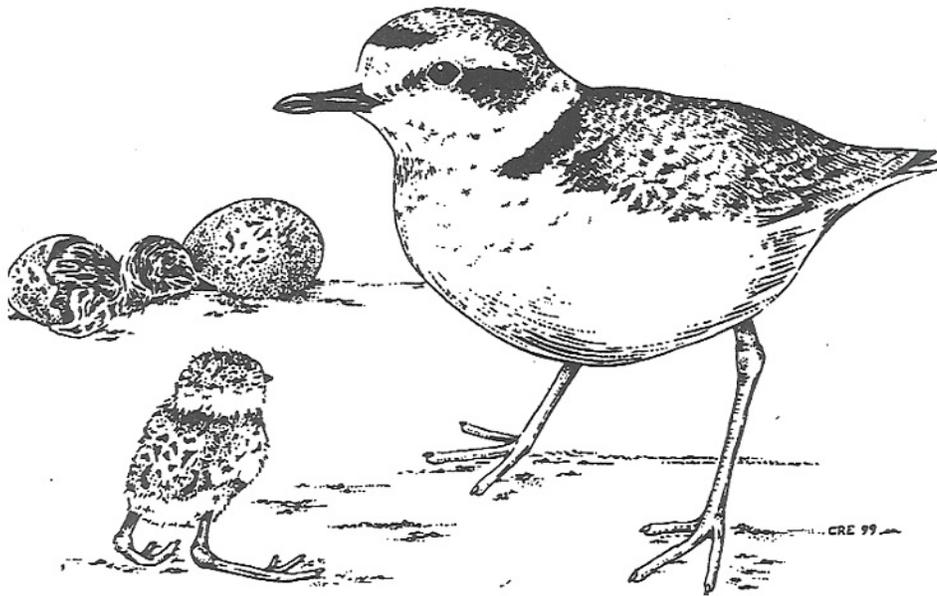


California State Parks
North Coast Redwoods District



Western Snowy Plover
Annual Report
2016-2017

December 2017

INTRODUCTION-

California State Parks (CSP) manages nearly 25 percent of the state's coastline. Many of these coastal lands provide important habitat for the western snowy plover (*Charadrius nivosus nivosus*), a shorebird listed as "threatened" by the federal government and a "species of special concern" by the State of California. As these coastal lands are also popular recreation areas for millions of people, strategic management of CSP lands is essential to meeting state and federal goals to stop the decline of this species and restore sustainable populations (CDPR 2002, CDPR 2014). Consequently, in March of 2002, CSP released the Western Snowy Plover Systemwide Management Guidelines (CDPR 2002), which were revised in June 2014 (CDPR 2014) to facilitate stewardship efforts to protect the western snowy plover (WSP or plover) and manage coastal habitat. The guidelines present an integrated approach to assessing WSP use of State Park System (SPS) lands, planning for the species' conservation, implementing management actions, and monitoring progress toward recovery (CDPR 2002, CDPR 2014). A major component of the Department's approach to WSP stewardship relies on thorough documentation of management efforts and adaptive responses at the unit or district level (CDPR 2002, CDPR 2014).

Regular evaluation of habitat management, visitor management, law enforcement, public education, and interpretative efforts is needed to continuously improve stewardship results. As such, this report assesses the effectiveness of efforts taken by CSP, North Coast Redwoods District (NCRD) to protect and restore WSP populations in light of management activities and monitoring results from recent years. This report will contribute to a systemwide annual report produced by CSP, Natural Resources Division to assess WSP management throughout CSP lands. In addition, as many activities associated with research, monitoring, or management of WSP require an endangered species permit under Section 10(a)(1)(A) of the Endangered Species Act, this report will meet the requirements of the NCRD's 10(a)(1)(A) permit (TE004234-5).

BACKGROUND

The coastal population of the WSP was listed as threatened under the Endangered Species Act in 1993 (USFWS 1993) as a distinct population segment. The listing included populations nesting along the coast in Washington, Oregon, and California. A significant population decline and a reduction in the number of active breeding areas prompted the federal listing. Expanding predator populations, human disturbance, urban development, and introduced

European beachgrass (*Ammophila arenaria*) have been attributed to the decline (USFWS 2007). The United States Fish and Wildlife Service (USFWS) designated critical habitat for the WSP in 1999. This designation was amended in 2004 following a lawsuit over the failure to analyze the economic impacts of the critical habitat. In 2007, the USFWS released the final recovery plan (USFWS 2007). The goal of the plan is to ensure the long-term viability of the U.S. Pacific coast WSP population with specific objectives to; (1) Increase population numbers distributed across the WSP's Pacific coast range; (2) Conduct intensive ongoing management for the species and its habitat, and develop mechanisms to ensure management in perpetuity; and (3) Monitor WSP populations and threats to determine success of recovery actions and refine management actions (USFWS 2007). According to the recovery plan, the population will be considered for delisting when a number of recovery criteria related to productivity and habitat protection are met within the six designated recovery units throughout the range (USFWS 2007). In 2006, the USFWS denied a proposal to de-list the plover but did propose a special 4(d) rule that would exempt counties from certain prohibitions on take as long as populations remain above recovery goals as identified in the recovery plan (USFWS 2006).

The NCRD is located within WSP Recovery Unit 2, which includes Del Norte, Humboldt, and Mendocino counties. Recovery criteria for Unit 2 include: (1) maintain 150 adults for 10 years; (2) maintain a 5-year average productivity of at least one fledged chick per male; and (3) have in place participation plans among cooperators to ensure protection and management of breeding, wintering, and migration areas to maintain the subpopulation sizes and average productivity listed above. In recent years, most plovers in Recovery Unit 2 bred and wintered in Humboldt County along ocean beaches (Colwell et al. 2015). Humboldt County is unique in that it also hosted nesting plovers along the Eel River gravel bars from 1996-2010. However, since 2011, no plovers have nested on gravel bars in RU2 (Feucht et al. 2016).

Since 1998, Recovery Unit 2 (RU2) Working Group has been active in monitoring suitable WSP habitat with a coordinated effort between federal, state, and local agencies as well as parties who have an interest in WSP conservation. Much of the WSP recovery effort is expected to be organized and facilitated by the working group, as members include conservation experts (e.g. Humboldt State University and consulting biologists) as well as resource managers (e.g. CSP, California Department of Fish and Wildlife, Bureau of Land Management, and USFWS) responsible for on-the-ground actions. In 2001, biologists from

Humboldt State University (HSU) and a local consulting firm began collaborating in what has become a multi-year effort to answer questions critical to effective management and recovery of the WSP in Recovery Unit 2. Consequently, the HSU WSP annual report has served as the Recovery Unit 2 annual report since 2001. Much of this report is based on those results.

The NCRD WSP program objectives for 2016/17 were to:

- Continue monitoring efforts throughout the NCRD and participation in the Recovery Unit 2 demographic study.
- Continue to work and coordinate with the Recovery Unit 2 Working Group and subcommittees, and the Humboldt Coastal Dunes Cooperative.
- Continue habitat restoration within WSP suitable habitat.
- Continue to use symbolic fencing to protect nests and brood-rearing areas from human disturbance when appropriate.
- Continue to use beach patrol logs for law enforcement rangers to document beach and dune patrols, violations, citations, and contacts.
- Continue to increase law enforcement presence at occupied State Park beaches during the WSP breeding season, especially during holiday weekends.
- Increase public outreach via the Recovery Outreach Subcommittee and improved signage.

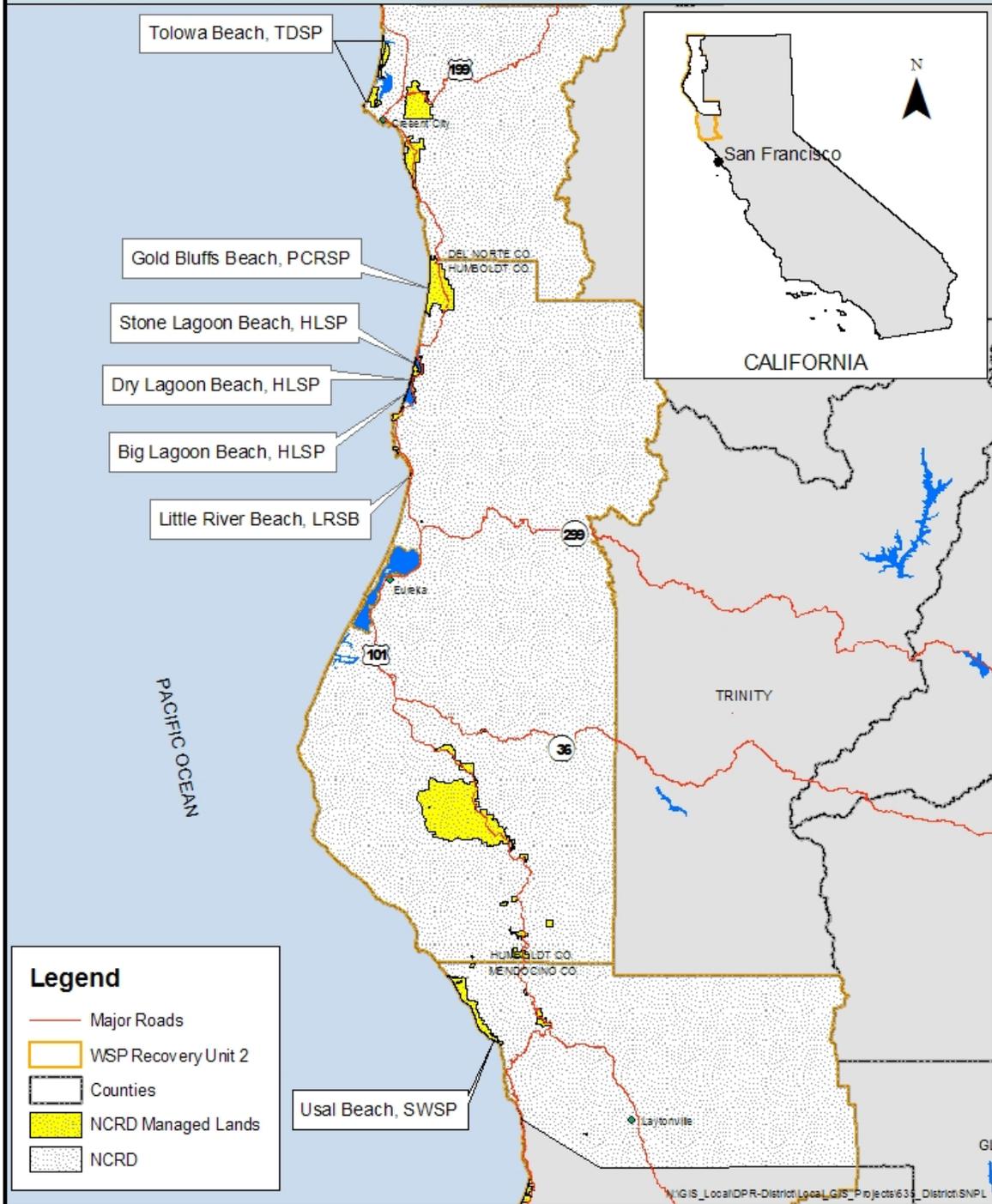
STUDY AREA

California State Parks, Redwood National Park (RNP), and HSU biologists surveyed 6 State Park beaches within the NCRD that have been identified by the RU2 Working Group as suitable WSP habitat (Fig. 1). These beaches are (1) Tolowa Dunes Beach, Tolowa Dunes State Park (TDSP); (2) Gold Bluffs Beach, Prairie Creek Redwoods State Park (PCRSP); (3) Stone Lagoon Beach (SL), Humboldt Lagoons State Park (HLSP); (4) Dry Lagoon Beach (DL), HLSP; (5) Big Lagoon Beach (BL), HLSP; and (6) Little River State Beach (LRSB). Though the RU2 working group has identified Pelican State and Usal beaches (Sinkiyone Wilderness State Park) as suitable habitat, these sites are usually not surveyed, due to difficulties with access.



California State Parks

North Coast Redwood District



North Coast Redwoods District
Western Snowy Plover Annual Report

FIGURE 1
General Location Map

METHODS

Management activities were conducted under USFWS (10)(a)(1)(A) recovery permits TE-004234-5 and TE-73361A-1.1, and USFWS banding permit #22971. During the 2016/2017 season (Sep 15, 2016 – Sep 14, 2017), suitable habitat within the NCRD was surveyed monthly ± 4 days of the 15th. Additional surveys were conducted at the end of each month during the breeding season (March-August) and occasionally during the non-breeding season (Sep-Feb). Intensive monitoring (to search for nests and young) occurred approximately every 4 days at sites where breeding plovers were observed.

Abundance and Distribution

Annual abundance and distribution of WSP were estimated based on mid-month (± 4 days) surveys of stretches of beach in the study area. Surveyors walked, or drove ATVs, stopping at 50-100 meter intervals to scan with binoculars and/or spotting scopes. Western snowy plover numbers, sex, age, and color band combinations were recorded whenever possible.

Reproductive Monitoring

Nests and/or breeding activity were searched for at least twice monthly, beginning 15 March and continuing until 31 August. Intensive monitoring (every 4-5 days) occurred at sites where plovers were recorded during the breeding season. Nest searching included observing suggestive behavior of adult plovers and watching them return to nests to incubate, following tracks, and/or spotting incubating adults on nests.

Predator Activity and Management

Data was collected on potential plover predators to assess the threat of predation between sites and different temporal scales. It is anticipated that this data will help evaluate relationships between relative abundance of potential predators and WSP reproductive success. To assess the threat of avian predators, area-constrained (500 m radius) point counts at 20-minute intervals (walking) or 10-minute intervals (ATV) have been conducted since 2008, in which the numbers of corvids and raptors were recorded. Also noted were the total numbers of potential predators [American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), and other potential avian predators] observed during the entire survey. Point count data were summarized by averaging values of multiple observations conducted during each visit to a site, and then averaging all observations for each study site. Mammalian predator tracks were noted opportunistically during surveys.

