

PALOS VERDES PENINSULA
LAND CONSERVANCY



Palos Verdes Peninsula Land Conservancy **MANAGEMENT REPORT**



Comprehensive Management and Monitoring Report

2019 - 2021

AND

2021 ANNUAL REPORT



**For the
Rancho Palos Verdes Natural
Communities Conservation Plan and
Habitat Conservation Plan**

March 2022

**COMPREHENSIVE MANAGEMENT
AND MONITORING REPORT 2019-2021**

for the

RANCHO PALOS VERDES

**NATURAL COMMUNITIES
CONSERVATION PLAN AND HABITAT
CONSERVATION PLAN**

Prepared for:

THE CITY OF RANCHO PALOS VERDES

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SECTION I

OVERVIEW AND EXISITING CONDITIONS

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SECTION I OVERVIEW AND SUMMARY OF ACTIVITIES

I.1 INTRODUCTION

This Management and Monitoring Report (Report) for the Rancho Palos Verdes Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP) is the fifth comprehensive report for the Palos Verdes Nature Preserve (PVNP). This report was prepared to document the results of the focused surveys for NCCP/HCP-covered plant and wildlife species within the PVNP, identify potential disturbance factors/threats to NCCP/HCP-covered plant and wildlife species, and to make management recommendations for the preservation of the existing NCCP/HCP-covered plant and wildlife species populations. This report was prepared in accordance with the requirements of the NCCP/HCP for the City of Rancho Palos Verdes (City), California.

The NCCP/HCP was prepared to “maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City and region pursuant to the requirements of the NCCP Act and Section 10(a) of the ESA (URS 2004a).” As a primary component of the Plan, the PVNP was proposed to conserve regionally important habitat areas and provide habitat linkages in order to benefit sensitive plants and wildlife. The final draft of the NCCP/HCP was adopted by the City in October 2019.

The Initial Management and Monitoring Report (Dudek 2007) was authored in 2006/2007 as a baseline report. The comprehensive monitoring report is prepared every three years and will include both a synthesis of all data collected in the preceding three years and an analysis of overall trends in biological resources. This comprehensive report includes the following:

1. Reports that detail surveys and data analysis regarding vegetation mapping, covered plants and wildlife;
2. A Habitat Restoration Plan.

This section of the Report documents an overview of the reporting process and of existing conditions in the PVNP. Section 2 contains covered plant and wildlife monitoring reports. Section 3 is a three year habitat restoration plan. Section 4 covers predator management. Section 5 reports on the Targeted Exotic Removal for Plants Program (TERPP). The Monitoring and Managing Trail Widening Threats to Habitat Report is included in Section 6. Discussion and management recommendations are provided in Section 7. The Annual Report for 2021 is in Section 8.

1.2 EXISTING CONDITIONS

The PVNP is located on the southern side of the Palos Verdes Peninsula, north of the Pacific Ocean in the City of Rancho Palos Verdes, California (Figure 1). The approximately 1,402-acre survey area lies in unsectioned lands in the following U.S. Geological Survey (USGS) 7.5 minute topographic maps: Redondo Beach, San Pedro, Torrance and Rancho Palos Verdes quadrangles; Township 5 South, Range 14 West and 15 West.

The PVNP has been divided into twelve Reserve areas consisting of the following subareas: Agua Amarga, Vicente Bluffs, Alta Vicente, Three Sisters, Abalone Cove, Portuguese Bend, Forrestal, San Ramon, Vista del Norte, Malaga Canyon, Ocean Trails and Filiorum. Topography is diverse, ranging from relatively flat lowland areas in the south, above steep coastal bluffs, to very steep slopes, ridgelines and gullies on the slopes to the north. Elevations range from approximately sea level along the coastal edges to approximately 1,300 feet above mean sea level at the northern most parcels. Adjacent land uses include single-family residences on most sides, open space associated with neutral lands on the peninsula, the Pacific Ocean to the south and west, and the Los Verdes and Trump National golf courses near the western and eastern ends of the PVNP.

Plant communities and land covers within the PVNP are representative of those found in this region. Vegetation mapping and coastal California gnatcatcher (*Polioptila californica californica*) (CAGN) and cactus wren (*Campylorhynchus brunneicapillus*) (CAWR) distribution data of the Peninsula used in the NCCP/HCP were prepared by Atwood et al. (1994) and updated and verified by Ogden (1999). Plant community classification in the NCCP/HCP generally follows Holland (1986), with some minor adaptations following Sawyer and Keeler-Wolf (1995). A new vegetation map for the Preserve was prepared in 2009 following the CNPS Vegetation Rapid Assessment protocol and the latest quantitative classification methods. Plant communities and land covers within the PVNP include coastal sage scrub (and coastal sage scrub sub-associations), southern cactus scrub, saltbush scrub, southern coastal bluff scrub, grassland, riparian scrub, exotic woodland, disturbed vegetation, cliff faces and rocky shores, disturbed areas, agriculture and developed areas.

Figure 1. Palos Verdes Nature Preserve.



I.3 SUMMARY OF ACTIVITIES

Habitat Management Plan

The initial Preserve Habitat Management Plan (PHMP) for the Draft NCCP was created in 2007. A component of the PHMP was the Habitat Restoration Plan for five acres per year for a total of 15 acres over the first three-year period. This plan was completed in April 2007 and concluded that Alta Vicente Reserve in the Preserve ranked the highest in terms of site suitability for an immediate restoration project. The Habitat Restoration Plan for Alta Vicente Reserve outlines appropriate revegetation locations and methodology to adequately comply with the Preserve Management requirements of the Rancho Palos Verdes NCCP. The Habitat Restoration Plan for Alta Vicente Reserve provides guidelines for the establishment of coastal sage scrub (CSS), coastal cactus scrub (CCS), and PVB butterfly habitat on a total of 15 acres during 3 consecutive years at the Alta Vicente Reserve. However, since a fire occurred at Portuguese Bend Reserve in August 2009, plans were adapted to focus immediate restoration at Portuguese Bend, and only Phase 1 and 2 (10 acres) were implemented at Alta Vicente. The Restoration Plan for Portuguese Bend covers restoration and monitoring of 25 acres over 5 years (2010 to 2015).

In 2015, PVPLC developed new restoration plans to execute the final phases of the restoration at Alta Vicente, and were included in the 2015 Comprehensive Report. Phase 3 was initiated in 2016 and Phase 4 initiated in 2017, with the installation of drip irrigation and coastal sage scrub vegetation species. In 2016, the Habitat Restoration Plan for the Abalone Cove Ecological Reserve was developed to continue with Restoration at Abalone Cove Reserve. The plan includes three phases with site preparation beginning in 2019. In 2021, a location for Phase 4 at Abalone Cove was chosen so that work could continue to create a contiguous habitat in areas that have high covered species occurrence. A new multi-year restoration plan is expected to be completed in 2022 to continue with the goal of completing 250 acres of restoration within the permit term for the Palos Verdes Nature Preserve. Section 3 includes the current restoration plan.

Fuel Load Reduction

Throughout 2019 – 2021, PVPLC was able to work together with the cities of Rancho Palos Verdes and Rolling Hills to target the removal of large populations of Acacia and mustard/non-native grasses. While one of the goals was to limit the amount of possible fuel load, the removal of non-native vegetation in turn improves habitat for local wildlife, including federally threatened coastal California gnatcatcher, Palos Verdes blue butterfly, El Segundo blue butterfly and the cactus wren, a state species of concern. To date, an approximate 53 acres of Acacia have been removed and 61 acres of mustard/non-native grassland have been treated. PVPLC continues to monitor Acacia locations for regrowth and is continuing to pursue funding to mow mustard/non-native grassland locations as a follow up maintenance. Sites are showing annual and perennial native seed bank germination including our local narrow leaved milkweed, which

is essential for the survival of the monarch butterfly. PVPLC will continue to pursue funding for these multi-benefit projects and will continue to target covered species locations and historical sites to maximize the project impacts. The 2021 report provides more detail on these fuel load reduction projects.

Additional Restoration

PVPLC attempts to seek additional funding when possible, to perform restoration on more than the minimum 5 acres required in the NCCP. Several opportunities of this nature occurred during the reporting period and some locations from previous reporting periods continue to be maintained. Detailed information can be found in the 2021 annual report (Section 8). Additional restoration that occurred during this reporting period (2019-2021):

- **Agua Amarga:** In September 2011, Los Angeles County Sanitation Districts (LACSD) provided funding to conduct 0.25 acre of riparian scrub restoration at the Lunada Canyon portion of the Agua Amarga Reserve as part of mitigation for one of their projects. A restoration plan was completed in 2011. In 2012, the PVPLC implemented weed and invasive plant removal (castor bean, ice plant, fennel). In Fall 2012, 362 container plants were installed. In Fall 2013, 2014 and 2015 additional plants were installed and maintained by volunteers. The project was monitored in 2016 and again in 2017, and plantings were meeting success criteria. The site was lightly weeded in 2021.

In 2012, an additional mitigation project (D&M Eight LTD) funded the planting of 147 riparian plants at Lunada Canyon. The plants were installed in January 2014 and irrigated with a drip irrigation system. Severe rains in 2014 caused torrential stream flows that removed some of the installed plants. PVPLC installed replacement plants and monitored the site's recovery in 2015, 2016 and 2017. The final report was submitted in 2018 and light maintenance continued in 2021.