Human Activity and Management

Data on human use were collected during regular WSP abundance and distribution surveys. Area-constrained point counts at 20-minute intervals (walking) or 10-minute intervals (ATV) were conducted and the number of humans, dogs (in compliance/not in compliance), and vehicles (in compliance/not in compliance) within 500 m of the observer were recorded. Total numbers of humans, dogs, and vehicles observed during the entire survey were tallied and identified as in compliance or out of compliance, depending on local regulations.

Habitat Condition and Plover Use

During abundance and distribution surveys, general habitat conditions were recorded. Nesting and brooding activities that occurred in restoration areas were noted to help assess the relationship between restored habitat and nesting/fledging success.

Data Summary and Analysis

Data were collected separately for the 6 State Park beaches, using handheld personal computers, global positioning system (GPS), ESRI Mobile GIS software (ArcPad), and WSP monitoring forms (Appendix A). Survey results were distributed weekly to the RU2 Working Group via email and included in the RU2 final report (Feucht et al. 2017). Abundance and distribution, predator activity, and human activity data are presented as means (± 1 SD) and figures are presented as means (± 1 SE). Per Capita Reproductive Success is calculated as the mean number of successfully fledged chicks of all breeding males (± 1 SD).

RESULTS and DISCUSSION

Abundance and Distribution Surveys

During the 2016-17 plover season, 6 sites were surveyed at least monthly, totaling 286 survey hours and approximately 460 person hours. Surveys indicated that the non-breeding population (124 ± 26.5) continues to be several times larger than the breeding population (14 ± 14.3) (Fig. 2a and b). The mean wintering population has increased from each previous year since 2009 and was the highest recorded in the NCRD in 2016. This steady increase can be attributed to the return of adults and yearlings, and to immigration (Feucht et al. 2016). Though the mean NCRD breeding population appeared to decrease by 68% in 2017 from a record high in 2016 (14 and 33, respectively), this low estimate reflects a sampling deficiency, as not all known breeding birds were detected on mid-month abundance and distribution surveys. The breeding population of RU2 as a whole remained the same from 2016 to 2017, at 72 breeding adults (with slightly more females than males) (Feucht et al. 2017).

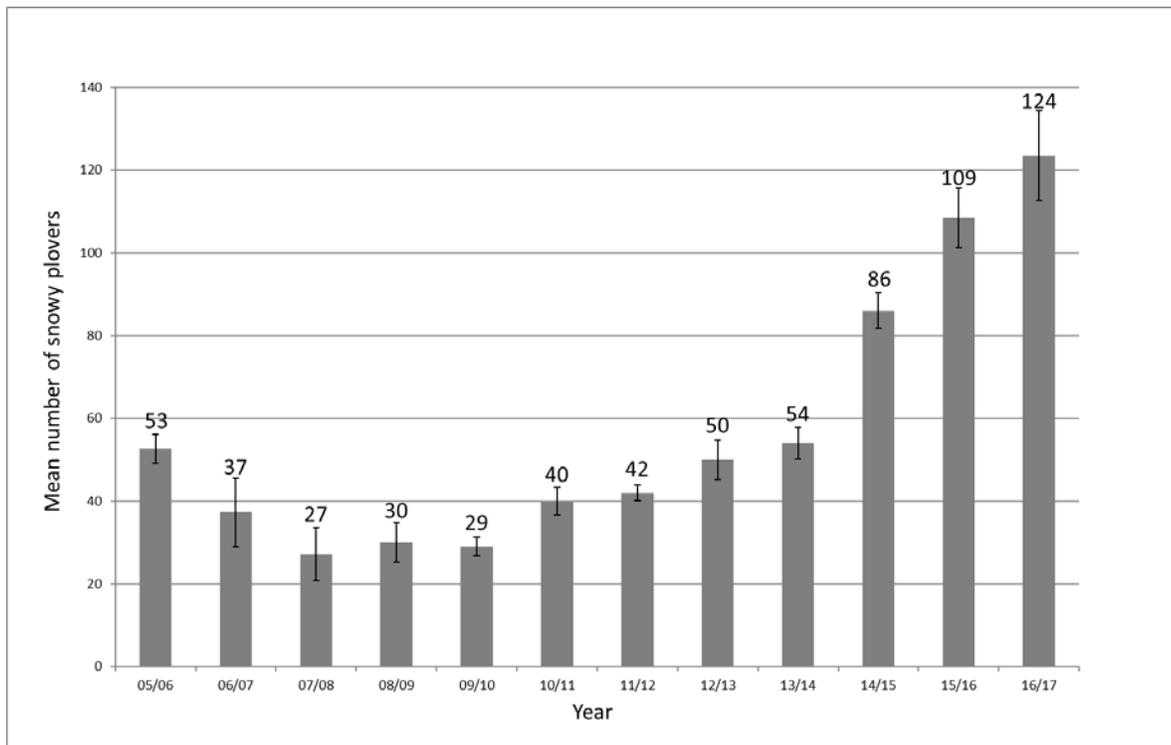


Figure 2a. Western Snowy Plover Wintering Abundance (mean \pm SE) in NCRD, September-February, 2005-2017.

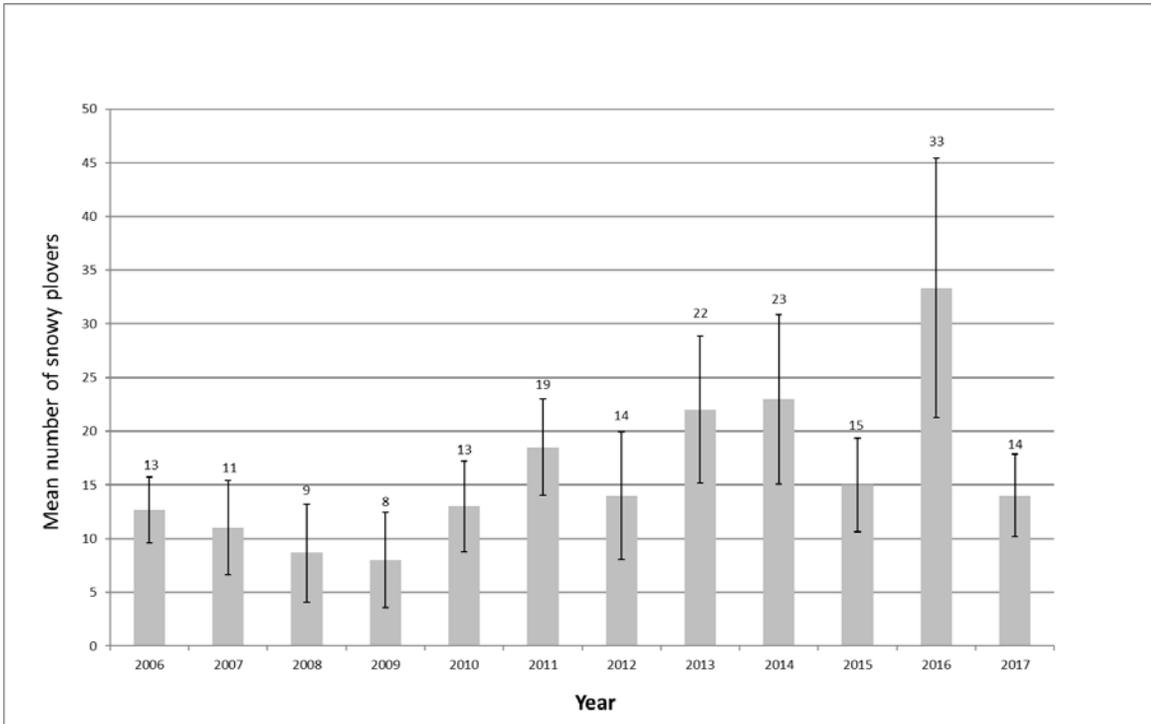


Figure 2b. Western Snowy Plover Breeding Abundance (mean \pm SE) in NCRD, March-August, 2005-2017.

Plovers were detected at 5 of 6 beaches in the NCRD (Tolowa Dunes, Gold Bluffs Beach, Stone Lagoon Beach, Big Lagoon Beach, and Little River State Beach) (Fig. 3). Breeding was confirmed at 4 sites; Gold Bluffs Beach, Stone Lagoon Beach, Big Lagoon Beach, and Little River State Beach. Little River State Beach and Big Lagoon hosted birds consistently throughout the year. For the third consecutive year, breeding season surveys documented birds at Tolowa Dunes, and for the second successive year, these birds nested at nearby Lake Earl Wildlife Area, managed by California Department of Fish and Wildlife (CDFW). For the first time, breeding plover presence and nesting were documented at Freshwater Lagoon Beach (FL), which lies adjacent to and north of Stone Lagoon, separated by a rocky point. This beach is under the jurisdiction of the National Park Service (NPS).

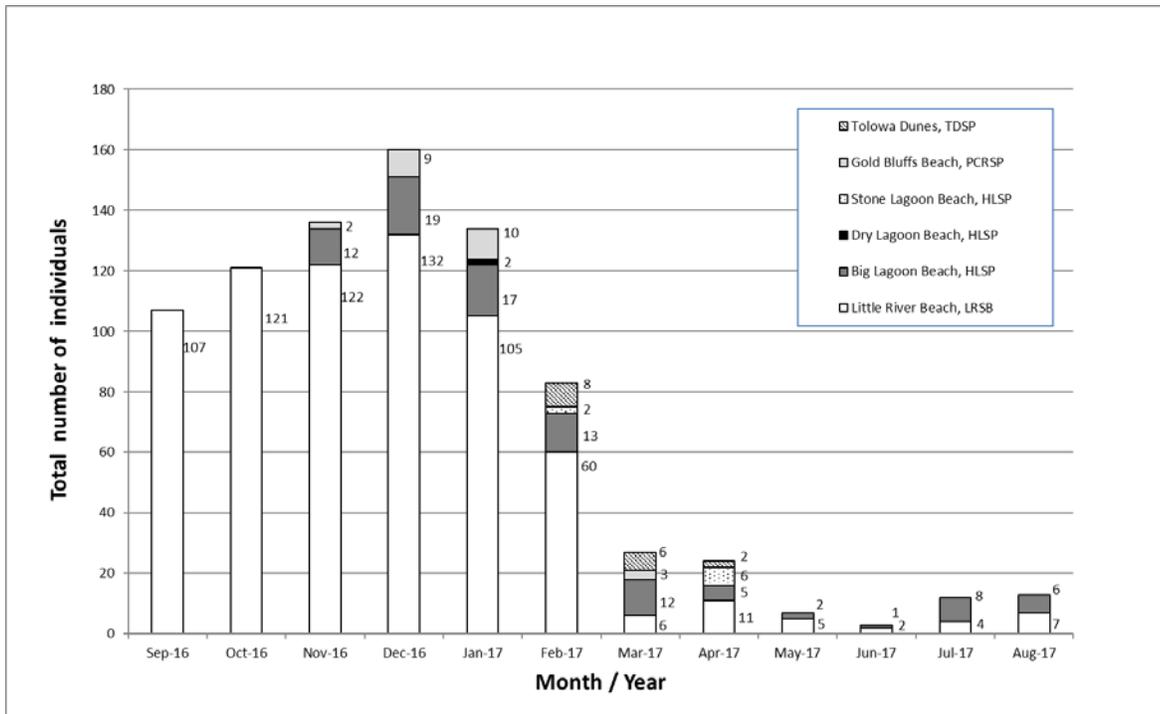


Figure 3. Western Snowy Plover Distribution during NCRD mid-month window surveys, 2016/17.

Reproductive Success

In the NCRD, a minimum of 19 known plovers (9 males, 10 females) initiated 16 nests and produced 34 eggs on 4 of the 6 beaches regularly surveyed. Of these, 9 chicks hatched and 5 fledged from 2 nests at Big Lagoon and one nest at Little River beach (Table 1 and Appendix B). Of the entire RU2 breeding population, NCRD hosted 26% (19 of 72) of the breeding adults and 12% (5 of 40) of the fledged chicks. Of the 13 nest failures in NCRD, 23% resulted from unknown causes, 39% from common raven predation, 23% from wind damage/burial (all during the same high wind storm event in early May), 7.5% from high tide wash-over, and 7.5% from abandonment (Appendix B). The oldest known snowy plover (Colwell et al. 2017), a male (RU2 resident and fledging from 2001), continued to breed. He fledged 2 juveniles at Big Lagoon, after initiating 2 other known nests, which failed, on the same beach. He began the breeding season at Stone Lagoon, and based on his and a mated female’s behavior, he likely had at least one undocumented nest that was lost to common raven predation. This male had successfully fledged chicks from Stone Lagoon for 4 of 7 years, since he moved from Clam Beach in 2009, where he was mostly unsuccessful for over a decade. However, he and his mate abruptly moved from Stone Lagoon during the 2017 breeding season following multiple instances of raven predation of nests there. This

was preceded in 2016 by the loss of all 3 of the nests he initiated there, probably all attributable to skunk predation.

Table 1. NCRD WSP 2017 breeding season summary by site and breeding season totals for all years

| <i>Unit</i> | <i>Known Females^a</i> | <i>Known Males^a</i> | <i># of Nests</i> | <i># Exclosed</i> | <i>% Hatched</i> | <i># Chicks Hatched</i> | <i>#(%) Chicks Fledged</i> | <i>Fledged per male</i> |
|---------------------------------|----------------------------------|--------------------------------|-------------------|-------------------|------------------|-------------------------|----------------------------|-------------------------|
| Tolowa Beach, TDSP ^c | 0 | 0 | 0 | 0 | 0% | 0 | 0 | 0 |
| Gold Bluffs Beach, PCRSP | 1 | 1 | 1 | 0 | 0% | 0 | 0 | 0 |
| Stone Lagoon, HLSP | 1 | 1 | 3 | 0 | 0% | 0 | 0 | 0 |
| Dry Lagoon, HLSP | 0 | 0 | 0 | 0 | 0% | 0 | 0 | 0 |
| Big Lagoon, HLSP | 4 | 3 | 6 | 0 | 33% | 6 | 3(50%) | 1.0±1.0 |
| Little River State Beach | 4 | 4 | 6 | 0 | 17% | 2 | 67% | 0.4±0.89 |
| All Sites 2017 | 10 | 9 | 16 | 0 | 19% | 9 | 5(55%) | 0.56±0.88 |
| 2016 | 9 | 8 | 13 | 0 | 31% | 11 | 5(45%) | 0.62±1.2 |
| 2015 | 5 | 5 | 11 | 0 | 27% | 8 | 4(50%) | 0.8±1.3 |
| 2014 | 13 | 10 | 35 | 0 | 3% | 3 | 2(66%) | 0.2±0.63 |
| 2013 | 7 | 7 | 8 | 0 | 43% | 7 | 6(86%) | 0.86±1.07 |
| 2012 | 1 | 1 | 2 | 0 | 50% | 3 | 1(33%) | 1±0 |
| 2011 | 6 | 6 | 7 | 0 | 43% | 8 | 4(50%) | 0.67±1.21 |
| 2010 | 2 | 3 | 8 | 0 | 25% | 4 | 3(75%) | 1±1 |
| 2009 | 1 | 1 | 1 | 0 | 100% | 3 | 3(100%) | 3±0 |
| 2008 | 0 | 0 | 0 | 0 | 0% | 0 | 0(0%) | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0% | 0 | 0(0%) | 0 |
| 2006 | 2 | 2 | 2 | 2 ^b | 50% | 3 | 0(0%) | 0 |
| 2005 | 6 | 5 | 6 | 3 | 83% | 14 | 3(21%) | 0.6±.89 |
| 2004 | 2 | 2 | 2 | 1 | 100% | 4 | 3(75%) | 1.5±.71 |
| 2003 | 3 | 2 | 3 | 1 | 33% | 3 | 0(0%) | 0 |
| 2002 | 3 | 3 | 8 | 2 | 25% | 6 | 0(0%) | 0 |
| 2001 | 3 | 3 | 7 | 4 | 57% | 10 | 5(50%) | 1.67±.58 |

a Based on histories of marked birds known to nest in the NCRD.

b The exclosure of one nest was removed late in incubation phase, due to potential adult predation. This nest subsequently failed.

Nest initiation and success have been irregular at Little River State Beach over the past 16 years. In 2017, 6 nests were initiated and one hatched 3 chicks, fledging 2 juveniles; these numbers represent roughly an average year. For the second consecutive time in 28 years, plovers attempted nesting in the vicinity of Tolowa Dunes (Feucht et al. 2017). Birds initiated

1 known nest, found with 3 eggs by NCRD staff in early April, near the breach area of Lake Tolowa, on land under the jurisdiction of CDFW. The nest did not survive to hatching. The nest was in close proximity (0.5-1.0km) to Tolowa Dunes State Park, and was monitored by NCRD during our twice monthly surveys. For the first time, nesting was documented at Freshwater Lagoon Beach, under the jurisdiction of the NPS, and adjacent to Stone Lagoon. Two pairs of birds that each suffered one documented, and likely repeated, nest failure from raven predation at Stone Lagoon (one pair) and Big Lagoon (one pair) beaches during early April through early May moved to Freshwater Lagoon Beach and initiated two nests in mid-May. The Freshwater Lagoon site is a very narrow beach and heavily visited, with a NPS visitor center located midway along its length, upslope of the back dune. One nest, located about 0.5 km north of the visitor center and near the mouth of Redwood Creek, failed. The other nest, located just outside the main beach access path from the visitor center, hatched and fledged 3 chicks. NCRD assisted in the installation of PPAs around each nest and with breeding surveys. Neither the CDFW nor the NPS nests have been included in our analysis. Overall, per capita reproductive success for the NCRD was down (0.56 ± 0.88) from the previous two years (2016: 0.62 ± 1.2 and 2015: 0.80 ± 1.3), while the per capita reproductive success in RU2 overall was 1.14 ± 1.22 , the second highest in two consecutive years since 2001 (Feucht et al. 2017).

Predator Activity and Management

Predation (including nests with unknown fate where predation was assumed) continues to be the leading cause of nest failure in RU2 (Feucht et al. 2017). Of the 13 nest failures in NCRD during 2017, 39% were definitively attributed to depredation by common ravens. Another 23% of failures were due to unknown causes, but most of these were suspected to have been depredated (compared to 75% suspected or confirmed in RU2 overall; Feucht et al. 2017) (Appendix B). Common raven predation was verified by direct observation or evidence (tracks) at 5 nest sites, and suspected, based on circumstantial evidence, at 1 additional nest. Three nests failed for unknown reasons, though it is highly likely they were depredated by ravens, due to absence of any direct sign (ravens can take eggs without leaving tracks in gravel substrate), coupled with the high frequency of known raven predation. In addition to known nests, raven predation was suspected to have caused the failure of at least 2, and probably more, nests that were undiscovered prior to predation. Observers saw mating plover

pairs or gravid females at well-visited scrapes, but on the subsequent survey 2-3 days later, found these scrapes abandoned and the pairs on a different beach or attempting a new nest. This occurred at our formerly most productive site, Stone Lagoon beach. A resident pair of common ravens appears to have developed the skill of finding plover nests in 2017; in previous years, raven predation was very rare here. This year, no nests survived to hatching at Stone Lagoon, and all breeding birds departed the beach to breed elsewhere after multiple failed nesting attempts.

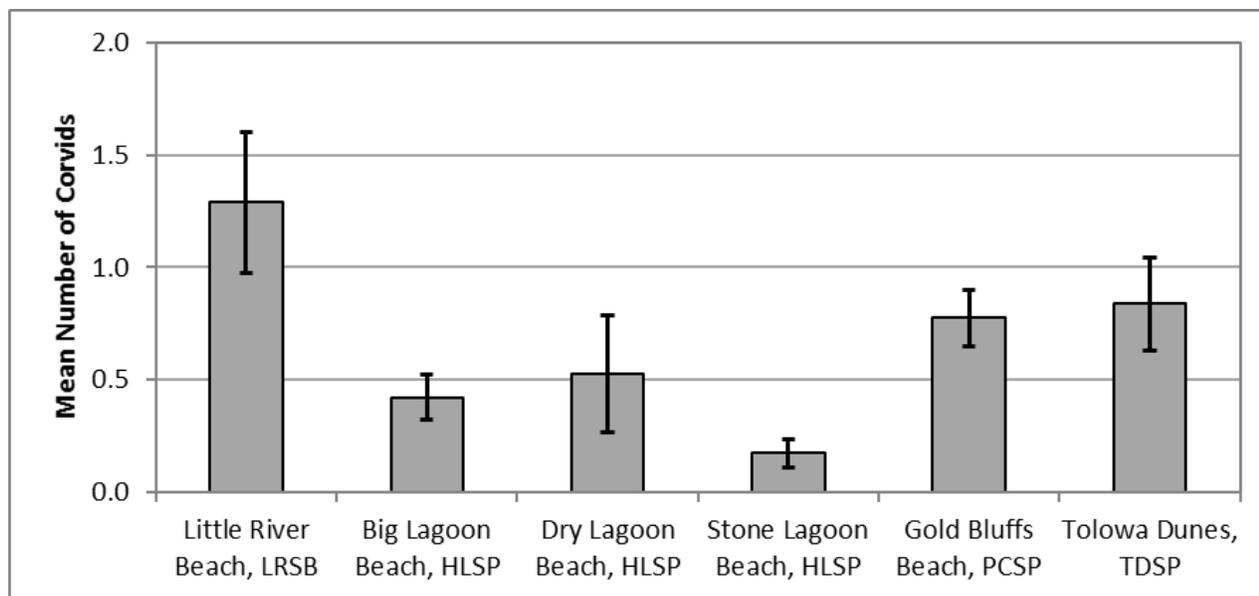


Figure 4. Corvid abundance, based on mean number detected during 500-m radius point-counts, on plover-breeding beaches in NCRD during 2016-17 season.

Striped skunk (*Mephitis mephitis*) predation occurred at two nests following other events that damaged the eggs, and was not the direct cause of failure (Appendix B). In 2016, skunk predation was the direct cause of at least 3 nest failures, all at Stone Lagoon. Anecdotal observations across years suggest that corvids, principally common ravens, are the primary predators of WSP eggs and chicks. Video evidence collected on Clam Beach County Park supports this notion (Colwell et al. 2009). Corvid activity for the 2016/17 plover season varied among NCRD sites (Fig. 4) with Tolowa Dunes Beach continuing to have high corvid activity (though decreased from last year), as well as Little River State Beach, which showed a substantial decrease in corvid numbers (mean; 1.3 ± 3.6) compared to 2015/16 (mean; 2.2 ± 3.2) (Fig. 5). Corvid numbers at Little River State Beach in 2016/17 were the lowest of the past 4 years, and the second lowest since 2008 (Fig. 5). At all other sites, corvid numbers changed little from last year, and remain consistent with those of previous years.

Colwell et al. (2010) compared estimated daily predation rates (DPR) to evaluate the relative impact of predation on nest survival among sites and between years from 2001 to 2010. They found that DPR of nests was particularly high at Clam Beach County Park/Little River State Beach (0.065-0.390), especially compared to sites such as Big Lagoon Beach (0.00) and Stone Lagoon Beach (0.00). While this generally held true for ensuing years, there was a marked increase in predation at Stone Lagoon in both 2017 and 2016, attributed to ravens and skunks, respectively.

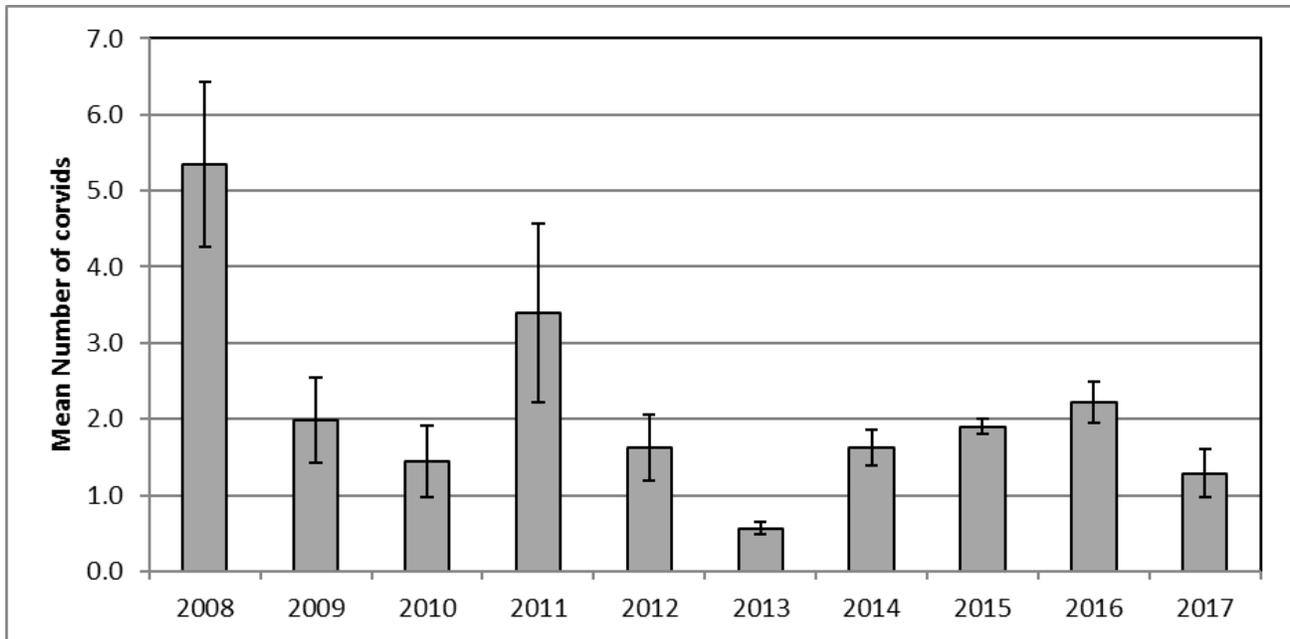


Figure 5. Annual corvid abundance, based on mean number detected during 500-m point-counts at Little River State Beach.

Activities associated with predator management (i.e., installation of anti-predator perching devices and installation/maintenance of predator proof trash receptacles) were similar across sites with the exception of Tolowa Dunes Beach, where public use developments are lacking entirely. The Redwood National and State Parks Corvid Management Strategy (RNSP 2008a) attempts to address corvid management at both local and landscape levels. The goal of the strategy is to decrease the density of corvids surrounding visitor use developments in Jedediah Smith Redwoods State Park, Del Norte Coast Redwoods State Park, Prairie Creek Redwoods State Park, and Redwood National Park (collectively referred to as Redwood National and State Parks or RNSP). RNSP is comprised of 132,000 acres in, or adjacent to, suitable plover habitat (i.e., Gold Bluffs Beach and Stone Lagoon) of the NCRD.

Human Activity and Management

Similar to previous years, Dry Lagoon Beach within Humboldt Lagoons State Park and Little River State Beach had the highest levels of human activity encountered during surveys (Fig. 6). Human activity at Dry Lagoon increased by approximately 75% over the previous year, but this may be an artifact of a small sample size (n=19). At Little River, human activity fell by roughly 25%; however, this may reflect the fact that HSU surveyors collected a larger proportion of data at LRSB than in past years, and their surveys tended to occur earlier in the day, when fewer humans are on the beach. There was a marked decrease in the mean number of dogs observed at Big Lagoon, where there was concerted increased law enforcement of dog restrictions in 2017: this may be evidence of resultant compliance. Dry Lagoon saw a fourfold increase in dogs; however, again this may be a relic of a small sample size. Alternatively, it may show increased use by dog owners from nearby Big Lagoon, where dog restrictions were more heavily enforced. Other sites remained consistent with past years' trends.