- **Vicente Bluffs:** In June 2008, a grant agreement was signed with the State Coastal Conservancy to provide habitat restoration at Vicente Bluffs Reserve. PVPLC restored three acres of coastal bluff scrub and El Segundo blue butterfly habitat by removing acacia, pampas grass and ice plant, and installing container plants with coastal bluff scrub and El Segundo blue butterfly host plants. PVPLC added plants to this site in 2013, 2014 and 2015 to fulfill the grant goals. Since then, volunteers have continued the effort to plant host plants and remove weeds through 2021 in order to expand habitat area for the El Segundo blue butterfly

- **Abalone Cove:** In 2015, illegal grading took place in the Abalone Cove Reserve. The city took action working closely with the US Fish and Wildlife Service to create a mitigation plan for the area. Project planning and design began and in 2019, site preparation started with the removal of non-native species. Irrigation installation and planting occurred in 2020 and is now being maintained for non-native species and fill-in planting as needed. Site maintenance started in 2021 and is set to occur for 5 years along with monitoring.

In 2021, PVPLC was awarded a NEEF grant to assist with funding of the third phase of the Abalone Core restoration project. The grant funding assisted in the paying for plants, setting up volunteer events on almost every weekend and in invasive species removal. The grant closes out at the end of 2022 and remaining funding will be used to help in maintenance and fill in planting all while creating educational opportunities for students to engage and learn about coastal ecosystems.

The National Fish and Wildlife Foundation (NFWF), the Santa Monica Bay Restoration Commission, the Coastal Conservancy, the U.S. Fish and Wildlife Service Coastal Program, and the California Trails and Greenways Foundation provided funding to restore and enhance five acres of coastal sage scrub and coastal bluff scrub. Three acres were planted in 2013, and an additional two acres were restored and enhanced in 2014, 2015, and 2016. Maintenance and fill-in planting continued in 2017 and final project monitoring was submitted to the grantors in 2018. The site was lightly weeded in 2021.

- **Portuguese Bend:** In 2012, PVPLC received funding from the Habitat Conservation Fund to create trail-side habitat consisting of coastal sage scrub or close unauthorized trails. The closeout of this grant occurred in 2018. PVPLC continues to monitor the successful completed work and maintain closures on unauthorized trails.
- **Fuel Load Reduction Projects:** Starting in 2019, PVPLC worked with the cities of Rancho Palos Verdes and Rolling Hills on Fuel Load Reduction projects throughout the PVNP. The projects consisted of removing a total of 53 acres of Acacia and mowing 61 acres of mustard/non-native grassland. The project continues through this reporting period and PVPLC continues to monitor these locations for regrowth and treating as needed.

Figure 2. Locations of 2019-2021 Restoration Activities.



Targeted Exotic Removal Program for Plants

In 2019, PVPLC treated 7 populations of invasive plants across four reserves (Table I, photopoints in Appendix D9) and approximately 38 acres of *Acacia*. Of the 7 treated populations, 6 were populations of *Euphorbia terracina* (Geraldton spurge, *Euphorbia*). *Euphorbia* grows rapidly in disturbed areas, is a prolific seeder and is rapidly expanding its distribution in southern California. Invaded areas show reduced ecological quality and reduced habitat quality compared to un-invaded areas. *Euphorbia* shows a broad habitat tolerance in southern California, invading both cool coastal areas and hot, dry, interior areas. Most of the populations of *Euphorbia* have been treated for several years, in attempts to keep it from spreading further into the Preserve. In addition to *Euphorbia* treatments, the 2019 TERPP treated approximately 38 acres of *Acacia cyclops* (Coastal Wattle) at Portuguese Bend.

In 2020, PVPLC treated 6 populations of *Acacia* which totaled approximately 14 acres and mowed an additional 10.8 acres of mustard at 3 locations.

In 2021, PVPLC treated 9 populations of *Acacia* which totaled approximately 14 acres and mowed an additional 5.5 acres of mustard. PVPLC also treated one population of *Phoenix canariensis* (Canary Island Date Palm) at Vicente Bluffs, treated 4 locations previous locations of *Acacia* removal in Filiorum and treated all previous *Euphorbia terracina* treatment sites and hand pulled seedlings.

Covered Plant Species

Six plant species occurring within the Palos Verdes Nature Preserve are listed as covered species under the NCCP, due to their rareness or limited distribution: *Aphanisma blitoides* (aphanisma), *Atriplex pacifica* (south coast saltbush), *Crossosoma californicum* (Catalina crossosoma), *Dudleya vires* spp. *insularis* (bright green Dudleya), *Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn), and *Suaeda taxifolia* (woolly sea-blight). Under the NCCP, these species require targeted monitoring to determine whether a population is expanding, stable, or declining, and to provide information for guiding habitat management.

During this triennial monitoring period, the Palos Verdes Peninsula Land Conservancy (Conservancy) conducted covered plant species monitoring during 2019. Previously poorly defined boundaries at the monitoring sites resulted in highly variable year to year counts of the species (PVPLC 2013). To reduce this variability, all sites were mapped using GPS to create maps to develop clearly defined boundaries for this and future surveys. Additional stands resulting from the Conservancy's restoration projects and those found in the Preserve were mapped as a management tool to promote better knowledge of the special status plant species within the Preserve. Results from the survey include a slight increase in count of several of the species studied. Both annual species, *Aphanisma blitoides* and *Atriplex pacifica* were observed in slightly higher quantity than in 2017 and but much lower than previous years within reference sites. *Dudleya* was surveyed in April and was found to be present at all three reference sites. *Dudleya* population appears to be in decline with the total number of individuals across all reference sites 2017. *Lycium* was surveyed in April and May and was found to be stable in all three reference sites while *Suaeda* reference sites experience decreases in the number of individuals. It is thought that the 2017 surveys inadvertently included the non-native *Bassia hyssopifolia*, and that *Suaeda* populations did not actually increase dramatically from 2015 to 2017 and have thus stayed relatively stable. Threats to all species include encroachment by harmful invasive plants, cliff erosion, long-term drought, and trampling. Specific recommendations include: Utilize methodology described in this report, including Re-GPS stands to determine where boundaries have changed, especially for the annuals *Aphanisma* and *Atriplex* and the perennial *Suaeda*, utilize the GIS maps for locating and counting stands, calculate areas for each stand to develop aerial extents for each species, calculate density for measuring

variation within stands for long-term assessments, continue seed collection for plant propagation, install covered plant species in restoration efforts and/or broadcast seed during periods of favorable precipitation, Remove encroaching invasive plants, continue to seek restoration funding for enhancing populations of these six species.

Covered Wildlife Species

El Segundo Blue Butterfly

Surveys were performed for the El Segundo Blue butterfly (*Euphilotes battoides allyni*) during the 2019 flight season pursuant to U.S. Fish and Wildlife Service Recovery Permit TE218630-2 issued to Irena Mendez. Surveys were conducted within three reserves of the approximately 1,402-acre Palos Verdes Nature Preserve located on the Palos Verdes Peninsula: Vicente Bluffs, Alta Vicente, and Abalone Cove. Six surveys were conducted between July 19 and August 17, 2019 at 10 survey sites within Vicente Bluffs (five survey sites), Alta Vicente (two survey sites), and Abalone Cove (three survey sites). One of the three survey sites at Vicente Bluffs is a new sites established this year; one of the two survey sites at Alta Vicente is a new survey site established this year. 51 ESB butterflies were observed in 2019 in close association with sea-cliff buckwheat (*Eriogonum parvifolium*) the ESB host plant. The 51 butterflies were observed at three of the 10 survey sites with 98 percent of the butterflies observed at two survey sites at Vicente Bluffs. At least one ESB butterfly was observed on each of the six surveys performed.

Palos Verdes Blue Butterfly

Surveys were performed for the Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdensis*, PVB) during the 2021 flight season pursuant to the U.S. Fish and Wildlife Service Recovery Permit TE-73946B-2 issues to Austin Parker of PVPLC. In April of 2020, captive bred PVB were released into the Palos Verdes Nature Preserve by Dr. Jana Johnson of Moorpark College in collaboration with the PVB working group which includes the US Fish and Wildlife Service, California Department of Fish and Wildlife, the Palos Verdes Peninsula Land Conservancy and the Urban Wildlands group. This was the first time PVB were flying in Palos Verdes since they were determined to be extirpated from the Preserve in the 1980s. The two sites within the PVNP that were determined to be the best habitat for PVB by the PVB partners were multiple locations within the Alta Vicente Reserve and one site in the Filiorum Reserve (Fig. 1). The Alta Vicente Reserve is currently under restoration but exhibits both species of host plant in three different locations. The Filiorum site is a historic occurrence of the *Astragalus trichopodus* var. *lonchus* and is not visible from the trail. No free flying PVB were discovered during the 2021 flight season in either release site within the PVNP.

California Gnatcatcher and Cactus Wren

A single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Poliophtila californica californica* (Federally Threatened) and the coastal-slope population of the cactus wren *Campylorhynchus brunneicapillus* (formerly a Candidate for federal listing; now treated as a California Bird Species of Special Concern¹) was conducted on the Palos Verdes peninsula in 2021. The study area extended across nine reserves covering a combined 1,225 acres managed by the Palos Verdes Peninsula Land Conservancy. Our survey may be compared with previous surveys for these two birds conducted at most of the same sites in 2006, 2009, 2012, 2015, and 2018, as well as with more limited surveys conducted at various locations on the peninsula since 2010.