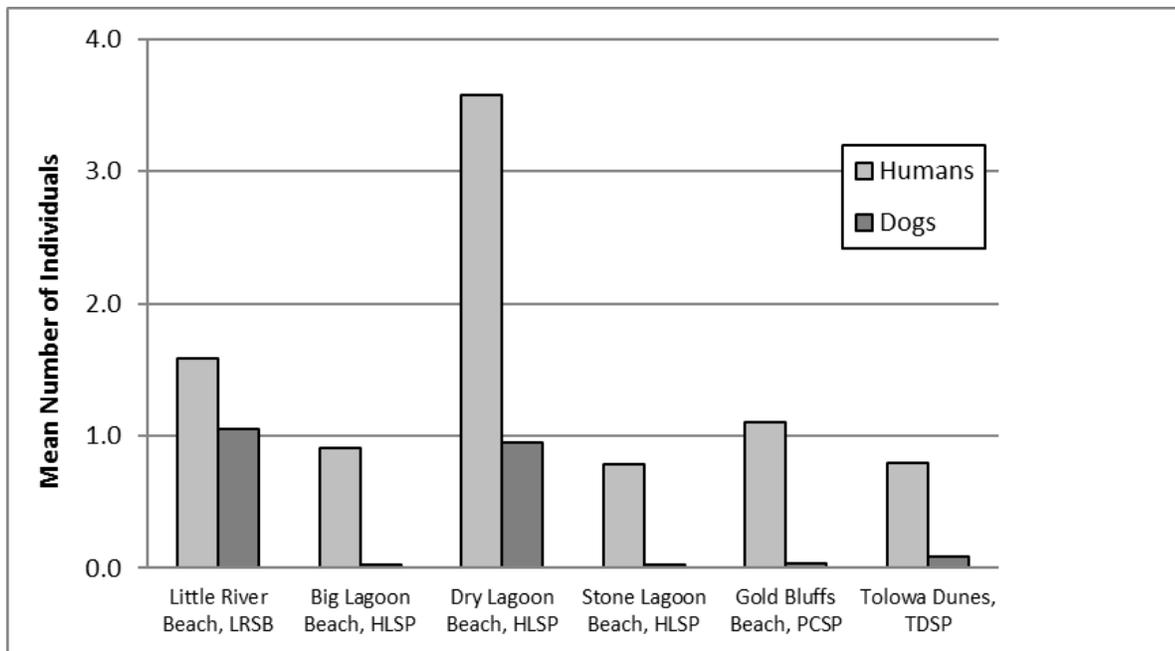


Figure 6. Human and dog abundance, based on mean numbers detected during 500-m point-counts during 2016-17 season.

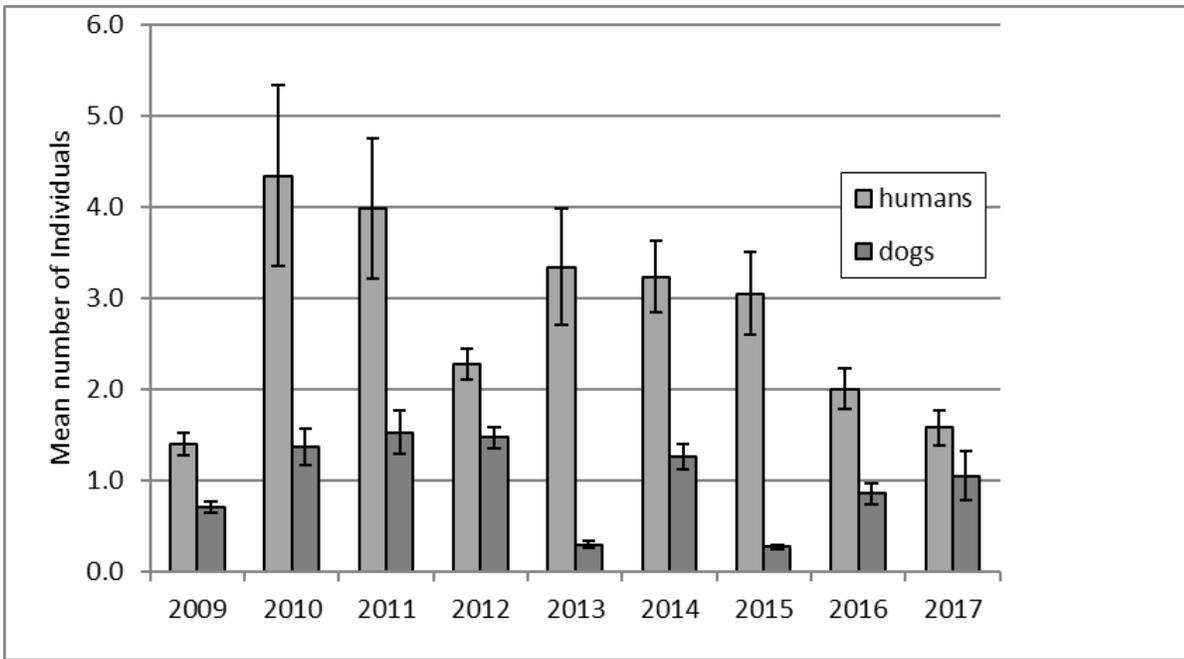


Figure 7. Human and dog abundance at LRSB, based on mean numbers detected during 500-m radius point-counts, 2009-2017.

Management efforts associated with minimizing human impact to snowy plovers included dog restrictions, vehicle restrictions, and the use of breeding and non-breeding Plover Protection Areas (PPAs). See Appendix C for site-specific beach and dune rules and regulations. All regulations and restrictions are posted on kiosks and signage at parking lots. However, vandalism has been a problem, such as at Big Lagoon and Little River State beaches, where vandals have been removing PPAs and signs. CSP rangers patrolled 6 NCRD beaches by vehicle and foot, but reports for 2 of them (Gold Bluffs Beach and Tolowa Dunes) were not available for our analysis. For the 4 beaches reporting, there were a total of 1616 patrols from September 2016 through August 2017. Of 78 violations observed during patrols, CSP Law Enforcement officers issued 42 warnings (39 for dog violations at Big Lagoon and 3 for other violations), and 36 citations [14 for dog violations (5-SL and 9-BL) and 22 for illegal camping (2-SL, 6-DL and 14 LRSB)] (Fig. 8). The higher number of dog violations at BL reflects an increased law enforcement effort to enforce regulations during the plover breeding season.

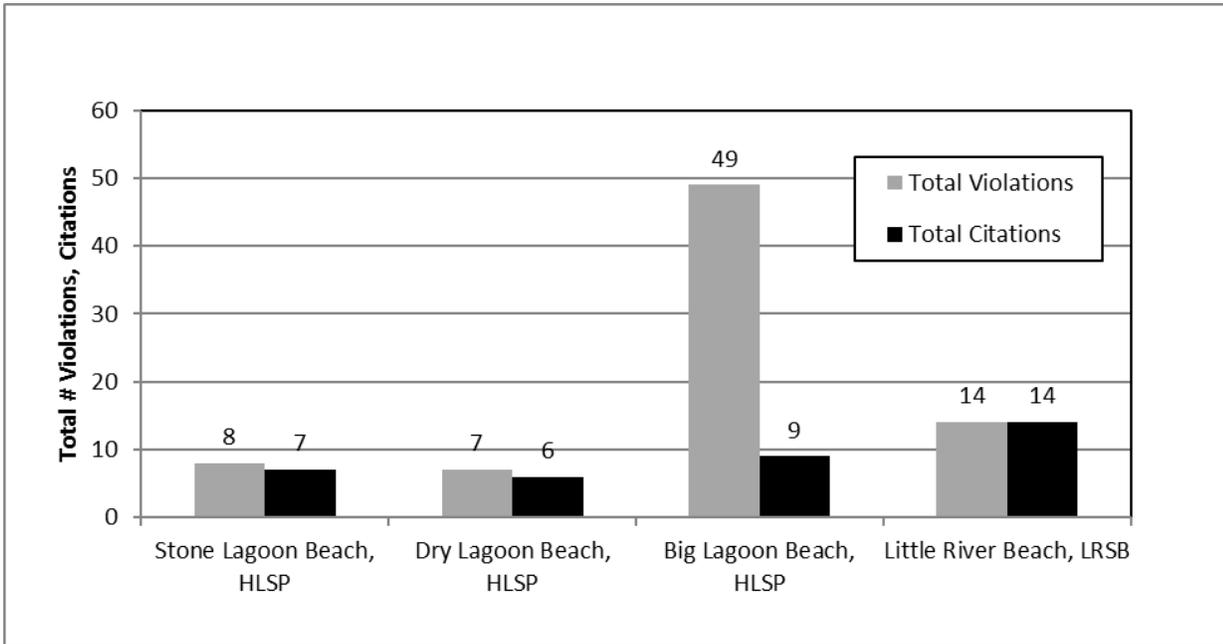


Figure 8. Violations observed and citations issued by CSP Law Enforcement during beach patrols, 2016-17 season.

In an effort to minimize visitor impacts to WSP, the NCRD continued to participate in the Recovery Unit 2 Outreach Subcommittee, which met 3 times in 2017. One of the major products of the Outreach Subcommittee has been the development and implementation of the Share the Beach Docent program, which began in 2003. Staff from NCRD helped with the Docent training. The Share the Beach Program continued in the 2016/17 plover breeding season with two docents at Little River State Beach and/or Clam Beach County Park. Docents were present from mid-May through July on most weekends and holidays, when visitor use is highest on the beaches. The docents walked the beaches as “roaming kiosks”, picked up trash, and conducted tabling at the north paved parking lot at the property boundary between Little River State Beach and Clam Beach County Park. In addition, they collected data on number of pedestrians, dogs, and other occurrences of recreational use (motorized vehicles, equestrian traffic, kites, and special events) on the beaches. The Outreach Subcommittee presented WSP educational displays during the local annual Kinetic Sculpture Race, “Godwit Days” bird watching festival, and the Sand Sculpture Festival. Approximately 2,735 students learned about snowy plovers through numerous outreach programs in 2017. An educational talk about WSP life history and management was shared with about 800 participants during two CSP NCRD Junior Lifeguard training programs in July. During the annual Ocean Day event, nearly 800 students learned about snowy plover life

history and suitable habitat, and then helped restore coastal dunes by removing invasive, non-native European beachgrass. Lastly, Friends of the Dunes discussed snowy plover life history in their Bay to Dunes program, in which approximately 1,135 students participated.

Habitat Condition and Management

In addition to providing quality habitat for the western snowy plover, the goals of coastal dune restoration in the NCRD are to restore natural dune processes by removal of invasive non-native plants such as European beachgrass, restoring natural topography and sand movement, and promoting the reestablishment of native dune vegetation. To that end, the NCRD has initiated the following coastal dune restoration activities.

TOLOWA DUNES STATE PARK

The South Lake Tolowa Dunes restoration project initiated in 2009 proposes restoration of 103 acres of coastal dune habitat in the southern portion of TDSP. Approximately 30 acres have been treated by hand to date. Retreatment, utilizing a combination of California Conservation Corps crews, Cal Fire crews, and Park staff is currently being conducted twice a year.

PRAIRIE CREEK REDWOODS STATE PARK

Between 2005 and 2009, European beachgrass was removed from approximately 26 acres of the Ossagon and Carruther's Cove area via heavy equipment. In Fall 2013, the North Gold Bluffs Beach Restoration Plan was initiated and 101 acres (from Home Creek to Ossagon) of nearshore dunes was treated via heavy equipment and hand removal. Another 100 acres of North Gold Bluffs Beach was treated with heavy equipment in Nov/Oct of 2015 for a total of approximately 227 acres being restored. Retreatment, utilizing a combination of California Conservation Corps crews, Cal Fire crews, and Park staff is currently being conducted twice a year.

HUMBOLDT LAGOONS STATE PARK

The restoration efforts at HLSP began in spring 2002 and initial treatment of the entire dune system was completed in March 2005. The control of invasive non-native vegetation in the nearshore dunes at HLSP beaches is currently at a maintenance level.

LITTLE RIVER STATE BEACH

Using mitigation funds from the Stuyvesant oil spill, the NCRD initially treated 34 acres of European beachgrass at LRSB. This effort, in combination with the original pilot project from 2005, resulted in the removal of beachgrass on 42 acres of LRSB. As with the pilot project,

the initial treatment was conducted with heavy equipment, primarily bulldozers. Retreatment, utilizing a combination of volunteers, California Conservation Corps crews, Cal Fire crews, and Park staff is currently at a maintenance level.

Of the 16 nests initiated in the NCRD, all but one (at south GBB at a site that undergoes continual “natural restoration” from creek over wash of *Ammophila*) were within sites that have undergone habitat restoration (Table 2) of varying scale. At Big Lagoon and Little River State beaches, where restoration efforts are at a maintenance level, 6 and 6 nests, respectively, were established. Two Big Lagoon nests hatched and fledged 1 and 2 chicks. One nest at Little River hatched and fledged all 3 chicks. At Stone Lagoon Beach, all 3 nests (and we suspect more) failed. The one nest at Gold Bluffs Beach failed. See Appendix C for site-specific habitat condition.