For 2021, we estimate 24 territories of California gnatcatcher this year, and seven territories of cactus wren. Compared with previous surveys, the estimate of California gnatcatcher territories for 2021 is up from 2018, but still below their 2006-2015 average. Both California gnatcatcher and cactus wren were present together at three reserves early in the year, and at four reserves by late spring. The California gnatcatcher was absent (or presumed absent) at two reserves (same as 2018 vs. absent at only one in 2015), and the Cactus wren absent at six of the nine reserves. We attribute these slight increases to the combination of the slight reprieve from the prolonged drought (i.e., an unusually rainy winter in 2019-20), and an increase in removal of non-native shrubs like acacia (*Acacia* spp.). However, the threats of drought, predation, invasion by non-native shrubs and annual plant species is still a major problem and could possibly hinder the recovery of both species locally. We attribute these declines to the combination of prolonged drought, the continued growth of invasive shrubs, and an increase in local predators. However, it is not clear which of these factors is driving the decline.

Trails

The Palos Verdes Nature Preserve trails fall under the City's Public Use Master Plan (PUMP), which is a NCCP covered activity and, therefore, must follow certain avoidance and minimization measures and guidelines to protect covered species. City Council approved the updated Preserve Trails Plan in October 2012. The plan included authorized trails and trail user designations for Filiorum Reserve, based on 2010 public workshops and comments. The recommendations for the other Reserves in the PVNP were based on input from the PUMP Committee, the 2011 "State of the Trails" workshop and public comments. Small changes to the Trails Plan have been made since then including the addition of the Wanderer Trail at San Ramon.

PVPLC collaborated with City staff on the Public Use Master Plan, to present to City Council in 2013.

From 2019 to 2021, PVPLC staff and volunteers have closed off 194 spur trails throughout the nature preserve. PVPLC held over 140 Rapid Response Volunteer days and 34 Volunteer Trail Crew events to address some larger trail projects in the Preserve. A detailed list of staff and volunteer accomplishments are listed below.

Table 1. Trail Maintenance Accomplishments 2019-2021

Area Closed Signs Installed	6 signs
Decals Replaced	306 decals
Graffiti Removed	59 locations
New/Repaired Carsonite Markers	35 markers
Trail Maintenance Projects(Brush/Weed Clearance)	1,141 projects
Spur Trail Closures (New/Old)	194 closures
Trail Crew Events (Maintenance Projects and Classes)	34 events
Rapid Response Volunteer Days	140 events

PVPLC and the City of RPV have collaborated to create a Volunteer Trail Watch program in 2012 to educate the public and improve trail etiquette, protect the natural resources of the Palos Verdes Nature Preserve, enhance the safety of, and promote an enjoyable experience for all Preserve visitors. From 2019 to 2021, Volunteer Trail Watch have contributed 12,328 hours to the program through training and field implementation activities, and reporting observations through the web portal for record keeping.

SECTION 2

PLANT AND WILDLIFE MONITORING

2.1 COVERED PLANT SPECIES REPORT



NCCP/HCP Covered Plant Species

2019 – 2021

Prepared By

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PALOS VERDES PENINSULA

LAND CONSERVANCY

March 2022



EXECUTIVE SUMMARY

Six plant species occurring within the Palos Verdes Nature Preserve are listed as covered species under the NCCP, due to their rareness or limited distribution: *Aphanisma blitoides* (aphanisma), *Atriplex pacifica* (south coast saltbush), *Crossosoma californicum* (Catalina crossosoma), *Dudleya virens* spp. *insularis* (bright green Dudleya), *Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn), and *Suaeda taxifolia* (woolly sea-blight). Under the Natural Communities Conservation Plan, these species require targeted monitoring to determine whether a population is expanding, stable, or declining, and to provide information for guiding habitat management.

During this triennial monitoring period, the Palos Verdes Peninsula Land Conservancy (Conservancy) conducted covered plant species monitoring during 2019. Previously poorly defined boundaries at the monitoring sites resulted in highly variable year to year counts of the species (PVPLC 2013). To reduce this variability, all sites were mapped using GPS to create maps to develop clearly defined boundaries for this and future surveys. Additional stands resulting from the Conservancy's restoration projects and those found in the Preserve were mapped as a management tool to promote better knowledge of the special status plant species within the Preserve. Results from the survey include:

- The 2019 Covered Plant Species survey described a slight increase in count of several of the species studied. Both annual species, *Aphanisma blitoides* and *Atriplex pacifica* were observed in slightly higher quantity than in 2017 and but much lower than previous years within reference sites.
- *Dudleya* was surveyed in April and was found to be present at all three reference sites. *Dudleya* population appears to be in decline with the total number of individuals across all reference sites 2017.
- *Lycium* was surveyed in April and May and was found to be stable in all three reference sites while *Sueada* reference sites experience decreases in the number of individuals. It is thought that the 2017 surveys inadvertently included the non-native *Bassia hyssopifolia*, and that *Sueada* populations did not actually increase dramatically from 2015 to 2017 and have thus stayed relatively stable.
- Threats to all species include encroachment by harmful invasive plants, cliff erosion, long-term drought, and trampling.

Specific recommendations include:

1. Utilize methodology described in this report, including
 - a. Re-GPS stands to determine where boundaries have changed, especially for the annuals *Aphanisma* and *Atriplex* and the perennial *Suaeda*.
 - b. Utilize the GIS maps for locating and counting stands.
 - c. Calculate areas for each stand to develop aerial extents for each species
 - d. Calculate density for measuring variation within stands for long-term assessments.
2. Continue seed collection for plant propagation
3. Install covered plant species in restoration efforts and/or broadcast seed during periods of favorable precipitation
4. Remove encroaching invasive plants with the following priority;
 - a. *Atriplex pacifica*
 - b. *Aphanisma blitoides*
 - c. *Dudleya virens* spp. *insularis* – At Sites DvI and Dv3
 - d. *Suaeda taxifolia*
5. Continue to seek restoration funding for enhancing populations of these six species.

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1.0 INTRODUCTION

The Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP) for the Palos Verdes Nature Preserve (PVNP) provide a list of six plant species that are targeted for monitoring by the Palos Verdes Peninsula Land Conservancy (Conservancy) every three years or when rainfall reaches 75% (9.75 inches) of average rainfall for the region. These species, known as covered species, have special status due to their rareness or limited distribution. Four of the six species, *Aphanisma blitoides* (aphanisma), *Atriplex pacifica* (south coast saltbush), *Crossosoma californicum* (Catalina crossosoma), and *Dudleya virens* spp. *Insularis* (bright green Dudleya), are listed by the California Native Plant Society (CNPS) as List 1B. 2 plants which are rare, threatened, or endangered in California and elsewhere. The fifth, *Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn), is listed as CNPS List 3.1, plants about which we need more information; seriously threatened in California. The sixth, *Suaeda taxifolia* (woolly sea-blight), is listed as CNPS List 4.2, which is a plant of limited distribution.

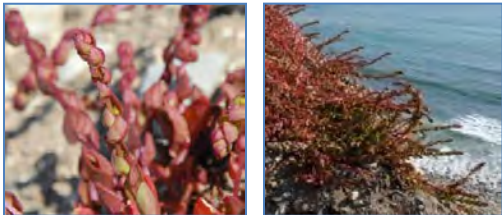
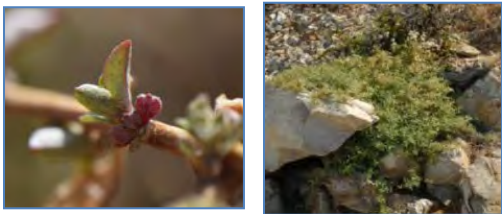

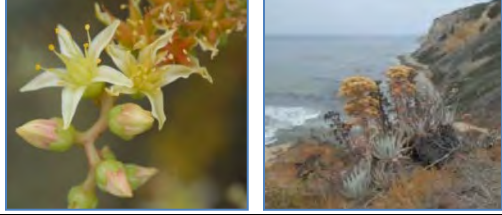


Under the terms of the NCCP, covered species need to be monitored to determine whether a population is expanding, stable, or declining. In recognition that the species differ phenologically during the year, each species should be monitored at its most appropriate time, generally in spring when the plant is blooming (Table 1). Also, because annual rainfall varies considerably, the monitoring of annual species should be conducted during those years when rainfall exceeds 75% of the long-term average annual precipitation. Longer-lived shrubs typically should be monitored once every three years.

A reconnaissance survey was conducted in 2006 to document the baseline population sizes of covered plant species for the Preserve Habitat Management Plan (Dudek 2007). The reconnaissance survey provided maps of surveyed stands of the covered species as well as three photo point locations to use in subsequent monitoring.

The Conservancy initiated the on-going monitoring in 2007 on a triennial basis, as mandated by the NCCP. The monitoring consists of collecting photo points at sites specified by Dudek (2007), counting the number of plants, and assessing the habitat at the sites. This report covers the photo point monitoring from 2019 through 2021. This report compares the 2019-2021 data from 2006 (Dudek 2007) and the 2007-09, 2010-12, 2013-2015, and 2016-2018 triennial reports (PVPLC 2011, 2013, 2016, 2020). All plant species are referred to by their genus only, unless when compared to a congener.