Social Attraction

Social attraction projects (NCRD 2012) were implemented at several sites (Gold Bluffs Beach, Stone Lagoon Beach, Big Lagoon Beach, and Little River State Beach) from 2011/12 through 2013/14. Though preliminary, results from the social attraction project suggest that the use of decoys and vocalizations may help encourage wintering birds to remain and breed at sites. Due to budget constraints, this project has been put on hold.

| | LRSB | BL | SL | DL | GBB | TDSP | Total NCRD |
|-------------|---------------------|--------------------|--------------|--------------|---------------|--------------|-----------------------|
| 2001 | (7) 1.67±.58 | (0) 0 | (0) 0 | (0) 0 | (0) 0 | (0) 0 | (7) 1.67±0.58 |
| 2002 | (8) 0 | (0) 0* | (0) 0* | (0) 0* | (0) 0 | (0) 0 | (8) 0 |
| 2003 | (3) 0 | (0) 0* | (0) 0* | (0) 0* | (0) 0 | (0) 0 | (3) 0 |
| 2004 | (1) 2±0* | (0) 0* | (0) 0* | (0) 0* | (1) 1±0* | (0) 0 | (2) 1.5±0.71 |
| 2005 | (3) 1±1 | (2) 0 | (0) 0 | (0) 0 | (1) 0* | (0) 0 | (6) 0.6±0.89 |
| 2006 | (2) 0 | (0) 0 | (0) 0 | (0) 0 | (0) 0* | (0) 0 | (2) 0 |
| 2007 | (0) 0 | (0) 0 | (0) 0 | (0) 0 | (0) 0* | (0) 0 | (0) 0 |
| 2008 | (0) 0 | (0) 0 | (0) 0 | (0) 0 | (0) 0* | (0) 0 | (0) 0 |
| 2009 | (0) 0* | (0) 0 | (1) 3±0 | (0) 0 | (0) 0 | (0) 0* | (1) 3.0±0 |
| 2010 | (5) 0* | (0) 0 | (3) 1.5±.71 | (0) 0 | (0) 0 | (0) 0* | (8) 1.0±1 |
| 2011 | (3) 0* | (3) 2±1.41 | (0) 0 | (0) 0 | (0) 0 | (0) 0* | (6) 0.67±1.21 |
| 2012 | (0) 0* | (2) 1±0* | (0) 0 | (0) 0 | (0) 0* | (0) 0* | (2) 1.0±0 |
| 2013 | (7) 1±1** | (0) 0* | (0) 0* | (0) 0 | (1) 0** | (0) 0* | (8) 0.86±1.07 |
| 2014 | (30) 0** | (1) 0* | (3).20±.63 | (0) 0 | (1) 0** | (0) 0 | (35) 0.2±0.63 |
| 2015 | (4) 0* | (2) 0 | (4) 2.0±1.4 | (0) 0 | (1) 0* | (0) 0 | (11) 0.80±1.3 |
| 2016 | (4) 0* | (1) 3±0* | (8) 0.5±1.0 | (0) 0 | (0) 0* | (0) 0 | (13) 0.62±1.2 |
| 2017 | (6) 0.5±1.0* | (6) 1.0±1.0 | (0) 0 | (0) 0 | (1) 0* | (0) 0 | (16) 0.55±0.88 |

*Invasive Exotic Removal Year

+Social Attraction Year

CONCLUSION

To facilitate management of plovers within the NCRD we analyze data and present results in relation to predation, human disturbance, and habitat degradation. These three inter-related factors have been reported to compromise reproductive success (USFWS 2007) and hence, limit plover populations along the Pacific coast. In order to continually improve our stewardship, results presented are interpreted in light of current management efforts.

In 2017, the NCRD Natural Resource Program continued monitoring WSP in the District with the help of HSU (Little River State Beach) and RNP (Prairie Creek Redwoods State Park). The mean wintering population within NCRD reached an eleven-year peak in 2017 of 124 individuals. After a record high mean breeding population of 33 in 2016, it appeared the mean breeding population decreased by more than half to 14 in 2017. This drop was likely due, in part, to the dispersal of breeding individuals from Big and Stone lagoons to an adjacent site, Freshwater Beach, on National Park Service land, and elsewhere to non-NCRD lands, in mid-May, following repeated nesting failure from raven predation. Additionally, our

mid-month surveys, from which we calculate the mean breeding population, missed the high count of breeding plovers. On NCRD beaches, 19 breeding plovers initiated 16 nests, produced 9 chicks and fledged 5 juveniles in 2017; this is more than the 17 breeders in 2016. This year tied with 2016 for the second highest number of fledglings since 2001, and produced about the average number of chicks hatched during all years of monitoring. Per capita reproductive success (0.56 ± 0.88) was relatively low, compared to the last 8 years. Of the entire RU2 breeding population, NCRD hosted 26% (19 of 72) of the breeding adults and 12% (5 of 40) of the fledged chicks. For the greater RU2, the breeding population held steady from 2016 at 72 individuals, the highest count since 2009. Furthermore, for the second consecutive year, RU2 produced a remarkably high number of 40 juveniles in 2017, tied with 2016 for the most fledglings since 2001 (Feucht et al. 2017). The RU2 per capita reproductive rate was 1.14 ± 1.22 , which exceeded the recovery objective of 1.0 for the second year in a row since 2004.

Predator Activity and Management

Feucht et al. (2017) reported that corvid predation of eggs and chicks continues to be the most significant problem limiting productivity of plovers in RU2. In the NCRD, of the 16 nests that were initiated in 2017, 13 nests failed; 5 from common raven predation, 3 from wind damage/burial (all during the same high wind storm event in early May), 1 from high tide wash-over, 1 from abandonment, and 3 from unknown causes. It is suspected that most of the failures from unknown causes can be attributed raven predation, and that there were likely additional nests that were depredated by ravens that went undiscovered. Effective predator management remains an essential tool for increasing philopatric juvenile recruitment in RU2.

Changes in corvid abundance across years and sites likely play a significant role in the degree of productivity. Having multiple suitable breeding sites available across years may function as an important factor for plovers facing changes in predator pressure, human pressure, and other habitat variables. As in years past, CSP continued using anti-predator perching devices and predator proof trash cans to manage predator concentrations in plover breeding areas. At a landscape level, CSP, in partnership with NPS, implemented the Corvid Management Strategy (RNSP 2008) within RNSP to decrease the density of corvids surrounding visitor use developments. The Corvid Management Strategy includes effectiveness monitoring and an adaptive management approach to facilitate the selection of

appropriate corvid management tools for CSP lands. Finally, CSP staff continue to participate in the RU2 working group and the RU2 Predator Subcommittee to identify means of enhanced predator management.

Human Activity and Management

In 2017, no nests were known to fail directly from human activity. In years past, humans have driven over nests, vandalized exclosures and removed eggs, stepped on eggs, and disturbed incubating adults, causing nest abandonment and the death of newly hatched chicks owing to hypothermia (Colwell et al. 2008). To address these risks, NCRD staff have erected non-breeding and breeding PPAs to protect WSP and their eggs (though these PPAs are often ignored and vandalized), increased enforcement of existing regulations (enforcement at Big Lagoon was increased with a resultant drop in dog numbers), and invested in plover-centric education and outreach programs. Surveyors continue to document humans (and dogs) displacing and flushing plovers.

To encourage protection of the beach and dune ecosystem and educate the public about sharing the beach with all species, the NCRD has been active in the WSP Recovery Unit 2 Outreach Subcommittee and the “Share the Beach” docent program at Little River State Beach and adjoining Clam Beach County Park. At a landscape level, CSP staff has initiated a district-wide outreach campaign to inform visitors about the potential effect they have on corvid populations, the impact corvids may have on sensitive species, and ways that visitors can minimize the effect they have on corvid populations.

Habitat Condition and Management

Of the three limiting factors identified by the USFWS, habitat quality (measured physiognomically and floristically) is perhaps the most difficult to assess. Within the NCRD, plovers have selected open and restored habitats during the breeding and non-breeding seasons and settled disproportionately in newly restored habitats. An evaluation in 2014 of snowy plover response to beach dune habitat restoration in Humboldt County found that plovers nested primarily (84%) in restored (via both natural processes and human-implemented) habitats (Leja 2015). Restored habitats were characterized by wide beach, gentle slope, low-height foredunes with scattered driftwood and low-growing dune mat, expansive, flat sand extending into the backdunes, and less European beachgrass cover than unrestored beaches; all of these features were prevalent in areas utilized by nesting plovers; wintering plovers also used restored areas.

The positive implications of European beachgrass removal and restoration of native dune vegetation for WSP recovery are vast. For example, 1) the native dune vegetation known as “dune mat” offers a heterogeneous substrate in which WSP eggs and chicks may be more cryptic and therefore less susceptible to predation; 2) the removal of beachgrass and its rhizomes facilitates the restoration of dune topography from artificially high, densely vegetated dunes to the sparsely vegetated low hummocks and open ground preferred by nesting plovers; and 3) European beachgrass is associated with a lower invertebrate abundance and diversity (Slobodchikoff and Doyen 1977, Webb et al. 2000). As plovers primarily forage on surface invertebrates of the beach and dunes, a lower abundance of invertebrates may have serious implications for plover survival.

Habitat restoration, specifically the removal of invasive non-native vegetation such as European beachgrass, continues to be a major component of CSP’s Natural Resource Program. CSP anticipates that the relationship between invasive non-native vegetation and plover productivity will become apparent in time with continued monitoring in restored and degraded habitats and observation of the effects of patch size, crypsis, topography, foraging opportunities, proximity to foot traffic, proximity to conspecifics, and corvid abundance on plover productivity.

It may prove beneficial to supplement debris cover in the HRA with additional driftwood, shells, and stones. Leja (2015) showed that there was double the amount of driftwood debris in naturally restored habitats (which plovers most frequently chose for nesting) than in human-restored areas.

Social Attraction

North Coast Redwoods District’s preliminary results from the social attraction project, conducted from 2011/12 through 2013/14, suggested that the use of decoys and vocalizations may help encourage wintering birds to remain and breed at these sites (NCRD, 2012). Additionally, the presence of conspecifics was found to be the most influential social variable on nest location selection during the breeding season (Leja 2015). Thus, there appears to be credence in continuing the social attraction project in both the winter and breeding seasons in restored habitat. Due to budget constraints, the project has not been deployed since 2014.

In 2017/18 the North Coast Redwoods Management Team has approved plans to:

- Continue monitoring efforts throughout the NCRD and participate in the Recovery Unit 2 demographic study.
- Continue to work and coordinate with the Recovery Unit 2 working group and subcommittees, and the Humboldt Coastal Dunes Cooperative.
- Continue habitat restoration within WSP suitable habitat.
- Continue to use symbolic fencing and reintroduce predator exclosures when appropriate.
- Continue to explore avenues to attract plovers to sites where factors leading to low reproductive success can be managed most effectively.
- Continue the use of CSP law enforcement beach patrol logs to document beach and dune patrols, violations, citations, and contacts.
- Continue to increase law enforcement presence at occupied State Park beaches during the WSP breeding season, especially during holiday weekends.
- Increase public outreach via Recovery Unit 2 Outreach Subcommittee and improve and increase signage, including a quicker turnaround on replacement of vandalized signs.

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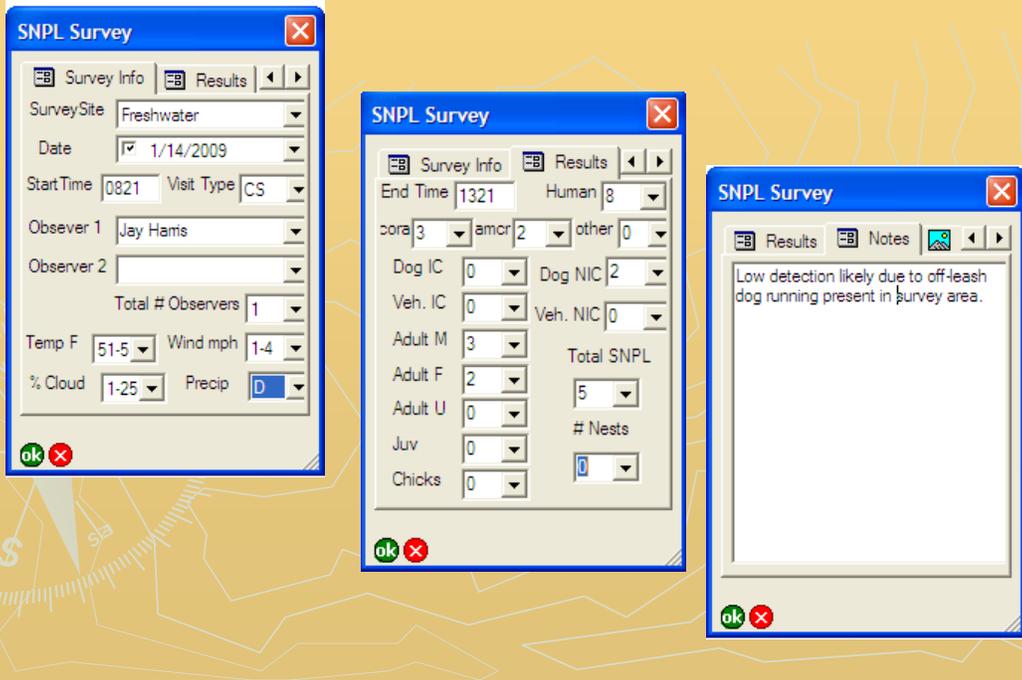
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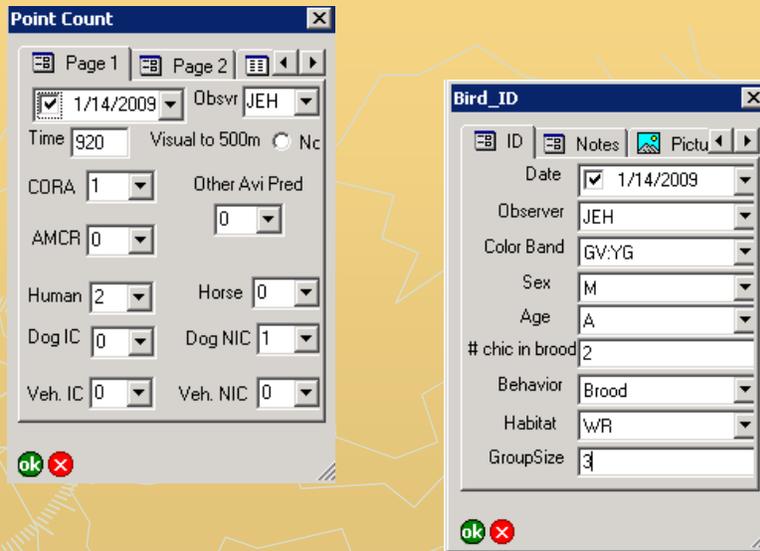
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APPENDIX A. WESTERN SNOWY PLOVER SURVEY FORMS

SNPL Monitoring



SNPL Monitoring



Appendix B. NCRD Western Snowy Plover Breeding Summary 2017

| Location | Nest Number | Female | Male | Number Hatched | Fate | Date Nest Found |
|--------------------------|--------------------|---------------|-------------|-----------------------|-----------------------|------------------------|
| Big Lagoon Beach, HLSP | 17BL01 | WW:AB | OV:BY | 0 | Failed-high winds | 04/03/17 |
| Big Lagoon Beach, HLSP | 17BL02 | OV:AW | OV:GR | 0 | Failed-CORA predation | 04/10/17 |
| Big Lagoon Beach, HLSP | 17BL03 | WW:WG | OR:YR | 0 | Failed UNK | 04/14/17 |
| Big Lagoon Beach, HLSP | 17BL04 | OR:WG | OR:YR | 0 | Failed UNK | 05/19/17 |
| Big Lagoon Beach, HLSP | 17BL05 | WW:AB | OV:BY | 3 | Fledged 2. | 06/05/17 |
| Big Lagoon Beach, HLSP | 17BL06 | OR:WG | OR:YR | 3 | Fledged 2 | 06/21/17 |
| Little River State Beach | 17CN03 | UNK | AG:AB | 0 | Failed-high winds | 04/14/17 |
| Little River State Beach | 17CN05 | WW:AY(?) | X:G(?) | 0 | Failed-CORA predation | 04/27/17 |
| Little River State Beach | 17CN08 | UNK | UNK | 0 | Failed-CORA predation | 05/08/17 |

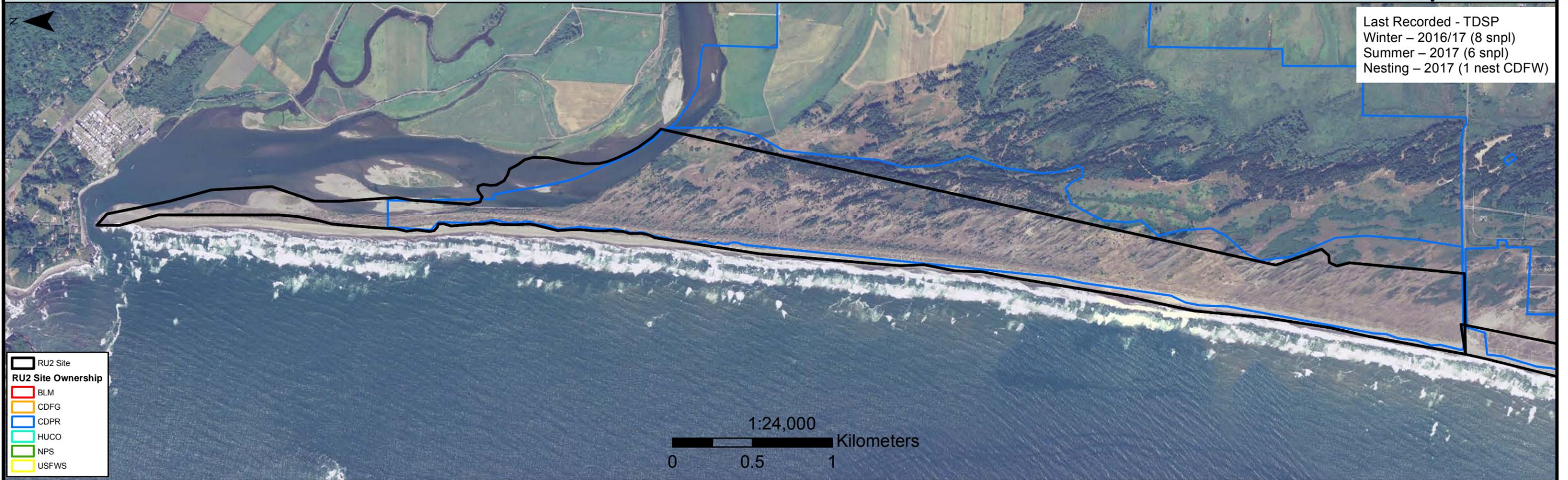
| | | | | | | |
|--------------------------|---------------|---------|-------|---|--------------------------------------|----------|
| Little River State Beach | 17CN20 | RY:GG | WV:BY | 0 | UNK Abandoned | 06/09/17 |
| Little River State Beach | 17CN21 | Y/V/Y:W | WA:BO | 0 | Failed-high tide, skunk predation | 06/12/17 |
| Little River State Beach | 17CN22 | AG:AB | WW:AR | 3 | Fledged 2 | 06/19/17 |
| Gold Bluffs Beach | 17GB01 | G/L/G:W | OV:WW | 0 | Failed-high winds | 04/27/17 |
| Stone Lagoon Beach, HLSP | 17SL01 | GY:RR | X:X | 0 | Failed UNK | 04/18/17 |
| Stone Lagoon Beach, HLSP | 17SL02 | UNK | UNK | 0 | Failed-CORA predation | 04/28/17 |
| Stone Lagoon Beach, HLSP | 17SL03 | UNK | UNK | 0 | Failed-CORA predation | 5/01/17 |

Appendix C - WSP Survey Sites

TDSP N. (Smith River to Kellogg Rd.)



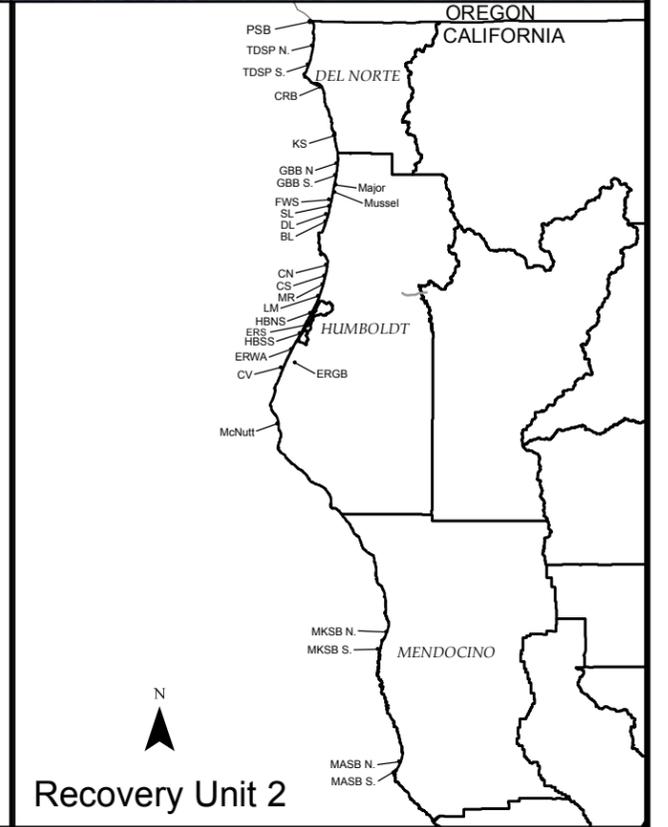
Last Recorded - TDSP
Winter - 2016/17 (8 snpl)
Summer - 2017 (6 snpl)
Nesting - 2017 (1 nest CDFW)



RU2 Site
RU2 Site Ownership
 BLM
 CDFG
 CDPR
 HUCO
 NPS
 USFWS

1:24,000
Kilometers
0 0.5 1

| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|--|---|--|---|---|
| <p><i>Existing</i> Population Surveys (1x Month) -ATV survey (70 min.) 10 min. PC -Foot survey (210 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> | <p><i>Existing</i> *Symbolic Fencing (if breeding determined)</p> | <p><i>Existing</i></p> | <p><i>Existing</i> Beach Patrolled (1x Week) Vehicle NIC if -South of Kellogg without special permit on CSP lands -Non-street legal -Off waveslope -Speed > 15 mph -Vehicle play observed Dog NIC if -Beyond 500 meter of Kellogg Rd. -Off leash -Off waveslope</p> | <p><i>Existing</i> North Coast Redwood Interpretive Association and Tolowa Dunes Stewards offer field trips and talks.</p> |
| <p><i>Needed</i></p> | <p><i>Needed</i> * E. beachgrass removal, few remaining areas with open sand and or native vegetation.</p> | <p><i>Needed</i> *PP trash receptacles *Address illegal dumping of carcasses and adjacent agricultural land use correlated with high # Corvids</p> | <p><i>Needed</i> *Regulatory signage</p> | <p><i>Needed</i> *Interpretative displays</p> |



N
Recovery Unit 2

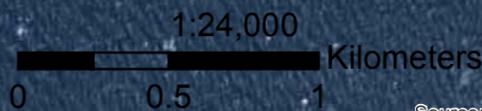
TDSP S. (Kellogg Rd. to Pt. St. George)



Last Recorded - TDSP
Winter - 2016/17 (8 snpl)
Summer - 2017 (6 snpl)
Nesting - 2017 (1 nest CDFW)

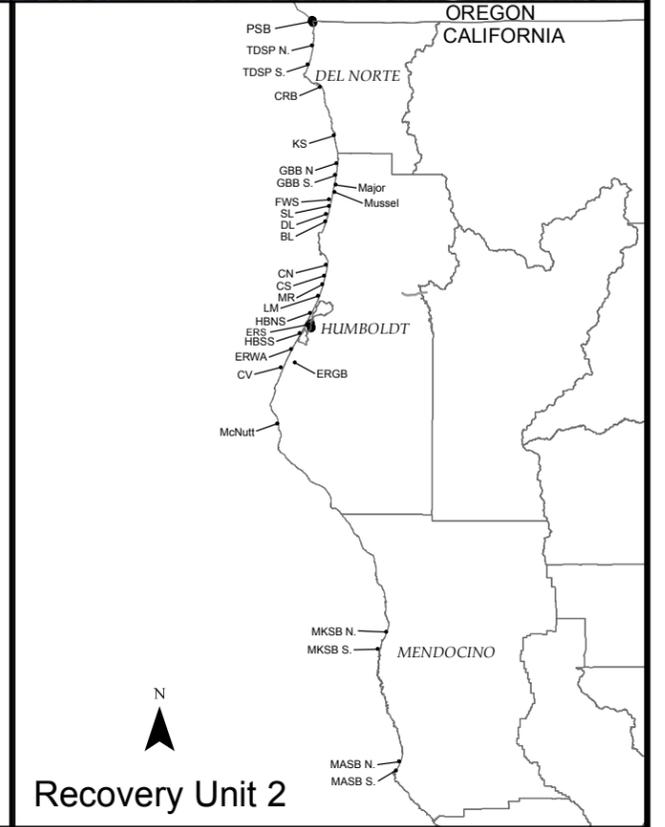


● Nests 2017
 RU2 Site
RU2 Site Ownership
 BLM
 CDFG
 CDPR
 HUCO
 NPS
 USFWS



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

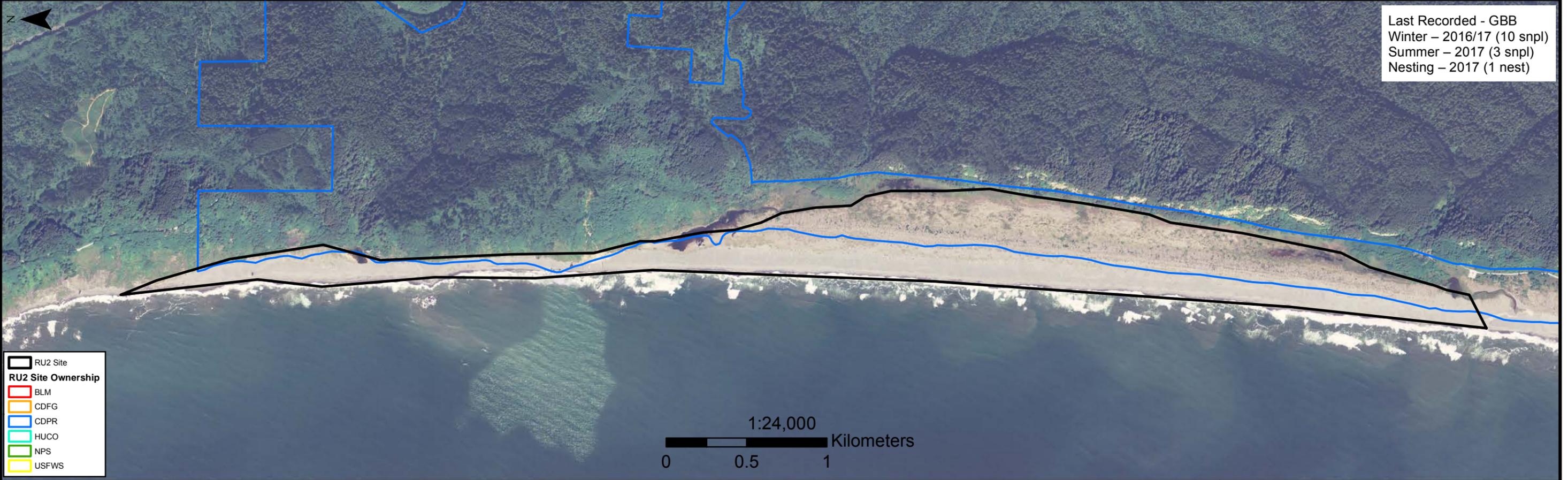
| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|---|---|--|--|--|
| <p><i>Existing</i></p> <p>Population Surveys (1x Month) -ATV survey (70 min.) 10 min. PC -Foot survey (210 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Symbolic Fencing (if breeding determined) *400 acre nearshore dune restoration planned for area just south of the Tolowa breach on CSP lands.</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p><i>Needed</i></p> <p>*PP trash receptacles *Address illegal dumping of carcasses and adjacent agricultural land use correlated with high # Corvids</p> | <p><i>Existing (CSP lands only)</i></p> <p>Beach Patrolled (1x Week) Vehicle NIC if -South of Kellogg without special permit -Non-street legal -off waveslope -speed > 15 mph -vehicle play observed</p> <p>Dog NIC if -Beyond 500 meter of Kellogg Rd. -Off leash -Off waveslope</p> <p><i>Needed</i></p> <p>*Regulatory signage</p> | <p><i>Existing</i></p> <p>North Coast Redwood Interpretive Association and Tolowa Dunes Stewards offer field trips and talks.</p> <p><i>Needed</i></p> <p>*Interpretative displays</p> |