As recommended in previous reports, the species' stands were mapped with a GPS unit for creating GIS maps. The digitized maps provide an accurate value for area and show the location of the photo point relative to the stand for use in data assessment.

Table 1. List of NCCP covered species, their CNPS status, recommended survey period, and images of the plants.

NCCP Covered Species	Plant Images
<p><i>Aphanisma blitoides</i>, aphanisma CNPS List I B.2 Annual, survey in April – May</p>	
<p><i>Atriplex pacifica</i>, south coast salt bush CNPS List I B.2 Annual, survey in April - May</p>	
<p><i>Crossosoma californicum</i>, California crossosoma CNPS List I B.2 Survey when leaves are red</p>	
<p><i>Dudleya vires</i> ssp. <i>insularis</i>, bright green liveforever CNPS List I B.2 Survey in April – June</p>	
<p><i>Lycium brevipes</i> var. <i>hassei</i>, Santa Catalina Island desert-thorn CNPS List 3.1 Survey in June</p>	
<p><i>Suaeda taxifolia</i>, woolly sea-blite CNPS List 4.2 Survey in summer</p>	

2.0 METHODS

Photo documentation for all six NCCP covered plant species was conducted during 2019 following the methodology and photo points established in 2006 (Dudek 2007).

Point data for all stands was collected using a Garmin 72H GPS unit. This data was transferred into GIS (Google Earth) to create digital maps showing the photo point locations and stand areas (Figure 1, Appendix C). Both the original photographs and maps from Dudek (2007) and hand-drawn maps created in 2011-12 were used as references for the 2019 effort. Due to the rugged terrain, not all sites could be entirely walked, so the final polygons were hand-edited in GoogleEarth. Each polygon area was computed to the square meter within GIS. Both the field data sheets and GPS unit collected the same metrics: Photo Number, Phenology, Stand Structure, Recruits (Y/N), Threats, Population Size, Percent Cover for the Species, Other Natives, Non-natives, and Bare Ground. Comments were added to provide descriptive information for the stand.

Supplemental surveys were conducted to track changes in stands of the covered species that are not Reference sites within the Pelican Cove, Abalone Cove, and Ocean Trails Reserves, as well as additional stands of species out-planted by the Conservancy in restoration areas. Photo points were established for all of the supplemental stands except *Dudleya*.

The surveys were conducted by Neil Uelman from April 26 to July 15, 2019. The coding system established by Dudek (2007) was followed for new stands. The Reference Sites include all sites established by Dudek 2007;

The large *Crossosoma* stand in eastern Forrestal was viewed from two locations, Cc3 and Cc3 Stitched. It is easier to obtain a full view of the stand from the latter location, but two photographs are required. Because counting the number of plants accurately in the field is impossible, the stitched image was viewed in a photoshop program and individual plants were marked to obtain a total count. *Dudleya* clumps with closely-spaced bases were counted as one individual (Dudek 2007). Best estimates of the number of individuals in the *Lycium* stand were obtained from visual observations following the methodology described in Appendix D.

Table 2. List of sites visited as Reference Sites (Dudek 2007) and as Supplemental Sites.

Species	Reference Sites	Supplemental Sites
<i>Aphanisma blitoides</i>	Ab44, Ab46, Ab49	Ab10, Ab11, Ab13, Ab14
<i>Atriplex pacifica</i>	Ap1, Ap2, Ap3	Ap10, Ap11, Ap12, Ap30, Ap31, Ap32
<i>Crossosoma californicum</i>	Cc1, Cc2, Cc3	Cc4, Cc5

<i>Dudleya virens</i> subsp. <i>insularis</i>	Dvi1, Dvi2, Dvi3	
<i>Lycium brevipes</i> var. <i>hassei</i>	Lbh1, Lbh2, Lbh3	Lbh 4
<i>Suaeda taxifolia</i>	St1, St2, St3	St4

Counts of all Reference sites were summed to produce an estimate of the total stand size. The areas computed with GIS were used to develop a measure of the density of each stand (individuals/m²).

Rainfall data were obtained from the National Weather Service website (www.nws.noaa.gov/climate/index.php?wfo=lox) for the Long Beach Airport station. The annual average rainfall value provided by the NWS for the Long Beach Airport is 17.63", based upon data measured from 1971 through 2000, with monitoring to be conducted during years that exceed 75% of that value (9.05"). All rainfall data are provided in "rain years" from the months of October 1 through September 30, to accurately reflect the rainfall influencing the plant species' subsequent growth. The rain years under consideration include 2018-2019.

3.0 RESULTS

3.1 RAINFALL

This triennial reporting period took place during a period of above average rainfall for the region. In the rain year 2018-19, rainfall was 17.63 inches. This is considerably higher than the rainfall during the previous survey (2017) which was completed during a very wet water year of 20.10 inches of rainfall.

3.2 COVERED SPECIES

In the following results discussion for each species, please refer to Appendix A for the detailed maps, Appendix B for the survey data, and Appendices C and D for the photo point images.

The total area, counts, density and ranges for each species for the Reference sites are shown in Table 3. The density data was calculated for the first time, to aid in the interpretation of long-term trends.

Table 3. Results of Covered Plant Surveys for 2019-2021 (Reference Sites).				
Species	Number of Sites	Total Area (m ²)	Total Count	Density Range (Individuals/m ²)
<i>Aphanisma blitoides</i>	3	188.55	100	0.16 – 0.62
<i>Atriplex pacifica</i>	3	2.1	2	0.04 – 0.95
<i>Crossosoma californicum</i>	3	18,215	436	0.2 – 0.88
<i>Dudleya virens</i> subsp. <i>insularis</i>	3	1,995	495	0.13 – 0.45
<i>Lycium brevipes</i> var. <i>hassei</i>	3	599.82	525	0.26 – 1.1
<i>Suaeda taxifolia</i>	3	432.21	210	0.03 – 0.57

Figure 1. Locations of photo points for covered plant species monitoring. Detailed maps are provided in Appendix I. Circles and squares with central dots are photo point locations.



3.2.1 COVERED SPECIES ASSESSMENT

Aphanisma – The survey for *Aphanisma* was conducted during May when the plants were red and easily visible. Of the three Reference sites (Ab44, Ab46, and Ab49) only Ab49 continued to support *Aphanisma*, with 100 individuals identified collectively in the site and a density range of 0.16 to 0.62 individuals/m². These estimates are far lower than quantities reported in 2017 (Table 4). Similar *Aphanisma* individuals were also found in Supplemental Sites such as Ab15 and Ab20, which was reported to support ~300 individuals in 2017 and only 400 found in 2019.

Atriplex – The survey for *Atriplex* was conducted during April and May. Indeed, the number of *Atriplex* recorded among reference sites in 2019 (2) was considerably lower than in 2017 (24) and 2015 (522). This drastic decrease in *Atriplex* individuals was primarily driven by fewer individuals found at Ap2, a site where 0 were found in 2019, 10 in 2017 and 500 in 2015. This species has proven to be relatively mobile, colonizing suitable bare ground and periodically disturbed habitats nearby (within 10m) locations of former or existing population locations.

Crossosoma – The *Crossosoma* sites were surveyed in May and July as leaf color transitioned to red, allowing for species identification on steep and inaccessible slopes of the Forrestal Reserve. The three reference sites continue to support *Crossosoma*, with the majority of the population in site Cc3 with 431 of the estimated 451 plants counted in 2019. The supplemental site Cc4 supports the next largest stand of 15 plants and is the site of active recruitment first observed in 2015.

Dudleya – *Dudleya* was surveyed in April and was found to be present at all three reference sites. *Dudleya* population appears to be in decline with the total number of individuals across all reference sites at 495, down from 990 in 2017. The decrease was driven by Dv1 which decreased from 576 to 60 individuals. The density range decreased from 2017 with a decreasing density in Dv3 (0.15 in 2019 from 1.2 in 2017) and in Dv2 (0.45 in 2019 from 1.8 in 2017). Poaching may be an issue for *Dudleya* in these areas.

Lycium – *Lycium* was surveyed in April and May and was found to be stable in all three reference sites. Density range (0.26 – 1.1 individuals/m²) and individual count estimates per reference site (200 in Lbh1, 300 in Lbh2, and 25 in Lbh3) in 2019 were below those recorded in 2017. A slight decrease in the number of individuals was also observed in supplemental site Lbh4, from 14 to 3 individuals. Recruitment was not observed at any of the reference sites in 2019.

Suaeda – All reference sites were visited in April 2019. Decreases were observed in St3 with roughly 200 individual plants counted in 2019 opposed to 247 in 2017. Plant density stayed consistent at St3 with 0.57 individuals/m² in 2019 to 0.6 individuals/m² in 2017. St1 and St4, showed no individuals. It is thought that past surveys inadvertently included the non-native *Bassia*

hyssopifolia. The non-native Chrystalline iceplant (*Mesembryanthemum crystallinum*) is strongly establishing along the coastal bluffs near stands of *Suaeda* (including reference sites).

Table 4. Summary of estimated counts from all surveys of the Reference sites conducted since 2006. The Surveys conducted in 2019 utilized the methodology described above.