GBB N. (Carruthers Cove to Fern Canyon)

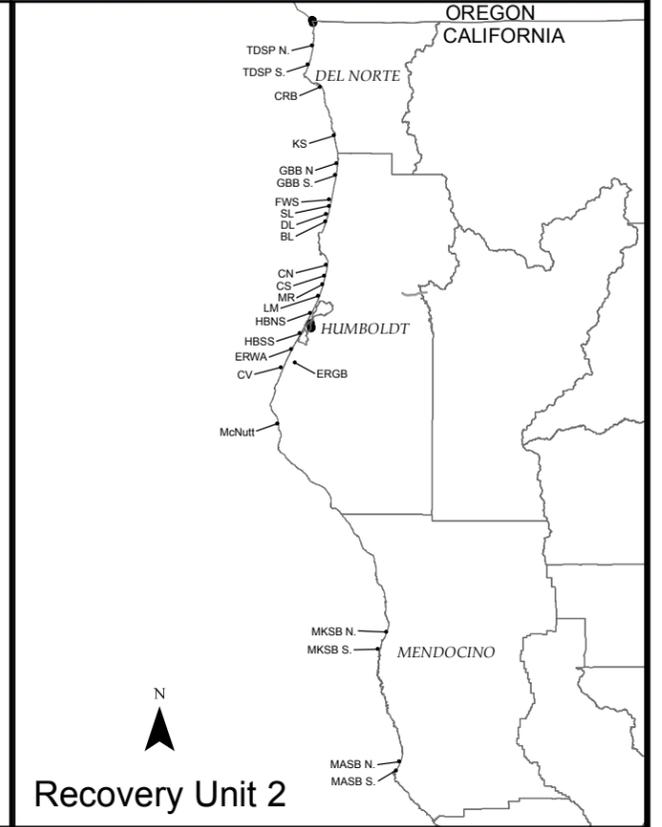


Last Recorded - GBB
Winter – 2016/17 (10 snpl)
Summer – 2017 (3 snpl)
Nesting – 2017 (1 nest)



RU2 Site
RU2 Site Ownership
 BLM
 CDFG
 CDFG
 CDFG
 HUCO
 NPS
 USFWS

| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|---|---|--|---|---|
| <p><i>Existing</i> Population Surveys-min. 2 surveyors Breeding (2x Month) Winter (1x Month) Breeding survey - by foot only -ATV (40 min.) 10 min. PC -Foot (230 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i> *Symbolic Fencing (if breeding determined) *E. beachgrass removal and maintenance (approximately 20 acres) ongoing from Carruthers's Cove to Ossagon. *E. beachgrass removal and maintenance (approximately 200 acres) starting in 2013 and currently ongoing from Ossagon to Fern Canyon.</p> <p><i>Needed</i></p> | <p><i>Existing</i> *Corvid Management Plan</p> <p><i>Needed</i></p> | <p><i>Existing</i> Beach Patrolled (7x Week) Vehicle use limited to permit Vehicle NIC if -Non-street legal -off waveslope -speed > 15 mph -vehicle play observed Dog NIC if -Off leash -Beyond area defined as waveslope to high tide line</p> <p><i>Needed</i></p> | <p><i>Existing</i> North Coast Redwood Interpretive Association</p> <p><i>Needed</i> *Interpretative displays</p> |

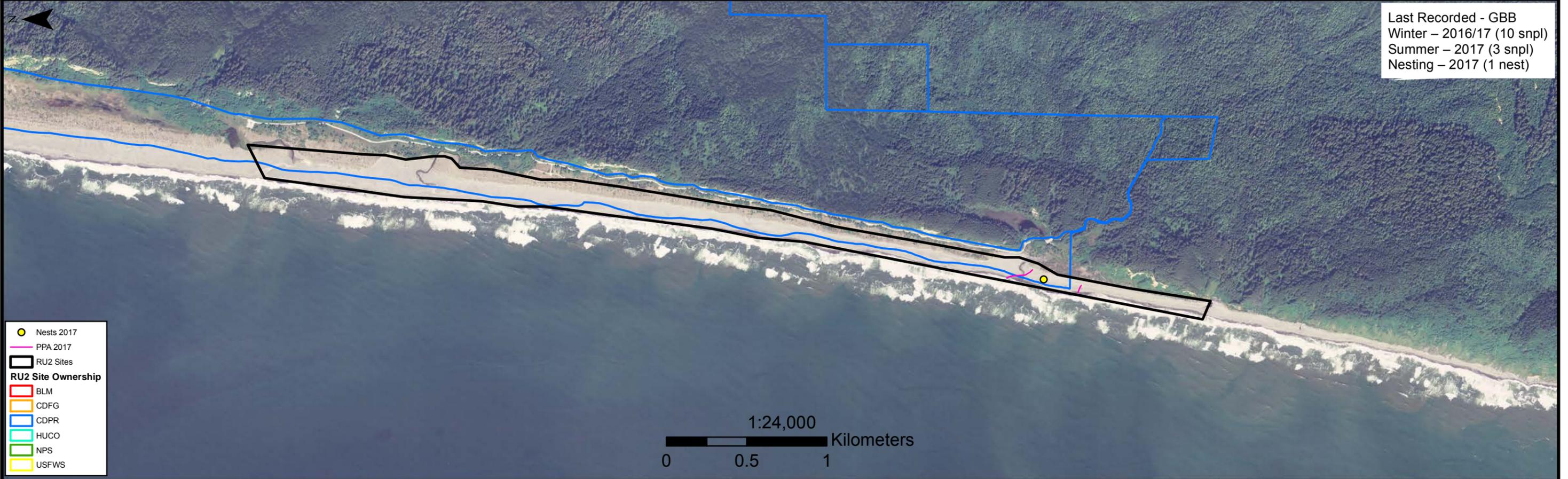


Recovery Unit 2

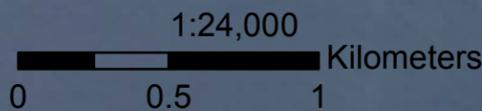
GBB S. (Fern Canyon to Major Creek)



Last Recorded - GBB
Winter – 2016/17 (10 snpl)
Summer – 2017 (3 snpl)
Nesting – 2017 (1 nest)



- Nests 2017
- PPA 2017
- RU2 Sites
- RU2 Site Ownership**
- BLM
- CDFG
- C DPR
- HUCO
- NPS
- USFWS

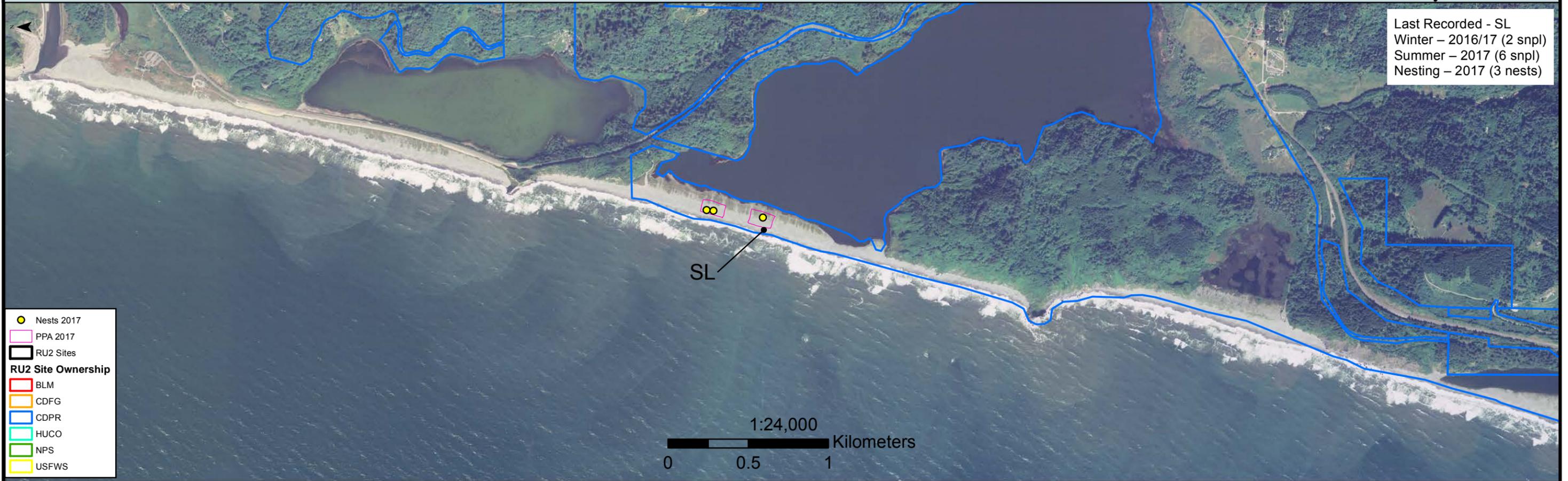


| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> | |
|---|--|--|--|---|---|
| <p><i>Existing</i> Population Surveys-min. 2 surveyors Breeding (2x Month) Winter (1x Month) Breeding survey - by foot only -ATV (30 min.) 10 min. PC -Foot (120 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i> *Symbolic Fencing (if breeding determined) *E. beachgrass removal by hand near Espa lagoon and GBB Campground.</p> <p><i>Needed</i></p> | <p><i>Existing</i> *Corvid Management Plan</p> <p><i>Needed</i></p> | <p><i>Existing</i> Beach Patrolled (7x Week) Vehicle use limited to permit Vehicle NIC if -Non-street legal -off waveslope -speed > 15 mph -vehicle play observed Dog NIC if -Off leash -Off waveslope</p> <p><i>Needed</i></p> | <p><i>Existing</i> North Coast Redwood Interpretive Association</p> <p><i>Needed</i> *Interpretative displays</p> | <p style="text-align: center;">N</p> <p style="text-align: center;">Recovery Unit 2</p> |

SL (Freshwater Rocks to Sharp Pt.)

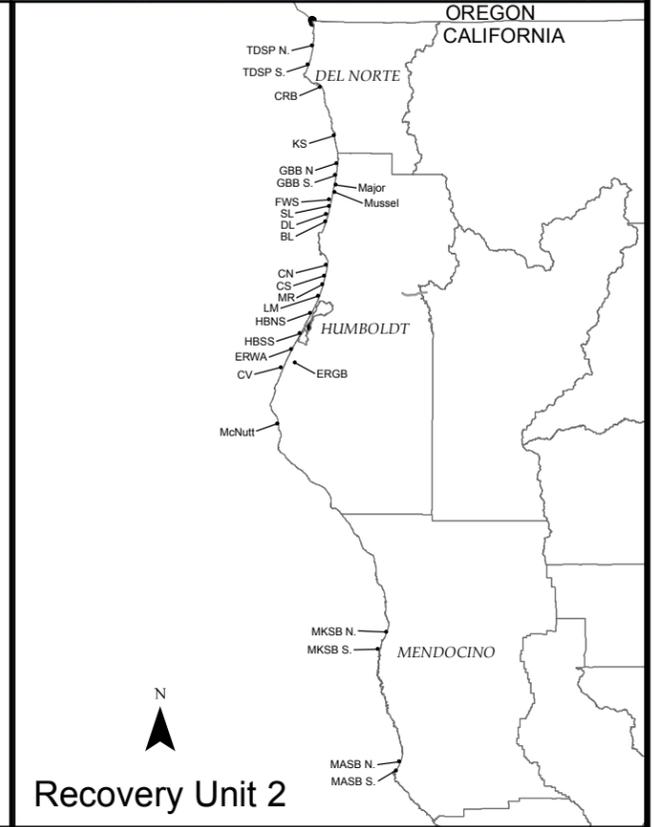


Last Recorded - SL
Winter – 2016/17 (2 snpl)
Summer – 2017 (6 snpl)
Nesting – 2017 (3 nests)



● Nests 2017
 PPA 2017
 RU2 Sites
RU2 Site Ownership
 BLM
 CDFG
 CDPR
 HUCO
 NPS
 USFWS

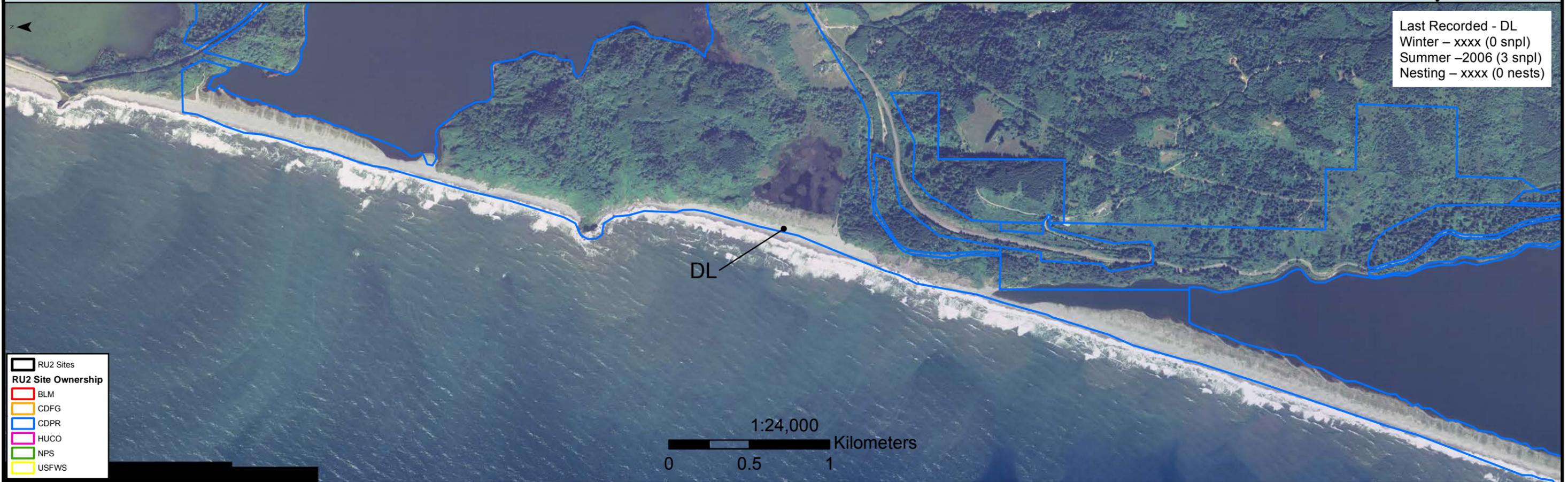
| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|---|---|--|--|--|
| <p><i>Existing</i></p> <p>Population Surveys Breeding (2x Month) Winter (1x Month) Survey - by foot only -Foot (55 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Symbolic Fencing (if breeding determined) *nearshore dune exotics at maintenance level.</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Predator proof receptacles</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>Beach Patrolled (1x/Week) Vehicle use limited to permit Vehicle NIC if -Non-street legal -off waveslope -speed > 15 mph -vehicle play observed Dog NIC if - Present outside of parking area or off leash anywhere</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p><i>Needed</i> *Interpretative displays</p> |



DL (Sharp Pt. to Big Lagoon Rocks)



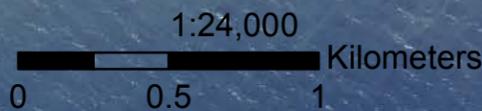
Last Recorded - DL
Winter - xxxx (0 snpl)
Summer -2006 (3 snpl)
Nesting - xxxx (0 nests)



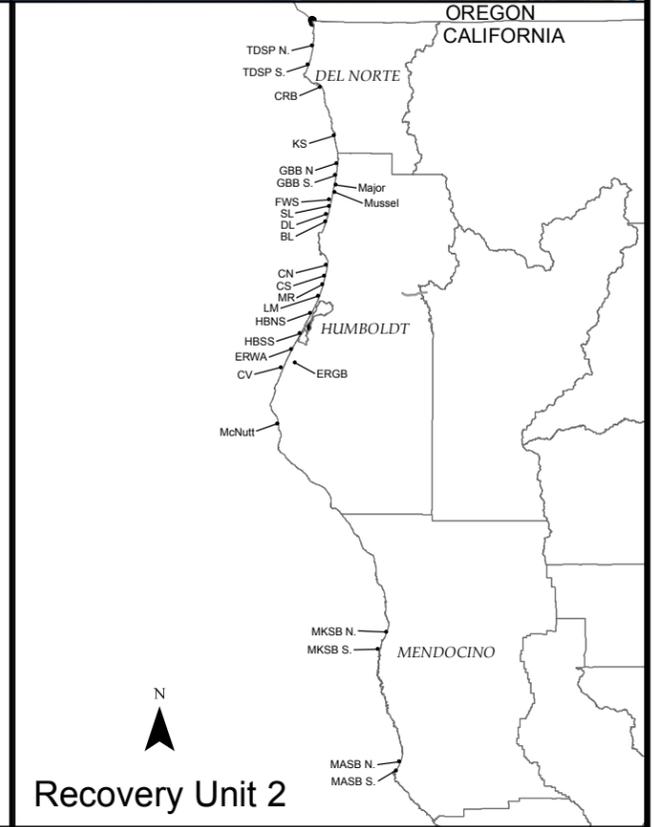
RU2 Sites

RU2 Site Ownership

- BLM
- CDFG
- C DPR
- HUCO
- NPS
- USFWS



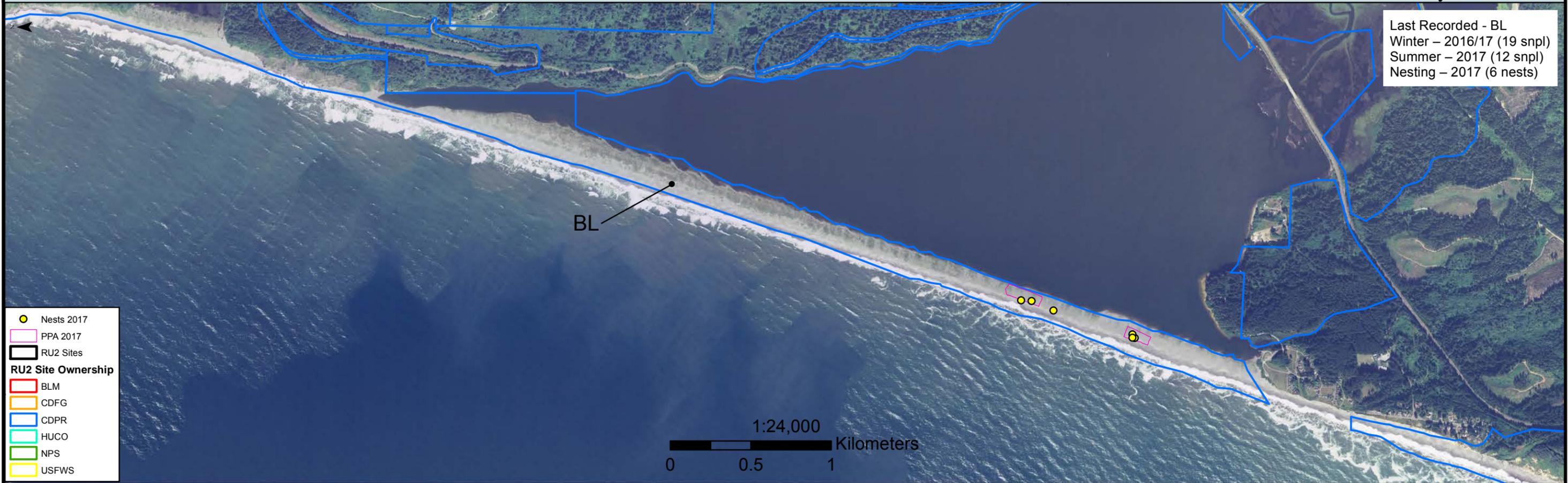
| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|---|--|--|--|--|
| <p><i>Existing</i></p> <p>Population Surveys Breeding (2x Month) Winter (1x Month) Breeding survey - by foot only -ATV (10 min.) 10 min PC -Foot (40 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Symbolic Fencing (if breeding determined) *nearshore dune exotics at maintenance level</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Predator proof receptacles</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>Beach Patrolled (1x Week) No vehicle use Dog use permitted on a leash of no more than six (6) feet in length from Sharp Pt. south to rocks separating Dry from Big Lagoon Dog NIC if - Off leash - Off waveslope</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p><i>Needed</i> *Interpretative displays</p> |



Recovery Unit 2

BL (Big Lagoon Spit)

Last Recorded - BL
Winter – 2016/17 (19 snpl)
Summer – 2017 (12 snpl)
Nesting – 2017 (6 nests)



- Nests 2017
- PPA 2017
- RU2 Sites
- RU2 Site Ownership**
- BLM
- CDFG
- CDPR
- HUCO
- NPS
- USFWS

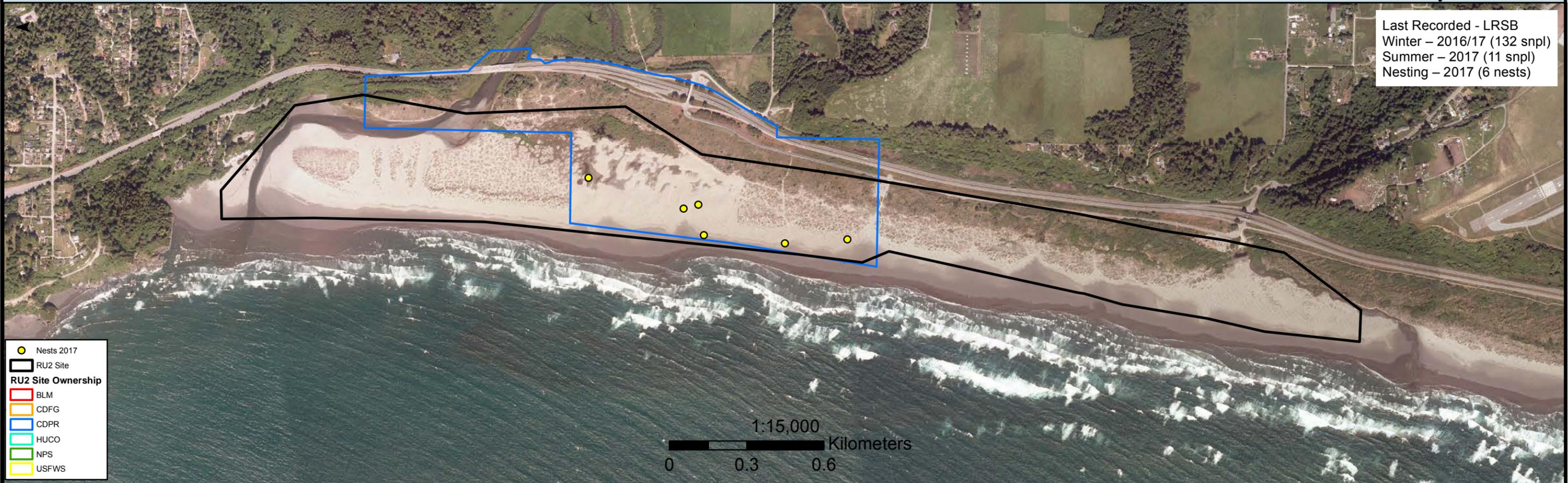
1:24,000
0 0.5 1 Kilometers

| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> | |
|--|---|--|--|--|--|
| <p><i>Existing</i></p> <p>Population Survey min. 2 surveyors Breeding (2x Month) Winter (1x Month) Breeding survey - by foot only -ATV (60 min.) 10 min PC -Foot (120 min.) 20 min. PC</p> <p>Demographic Survey (1x Week if breeding determined)</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Symbolic Fencing (if breeding determined) *Nearshore dune exotics at maintenance level.</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>*Predator proof receptacles</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p>Beach Patrolled (3x Week) No vehicle use No dogs permitted on BLSP. Dogs are permitted on a leash at BLCP, within approximately 100 meters of BLCP parking area</p> <p><i>Needed</i></p> | <p><i>Existing</i></p> <p><i>Needed</i> *Interpretative displays</p> | |

Recovery Unit 2



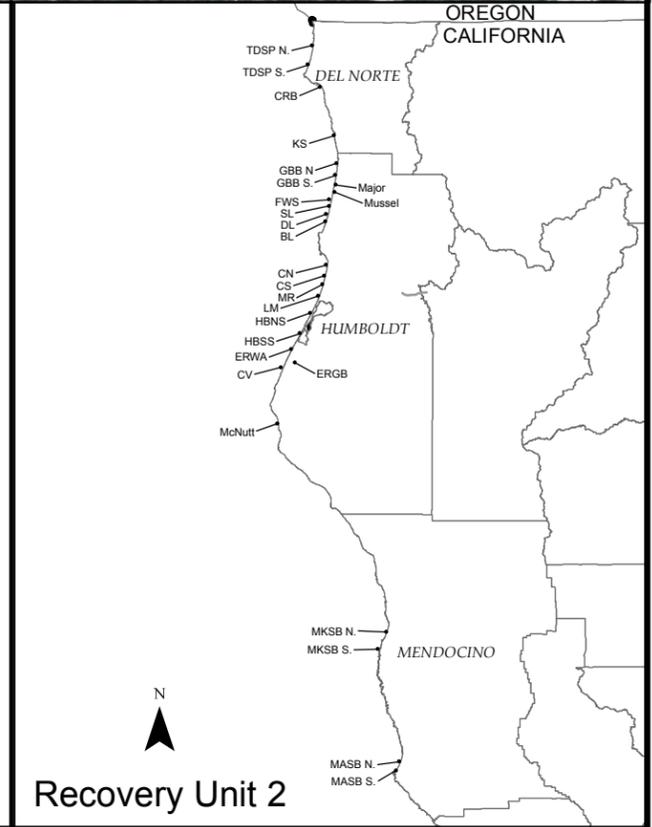
Last Recorded - LRSB
Winter – 2016/17 (132 snpl)
Summer – 2017 (11 snpl)
Nesting – 2017 (6 nests)



● Nests 2017
 □ RU2 Site
RU2 Site Ownership
 ■ BLM
 ■ CDFG
 ■ CDFR
 ■ HUCO
 ■ NPS
 ■ USFWS

1:15,000
 0 0.3 0.6 Kilometers

| <u>Research & Monitoring</u> | <u>Habitat Management</u> | <u>Predator Management</u> | <u>Law Enforcement</u> | <u>Education & Outreach</u> |
|---|---|---|--|---|
| <p><u>LRSB ONLY</u> <u>From N. parking lot to LR</u> <i>Existing</i> Population Survey Breeding (2x Month) Winter (1x Month) -Foot (60 min.) 20 min. PC</p> <p>Demographic Survey (1x/Week if breeding determined)</p> <p><i>Needed</i></p> | <p><u>LRSB ONLY</u> <i>Existing</i> *Symbolic Fencing (if breeding determined) *Nearshore dune restoration completed (44 ac.) with ongoing yearly maintenance.</p> <p><i>Needed</i></p> | <p><u>LRSB ONLY</u> <i>Existing</i> *Nixalite on perches</p> <p><i>Needed</i> *Predator proof receptacles</p> | <p><u>LRSB ONLY</u> <i>Existing</i> Beach Patrolled (3x/Week) Vehicle NIC if -Non-street legal -off waveslope -speed > 15 mph -vehicle play observed Dog NIC if -off leash -off waveslope</p> <p>*Regulatory signage installed</p> <p><i>Needed</i></p> | <p><u>LRSB ONLY</u> <i>Existing</i> *FOD/Docents * Interpretive signage and materials installed at parking areas and beach accesses.</p> <p><i>Needed</i></p> |



Recovery Unit 2