Species	2006	2007	2008	2010	2011	2015	2017	2019
<i>Aphanisma blitoides</i>	---	---	≥371	≥250	300	2,500	310	550
<i>Atriplex pacifica</i>	136	0	376	5	17	522	24	43
<i>Crossosoma californicum</i>	540	--	≥198	783	---	756	805	451
<i>Dudleya vires ssp. insularis</i>	3,430	550	408	240	---	527	513	495
<i>Lycium brevipes var. hassei</i>	750	300	---	605	---	630	630	528
<i>Suaeda taxifolia</i>	455	55	48	122	---	528	295	210

4.0 DISCUSSION

Rainfall

The 2019 Covered Plant survey took place during a wet year with rainfall with 17.63 inches. The resulting growing conditions were in great contrast to previous drought years, excluding 2017. In 2019, plant communities responded to increased water availability with relatively high percent cover of native deciduous shrubs and prolific germination of annual invasive non-native species. The amount of rain appears to have varying impacts to covered plant species and opposing results dependent on life history traits (annual or perennial).

Slight increase in annual species

The 2019 Covered Plant Species survey described a slight increase in count of several of the species studied. Both annual species, *Aphanisma blitoides* and *Atriplex pacifica* were observed in slightly higher quantity than in 2017 and but much lower than previous years within reference sites. The decline of *Atriplex* since 2015, at references sites does appear to be representative of a decrease in presence of the species across the Preserve. Although the species was found growing outside of and nearby references sites and within supplemental sites, counts remained low and the movement of the species outside of designated references site boundaries did not explain total decreases observed. More likely, the loss of suitable habitat through the colonization of bare ground by non-native plant species and the

encroachment of native woody shrubs have disrupted favorable growing conditions for *Atriplex* at many formerly occupied locations. Another annual species, *Aphanisma blitoides* appears to have had a slight recovery. In 2015 2,500 plants were observed in 2015 with only 310 in 2017 and 550 in 2019. A decrease in abundance of the species is likely with the previously mentioned encroachment in suitable habitat areas by non-native species, however the extent of the actual decrease is likely less with observed decreases between survey periods more likely a product of difficult identification of individual plants. The cause and nature (actual or observed) of the decrease in *Aphanisma* is unclear, however threat to *Atriplex pacifica* by non-native plants and the conversion to later successional stages of coastal sage scrub appear to be factors driving actual decreases in species abundance.

Stable perennial species populations

Perennial covered species appeared to benefit from the rainfall and maintain stable populations. Mature stands and areas with less invasive plant encroachment experience positive growth or improved plant health. *Dudleya* and *Crossosoma* maintained similar quantities and continued to exhibit signs of some reproductive success. Recruitment of several young *Crossosoma* plants was observed in 2019 at Cc2 and Cc4. The establishment of young *Crossosoma* at Cc4 may indicate wider reproductive success of the species in Forrestal. Due to the inaccessible nature of the canyon, it is impossible to account for young or recently recruited *Crossosoma* at Cc3. It is possible that the 2010, 2015 & 2017 counts for *C. californicum* are erroneous and not that large. The population is probably closer to the 2006 estimate. Based on that, the 2019 drop is probably a result of the increasing drought that we have been experiencing the past 8 years and a drop in the population would not be that unlikely due to this and over that time frame. The population of *C. californicum* is most likely going to continue to drop unless annual rain increases, and the summer coastal marine layer returns to its once vigorous state. *Sueada* reference sites experience decreases in the number of individuals. It is thought that the 2017 surveys inadvertently included the non-native *Bassia hyssopifolia*, and that *Sueada* populations did not actually increase dramatically from 2015 to 2017 and have thus stayed relatively stable.

4.1 WEATHER AND CLIMATE

Rainfall has been below average for all but a few years since the establishment of the Palos Verdes Nature Preserve. Rainfall is highly variable in southern California, with wide swings from years with high precipitation to multiple years of below average rain.

Increased water availability in 2019 appears to have been a benefit to perennial species and pose challenges to one annual species. The proliferation of invasive non-native plant species and increased cover by native perennial shrubs may be posing challenges to *Atriplex pacifica*, a low growing annual seemingly unable to compete spatially with larger profile species.

While long-term drought has the potential to impact the survivorship of the more drought-sensitive species, heat waves and increased temperatures from climate change provide additional stressors.

4.2 MANAGEMENT

The Conservancy is in a good position to monitor the status of covered and special concern species and to increase their populations through stewardship activities. Considerable attention is directed toward collecting seeds for growing individuals for on-site installation or broadcasting seed when weather conditions are appropriate.

The Conservancy actively seeks grants for restoration, including projects along the coastal bluffs. Through a Santa Monica Bay Restoration Commission/Coastal Conservancy grant obtained in 2012, bluff habitat plants were installed at Abalone Cove in 2013, resulting in increased numbers of *Dudleya* and *Lycium*. Starting in 2020, restoration of portions of the Abalone Cove Reserve began.

5.0 RECOMMENDATIONS

Recommendations

- 1.) Control non-native plant encroachment.
- 2.) Assess potential to reduce mature CSS cover in *Atriplex pacifica* occupied areas.
- 3.) Seed collection and nursery propagation?
- 4.) Consider and evaluate potential areas for species introduction.

6.0 LITERATURE CITED

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APPENDIX A

Covered Species Survey Data

Photo Point Number	Phenology	Stand Structure	Recruits	Survey Area	Plant Count	Species	Other Natives	Non Native	Bare
Aphanisma Blitoides									
Ab11	fruiting	mature	y	310m2	50	2	25	38	35
Ab10					0	0	15	85	0
Ab15	fruiting	mature	y	158.86m2	100	10	25	40	25
Ab20	fruiting	mature	y	1500m2	300	5	15	60	20
Ab13					0	0	5	20	75
Ab49	fruiting	mature	Y	188.55m2	100	10	2	78	10
Ab44					0	0	2	28	70
Ab46					0	0	5	30	65
Ab14					0	0	15	35	50
Atriplex pacifica									
Ap1	Flowering	Young	Y	2.1m2	2	2	2	46	50
Ap2					0	0	2	48	50
Ap12	Flowering	mature	y	46.25m2	23	5	1	15	79
Ap31	Flowering	Young	Y	49.31m2	17	5	0	60	35
Ap30					0	0	0	50	50
Ap32					0	0	1	88	10
Ap10					0	0	2	96	2
Ap11	Non-flowering	Young	Y	25m2	1	1	2	47	50
Crossosoma californicum									
Cc5			N		0	0	50	48	2
Cc1			N		0	0	93	5	2
Cc3	Dormant	Mature	U	18,200m2	431	15	75	5	5
Cc4	Non-flowering	Mixed	Y	17m2	15	2	75	2	5
Cc2	Flowering	Mixed	Y	15m2	5	2	81	2	15
Dudleya virens ssp. insularis									
Dvi1	Non-flowering	Mixed	Y	440m2	60	15	20	35	30
Dvi2	Non-flowering	Mixed	Y	675m2	305	25	5	30	40
Dvi3	Non-flowering	Mixed	Y	840m2	130	10	10	50	30
Lycium brevipes var. hassei									
Lbh1	Non-flowering	mature	N	180.67m2	200	85	0	5	10
Lbh2	Non-flowering	mature	N	394.15m2	300	90	0	5	5
Lbh3	Non-flowering	mature	N	25m2	25	60	5	20	15
Lbh4	Non-flowering	young	N	11.5m2	3	2	0	98	0
Suaeda taxifolia									
St3	Non-flowering	Mixed	Y	350m2	200	15	10	25	50
St2	Flowering	Mixed	N	82.21m2	10	20	5	55	20
St1					0	0	5	80	15
St4					0	0	1	84	15

APPENDIX B

Survey Photo Points







Ab20













Ap1





























AP31























Cc2

Cc2









Cc3





Cc3



Cc3







Cc3







Cc4





Cc4

























Lbh1











Lbh4


































APPENDIX C

Maps


Pelican Cove Park 2019

Legend

 Additional *S. taxifolia*, *A. blitoides*




Legend

 Additional *A. pacifica*



Legend

 Dvi1



400 ft



Forrestal Preserve 2019



Forrestal Preserve 2019



Ocean Trails 2019



Pelican Cove Park 2019



Add. *A. pacifica*

Dvi1

Add. *S. taxifolia*, *A. blitoides*

Legend

- Additional *D. virens* subsp. *insularis*
- Additional *S. taxifolia*, *A. blitoides*



APPENDIX D

Survey Data Sheets

**NCCP Covered Plant Species
Photo Point Monitoring**

Species: Crossosoma californicum Preserve: Forrestal Preserve Date: 7/15/19

Rainfall to date: 17.62 Comments: Overcast Morning

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments: N 33.738099 W-118.347362
Cc5	Cc5-2019					No C. californicum observed at this site. Planted Plants (2015) probably did not survive in the restoration site. Observed changes from previous survey
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	
	0	0	50%	48%	2%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments: N 33.73933 W-118.346758
Cc1	Cc1-2019					No C. californicum (live plants) observed at this site. I was able to locate dead branches sticking up from a R. integrifolia shrub at a C. californicum, but no other alive or dead plants were found at the site.
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	
	0	0	93%	5%	2%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments: N 33.741641 W-118.341041 A Polygon area
Cc3	Cc3-2019 stitched	Dormant	Mature	Unknown	Erosion	
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
19,200m ²	~431	15%	75%	5%	5%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey

Additional Comments:

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".

Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered

Stand Structure: Mixed (young & old), Mature (only old), Young (only young)

Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)

Comments: Explanation of observations

Rev 2-16

**NCCP Covered Plant Species
Photo Point Monitoring**

Species: Crossosoma californicum Preserve: Forrestal Preserve Date: 5/13/18

Rainfall to date: 17.59 Comments: Overcast day

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Cc4	Cc4-2019	Non-flowering	Mixed	Y	Erosion	N 33.741967 W -118.342024 Seedlings Present. * polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
17m ² 15		2%	75%	2%	5%	
Cc2	Cc2-2019	Flowering	Mixed	Y	Erosion	N 33.742162 W -118.341623 Seedlings Present.
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
15m ² 5		2%	81%	2%	15%	
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey

Additional Comments:

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".
 Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered
 Stand Structure: Mixed (young & old), Mature (only old), Young (only young)
 Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)
 Comments: Explanation of observations

NCCP Covered Plant Species

Photo Point Monitoring

Species: *Dudleya Virens* subsp. *insularis*
Suaeda taxifolia, *Atriplex pacifica* Preserve: Ocean TrailsDate: 4/29/19Rainfall to date: 17.07 Comments: Overcast daySurveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ap1	Ap1-2019	Flowering	Young	Y	Invasives	N 33.724772, W-118.338101 At base of Fenzline
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
2.10m ²		2%	2%	46%	50%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ap31	Ap31-2019	Flowering	Young	Y	Invasives, Erosion	N 33.724484 W-118.336731 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
49.31m ²		5%	0%	60%	35%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ap32	Ap32-2019					No <i>A. pacifica</i> observed at this site. N 33.723606, W-118.336184
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	* Site completely inundated with <i>Brassica nigra</i> . Observed changes from previous survey
0		0%	1%	88%	10%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Se2	Se2-2019	Flowering	Mixed	N	Invasives, Erosion	N 33.72341, W-118.3363 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
82.21m ²		20%	5%	55%	20%	

Additional Comments: Additional *S. taxifolia*, *Dudleya virens* subsp. *insularis*, and *A. bitoides* observed at N 33.723165, W-118.33619 (Polygon area - throughout bluff area - See map created with report). Estimated numbers *S. taxifolia* (20), *A. bitoides* (30).

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".

Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered

Stand Structure: Mixed (young & old), Mature (only old), Young (only young)

Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)

Comments: Explanation of observations

Rev 2-16

→ *Dudleya virens* subsp. *insularis* (20).

NCCP Covered Plant Species

Photo Point Monitoring

Species: Dudleya Virens subsp. insularis
Suaeda taxifolia, Atriplex pacifica Preserve: Ocean Trails Date: 4/29/19

Rainfall to date: 17.07 Comments: Overcast day

Surveyors: Neil Nelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Se3	Se3-2019	Non-flowering	Mixed	Y	Invasives, Erosion	N33.723014, W-118.336135 *Polygon area
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
350m ²	200	15%	10%	25%	50%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ap30	Ap30-2019			X	Invasives	No A. pacifica observed at this site. N33.725151, W-118.339057
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
	0	0%	0%	50%	50%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Dvi3	Dvi3-2019	Non-flowering	Mixed	Y	Invasives, Erosion	N33.724549, W-118.339606
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
840m ²	130	10%	10%	50%	30%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Dvi2	Dvi2-2019	Non-flowering	Mixed	Y	Invasives, Erosion	N33.725442, W-118.340667
Population Size: Area	Number	% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
675m ²	305	25%	5%	30%	40%	

Additional Comments:

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".

Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered

Stand Structure: Mixed (young & old), Mature (only old), Young (only young)

Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)

Comments: Explanation of observations

Rev 2-16

**NCCP Covered Plant Species
Photo Point Monitoring**

Lycium brevipes subsp. *hasseri*

Species: *Aphanisma blitoides*, *Atriplex pacifica* Preserve: Abalone Cove / Inspiration Point Date: 5/6/19

Rainfall to date: 17.07 Comments: Overcast day

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Lbh 1	Lbh1-2019	Non-Flowering	Mature	N	Invasives, Erosion	N 33.73811 W -118.374258 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
180.67m ² ~200		85%	0%	5%	10%	
Lbh 2	Lbh2-2019	Non-Flowering	Mature	N	Invasives, Erosion	N 33.737425 W -118.374482 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
394.15m ² ~300		90%	0%	5%	5%	
Ap 10	Ap10-2019					N 33.737735 W -118.374866 No. A. pacifica observed at this site.
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	2%	96%	2%	
Ap 11	Ap11-2019	Non-Flowering	Young	Y	Invasives	N 33.737938 W -118.374944
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
25m ² 1		1%	2%	47%	50%	

Additional Comments: • Additional A. pacifica observed at N 33.737646, W -118.374492 (43 Plants Flowering).
• Additional A. pacifica observed at N 33.737628, W -118.374136 (4 Plants Flowering).

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".
Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered
Stand Structure: Mixed (young & old), Mature (only old), Young (only young)
Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)
Comments: Explanation of observations

NCCP Covered Plant Species

Photo Point Monitoring

Lycium brevipes subsp. *hassii*Species: *Aphanisma litoides*, *Atriplex pacifica* Preserve: *Abalone Cove/Invasive Bight* Date: *5/6/19*Rainfall to date: *17.07* Comments: *Overcast day*Surveyors: *Neil Uelman*

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
<i>Lb13</i>	<i>Lb13-2019</i>	<i>non-flowering</i>	<i>Mature</i>	<i>N</i>	<i>Invasives, Erosion</i>	<i>N 33.737226</i> <i>W -118.373918</i>
Population Size:	% Species	% Other	% Non-	% Bare	Observed changes from previous survey	
Area Number	Cover	Natives	native			
<i>25m²</i>	<i>25</i>	<i>60%</i>	<i>5%</i>	<i>20%</i>	<i>15%</i>	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
<i>AP2</i>	<i>AP2-2019</i>					<i>NO A. pacifica</i> <i>Observed at this site.</i> <i>N 33.7374</i> <i>N 33.737131</i> <i>W -118.373937</i> <i>W -118.373621</i>
Population Size:	% Species	% Other	% Non-	% Bare	Observed changes from previous survey	
Area Number	Cover	Natives	native			
	<i>0</i>	<i>0%</i>	<i>2%</i>	<i>48%</i>	<i>50%</i>	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
<i>AP1</i>	<i>AP1-2019</i>	<i>non-flowering</i>	<i>Mixed</i>	<i>Y</i>	<i>Invasives</i>	<i>N 33.737934</i> <i>* Polygon area</i> <i>W -118.373592</i>
Population Size:	% Species	% Other	% Non-	% Bare	Observed changes from previous survey	
Area Number	Cover	Natives	native			
<i>250m²</i>	<i>24</i>	<i>2%</i>	<i>15%</i>	<i>33%</i>	<i>50%</i>	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
<i>Ab49</i>	<i>Ab49-2019</i>	<i>Fruiting</i>	<i>Mature</i>	<i>Y</i>	<i>Invasives, Erosion</i>	<i>N 33.739215</i> <i>* Polygon area</i> <i>W -118.374087</i>
Population Size:	% Species	% Other	% Non-	% Bare	Observed changes from previous survey	
Area Number	Cover	Natives	native			
<i>188.55m²</i>	<i>100</i>	<i>10%</i>	<i>2%</i>	<i>78%</i>	<i>10%</i>	

Additional Comments:

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".

Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered

Stand Structure: Mixed (young & old), Mature (only old), Young (only young)

Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)

Comments: Explanation of observations

NCCP Covered Plant Species

Photo Point Monitoring

Species: *Lycium brevipes* subsp. *hasseri*, *Aphanisma blitoides*, *Atriplex pacifica* Preserve: Abalone Cove / Inspiration Point Date: 5/6/19

Rainfall to date: 17.07 Comments: overcast day

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ab20	Ab20.2019	Fruiting	mature	Y	Invasives / Erosion	N33.739001 * Polygon area W-118.374712
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
1,500m ² 300		5%	15%	60%	20%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Lb14	Lb14.2019	Non-flowering	Young	N	Invasives	N33.740489 * underneath dense covering of <i>Brassica nigra</i> W-118.376004
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
11.5m ² 3		2%	0%	98%	0%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ab46	Ab46.2019					No <i>A. blitoides</i> observed at this site. N33.740901 W-118.377247
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
		0%	5%	30%	65%	
PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ab44	Ab44.2019					No <i>A. blitoides</i> observed at this site. N33.740867 W-118.377359
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
		0%	2%	28%	70%	
Additional Comments: 1) x1 <i>S. taxifolia</i> observed at N33.73424 W-118.37504 739279 374932 2) Additional <i>A. blitoides</i> patch observed at N33.740416 W-118.376425 with 100 individual plants in fruit. 3) Additional <i>A. blitoides</i> patch observed at N33.740711 W-118.376635 with 25 individual plants in fruit.						
Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".						
Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered						
Stand Structure: Mixed (young & old), Mature (only old), Young (only young)						
Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)						
Comments: Explanation of observations						

**NCCP Covered Plant Species
Photo Point Monitoring**

Species: A. Pacifica, A. blitoides Preserve: Abalone Cove (Inspiration Point) Date: 5/22/19

Rainfall to date: 17.54 Comments: _____

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Ap12	Ap12-2019	Flowering	Mature	Y	Invasives, Erosion	N 33.736251 W-118.369384 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
46.25m ² 23		5%	1%	15%	79%	
Ab13	Ab13-2019					No A. blitoides observed at this site. N 33.736249 W-118.369284
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	5%	20%	75%	
Ab12	Ab12-2019	Fruiting	Mature	Y	Invasives, Erosion	Plants on steep drop-off of bluff. observable from beach side. N 33.736398 W-118.369424 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
347.30m ² ~150		15%	5%	30%	50%	
Ab14	Ab14-2019					No A. blitoides observed at this site. Thick covering of Brassica nigra. N 33.737237 W-118.369009
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	15%	35%	50%	
Additional Comments: • Additional A. Pacifica observed at N 33.738233, W-118.368946 (3 Mature Plants). • Additional A. Pacifica observed at N 33.73804, W-118.368914 (1 Mature Plant)						
Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70". Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered Stand Structure: Mixed (young & old), Mature (only old), Young (only young) Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments) Comments: Explanation of observations						

**NCCP Covered Plant Species
Photo Point Monitoring**

Species: A. Pacifica, A. blitoides Preserve: Abalone Cove (Inspiration Point) Date: 5/22/19

Rainfall to date: 17.54 Comments: _____

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
A615	A615-2019	Fruiting	Mature	Y	Invasives, Erosion	N 33.738147 W-118.369166 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
158.86m ² ~100		10%	25%	40%	25%	
A611	A611-2019	Fruiting	Mature	Y	Invasives, Erosion	N 33.737844 W-118.36925 * Polygon area
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
310m ² ~50		2%	25%	38%	35%	
A610	A610-2019					NO A. blitoides observed at this site. N 33.737538 W-118.369234
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	15%	85%	0%	
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
Additional Comments: • Additional A. blitoides patch observed at N 33.737824, W-118.369627 (~50 individual plants in fruiting stage).						
Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".						
Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered						
Stand Structure: Mixed (young & old), Mature (only old), Young (only young)						
Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)						
Comments: Explanation of observations						

NCCP Covered Plant Species

Photo Point Monitoring

Species: Suaeda taxifolia
Dudleya vires subsp. insularis Preserve: Pelican Cove Park Date: 4/26/19

Rainfall to date: 17.07 Comments: Overcast day

Surveyors: Neil Uelman

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Set 4	Set 4.2019					NO <i>S. taxifolia</i> observed at this site N 33.741246 W -118.404613
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	1%	84%	15%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Set 1	Set 1.2019					NO <i>S. taxifolia</i> observed at this site N 33.741691 W -118.403554
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
0		0%	47.5%	80%	15%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Dvi 1	Dvi 1.2019	Adm-Flowering	Mixed	Y	Invasives, Erosion	* Polygon area N 33.7422 W -118.406765
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey
440 m ² 60		15%	20%	35%	30%	

PP#	Photo Number	Phenology	Stand Structure	Recruits (Y/N)	Threats: Invasives, Erosion, Other	Comments:
Population Size: Area Number		% Species Cover	% Other Natives	% Non-native	% Bare	Observed changes from previous survey

Additional Comments: • 3 *A. pacifica* observed up from Dvi 1 site: N 33.742092
 (Flowering) W -118.406946

Rainfall: Obtain measurement prior to departing for field; 75% of normal rainfall = 9.70".

Phenology state with 50% of Dominant state: Non-flowering, Flowering, Fruiting, Dormant, Dead, Withered

Stand Structure: Mixed (young & old), Mature (only old), Young (only young)

Threats: Harmful invasive non-natives, Native competition, Erosion, Human disturbance, Other (note in comments)

Comments: Explanation of observations

APPENDIX E

Survey Notes

PVPLC – Abalone Cove - Portuguese Point - Inspiration Point
Survey Notes: 2019

- **Ap10 – No *A. pacifica* observed at this site. Site inundated with non-natives.**




- Additional area where *A. pacifica* was observed during survey (polygon area in map below – 3 adult plants were found).
Location: (N 33.737646 W -118.374492).



Abalone Cove - Portuguese Point

Legend

 Additional *A. pacifica*



- Additional area where *A. pacifica* was observed during survey (polygon area in map below – 4 young plants were found). Location: (N 33.737628 W -118.374136).



Abalone Cove - Portuguese Point

Legend
Additional *A. pacifica*



300 ft



Google Earth

- **Ap2** – No *A. pacifica* observed at this site.



- Additional area where *S. taxifolia* was observed during survey (point in map below – 1 mature plant was found).
Location: (N 33.739279 W -118.374932).



Abalone Cove - Portuguese Point

Additional. *S. taxifolia*



Google Earth

200 ft




- Additional area where *A. blitoides* was observed during survey (polygon in map below – 100 mature plants were found).
Location: (N 33.740416 W -118.376425).



Abalone Cove - Portuguese Point

Legend

 Additional. *A. blitoides*




- Additional area where *A. blitoides* was observed during survey (polygon in map below – 25 mature plants were found).
Location: (N 33.740711 W -118.376635).



Abalone Cove - Portuguese Point

Legend

 Additional. *A. blitoides*



- Ab46 - No *A. blitoides* observed at this site.



- Ab44 - No *A. blitoides* observed at this site.



- Ab13 - No *A. blitoides* observed at this site.



- Ab14 - No *A. blitoides* observed at this site. Thick covering of *Brassica nigra* present at site.




- Additional area where *A. pacifica* was observed during survey (polygon in map below – 3 mature plants were found).
Location: (N 33.738233 W -118.368946).



Abalone Cove - Inspiration Point

Legend

 Additional. *A. pacifica*

Google Earth

100 ft




- Additional area where *A. pacifica* was observed during survey (polygon in map below – 1 mature plant were found).
Location: (N 33.73804 W -118.368914).



Abalone Cove - Inspiration Point

Legend

 Additional. *A. pacifica*

Google Earth

100 ft



- Ab10 - No *A. blitoides* observed at this site.




- Additional area where *A. blitoides* was observed during survey (polygon in map below – ~ 50 mature plants (fruiting) were found). Location: (N 33.737824 W -118.369627).



Abalone Cove - Inspiration Point

Legend

 Additional *A. blitoides*



PVPLC – Forrestal Preserve

Survey Notes: 2019

- Recruitment of *C. californicum* observed at both Cc2 and Cc4 sites.



- Cc5 - No *C. californicum* observed at this site. Planted plants probably did not survive in the restoration site.



- Cc1 – No alive *C. californicum* observed at this site. I was able to locate one plant that was sticking up from a *Rhus integrifolia* shrub, but the plant was no longer alive (dead branches – see photos below). No other *C. californicum* were located at the site. It appears that the *R. integrifolia* has filled in the area where the *C. californicum* were growing and possibly out competed them.



PVPLC – Ocean Trails

Survey Notes: 2019

- Ap32 – No *A. pacifica* observed at this site. Site thoroughly inundated with *Brassica nigra*.



- Ap30 – No *A. pacifica* observed at this site.



- Additional area where *S. taxifolia*, *A. blitoides*, *D. virens subsp. insularis* were observed during survey (pictures and maps below). Location: (N 33.723165 W -118.33619). Estimated numbers: *S. taxifolia* (20 adult plants), *A. blitoides* (300 mature plants in fruit), *D. virens subsp. insularis* (200 plants – mix of mature and young plants – non-flowering).







Ocean Trails 2019

Legend

- Additional *D. virens* subsp. *insularis*
- Additional *S. taxifolia*, *A. blitoides*



- Great recruitment of *S. taxifolia* at St3 site this year (15 very young plants counted).



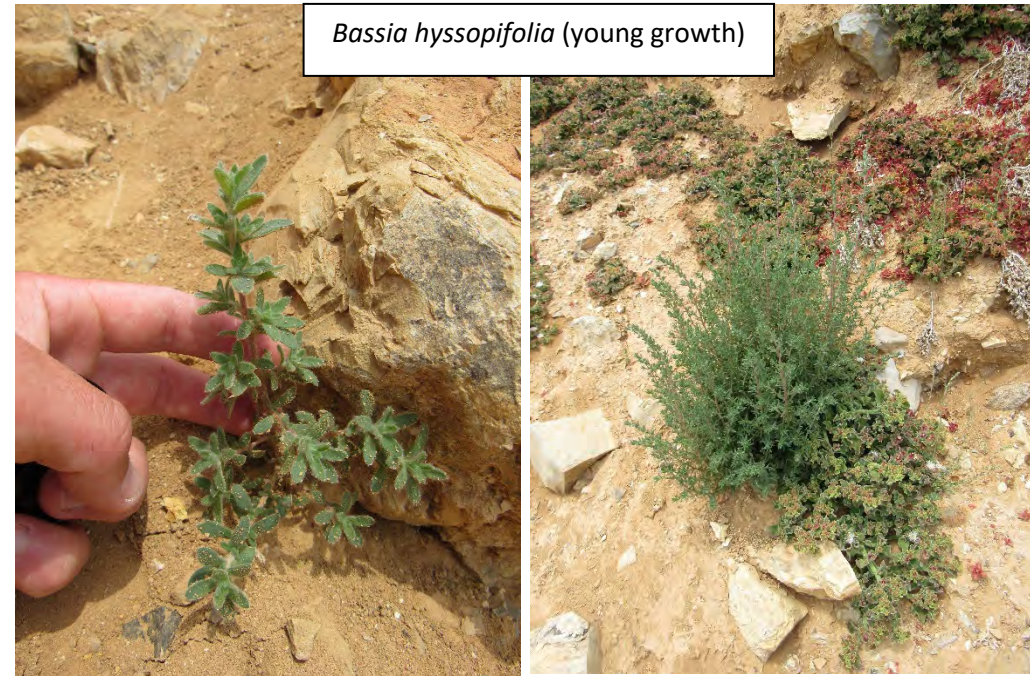
PVPLC - Pelican Cove Park

Survey Notes: 2019

- St1 – No *S. taxifolia* observed at this site.



- St4 – No *S. taxifolia* observed at this site. The site is inundated with non-natives. Five Horn Bassia (*Bassia hyssopifolia*) is especially prevalent at this site and this plant in its young age can be confused with *S. taxifolia* (see photos below). No remnants (old dead shrubs) of *S. taxifolia* could also be found.

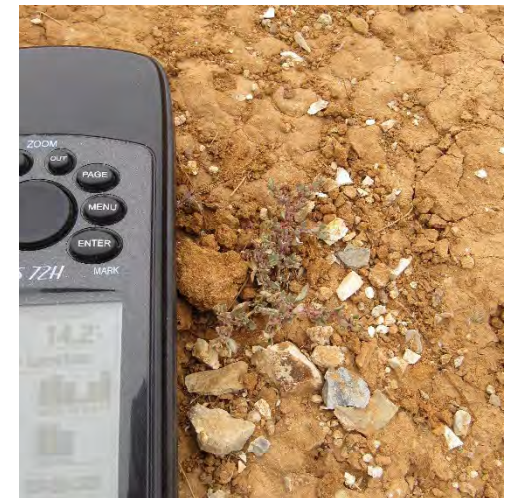


Bassia hyssopifolia (young growth)




Suaeda taxifolia (young growth)

- Additional area where *A. pacifica* was observed during survey (polygon area in map below – 3 adult plants were found).
Location: (N 33.742092 W -118.406946).



Pelican Cove Park 2019

Legend

 Additional *A. pacifica*



- Additional area where *S. taxifolia* and *A. blitoides* were observed during survey (polygon area in map below). Numbers for plants in polygon: *S. taxifolia*: 15 adult plants, *A. blitoides*: 50 mature (fruiting) plants



Pelican Cove Park 2019

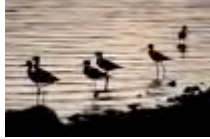
Legend

Additional *S. taxifolia*, *A. blitoides*



Google Earth

2.2 CALIFORNIA GNATCATCHER AND CACTUS WREN SURVEYS



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November 16, 2021

Ms. Love,

I certify that the information in this survey report and attached exhibits fully and accurately represents our work.

Daniel S. Cooper
President, CEM, Inc.
USFWS Permit #TE 100008-3

Austin Parker
Palos Verde Peninsula Land Conservancy
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Palos Verdes Nature Preserve Survey for the California Gnatcatcher and the
Cactus Wren
Palos Verdes Peninsula Land Conservancy
Los Angeles County

2021
Final Report

Prepared by:

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November 16, 2021

Introduction and Summary

We report on a single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Poliophtila californica californica* (Federally Threatened) and the coastal-slope population of the cactus wren *Campylorhynchus brunneicapillus* (formerly a Candidate for federal listing; now treated as a California Bird Species of Special Concern¹) on the Palos Verdes peninsula in 2021. Our study area extended across nine reserves covering a combined 1,225 acres managed by the Palos Verdes Peninsula Land Conservancy (see Figure 1 for regional locations, and Figures 2-8 for aerial images of individual reserves, and Figure 9 for the results for the entire Preserve). Our survey may be compared with previous surveys for these two birds conducted at most of the same sites in 2006, 2009, 2012, 2015, and 2018 (Dudek 2007, Hamilton 2009, CEM 2013, CEM 2015, CEM 2018), as well as with more limited surveys conducted at various locations on the peninsula since 2010 (e.g., CEM 2011, 2013, and 2014).

For 2021, we estimate 24 territories of California gnatcatcher this year, and seven territories of cactus wren. Compared with previous surveys, the estimate of California gnatcatcher territories for 2021 is up from 2018%, but still well below their 2006-2015 average. Both California gnatcatcher and cactus wren were present together at three reserves early in the year, and at four reserves by late spring. The California gnatcatcher was absent (or presumed absent) at two reserves (same as 2018 vs. absent at only one in 2015), and the Cactus wren absent at six of the nine reserves. We attribute these slight increases to the combination of the slight reprieve from the prolonged drought (i.e., an unusually rainy winter in 2019-20), and an increase in removal of non-native shrubs like acacia (*Acacia* spp.). However, the threats of drought, predation, invasion by non-native shrubs and annual plant species is still a major problem and could possibly hinder the recovery of both species locally.

Methods

We conducted targeted surveys for the California gnatcatcher and the cactus wren on 27 days on nine reserves managed by Palos Verdes Peninsula Land Conservancy (collectively known as the Palos Verdes Nature Preserve) at the southwestern tip of the Palos Verdes peninsula (Table 1; Figure 1) between 15 Feb. and 18 May 2021 (Tables 1 and 2). More than one site was visited on most days, for a total of c. 57 survey hours (Table 2). We used a two-visit protocol, with surveys spread at least one week apart, with one early-season visit from late Feb. to late March (“Round 1”) and one late-season visit during mid-May to mid-June (“Round 2”).² Some Reserves were deemed appropriate for a third, middle round survey in

¹ In 2008, coastal populations of the cactus wren north of southern Orange County were deemed distinct from those in southern Orange County (termed *C. b. sandiegensis*) by the most recent publication of California Bird Species of Special Concern (Shuford and Gardali 2008). However, this view is not widely held within the ornithological community, and due to their extreme isolation and a life history that is essentially identical with coastal-slope populations to the south into San Diego County, we, as well as regulatory agencies like the Calif. Dept. of Fish and Game (CDFG; L. Comrack, pers. comm., April 2008), treat the Palos Verdes birds as a sensitive species under state law. In addition, CDFG requires that all playback surveys for the cactus wren in coastal-slope Los Angeles Co. (and Ventura Co.) be conducted under a Memorandum of Understanding reserved for special-status species.

² The 2006 preserve-wide surveys had used a 3-visit protocol; a reduction in effort to two visits for 2009 and in subsequent years was made per the NCCP guidelines for RPV.

April (which had not been attempted in recent surveys). Data from a popular online bird sighting reporting platform (eBird; www.ebird.org) were incorporated into our analysis, as applicable, since many of the reserves were visited by competent birders during the same survey windows. Data from the Palos Verdes Peninsula Land Conservancy's cactus wren community science monitoring program were also taken into account in areas where the species was unusually quiet during our survey days. These "supplemental" surveys were not factored into the survey effort presented in this report, which only includes our (Cooper/Parker) protocol-level surveys.

Following established protocol for California gnatcatcher surveys (USFWS 1997), visits were made between 6:00 a.m. and noon, typically beginning late morning when ambient morning temperatures were above (or were predicted to rise above) 55 degrees F. Surveys were not conducted under extreme weather (temperature, wind) conditions. Taped vocalizations of each species were employed on all surveys, as outlined in guidelines provided by PVPLC and approved by U.S. Fish and Wildlife Service/Department of Fish and Game ("7.3.2 Animal Species Monitoring"). A "zigzag" walking route was used to cover each reserve, following as closely to the most recent (2009) survey as possible. No more than 80 acres of coastal sage scrub was surveyed on any single day, following USFWS (1997) guidelines. The survey routes used in 2021 were intended to follow those used by previous surveyors (Dudek 2007, Hamilton 2009, etc.), though portions of several reserves contained only scattered patches of coastal sage scrub, or had inaccessible areas that could not be reached during the survey; these were generally skipped in 2021 to focus most efficiently on prime coastal sage scrub and cactus habitat within the preserve network, as was done in prior years.

Most surveys were carried out by Daniel S. Cooper (TE 100008-3; SC-10615), assisted by Austin Parker (TE 73946B-2) of the Palos Verdes Land Conservancy. Both Cooper and Parker have extensive experience with California gnatcatcher surveys throughout Los Angeles and other southern California counties, and have conducted similar target bird surveys at the Portuguese Bend Reserve in prior years for the Palos Verdes Peninsula Land Conservancy.

In addition to recording aural detections of both species, visual scans (using Leica 8x42 Ultravid binoculars and Zeiss 10x42 binoculars) were made of all cactus habitat for cactus wren nests, and sightings of the brown-headed cowbird (*Molothrus ater*), a known parasite of songbird nests, as well as other sensitive species were noted. Basic weather conditions were observed at the start and end of each visit (Table 2). All observations of the two target species were recorded directly onto aerial photographs, with special attention paid to documenting the number and breeding/territorial status of each in notes. For each sighting of a target species, we recorded:

- Date and start time of sighting (sightings were typically very brief, so stop times were typically not recorded unless more than a few seconds);
- Sex/age of individual(s) (if known);
- Banding information (color-banded, metal-banded, etc.);
- Habitat type where found (only if not coastal sage scrub for California gnatcatcher or cactus scrub for cactus wren);
- Number of birds associated with individual (e.g., family group, pair, etc.); and
- Breeding activity observed

Locations of all target/special-interest species were recorded on ArcGIS Field Maps and turned into maps of all observations and territories. Maps of the territories of both species are presented in the Discussion section below (Figs. 2-9).

From these sightings, we estimated the number of territories for each reserve, cognizant that two visits were insufficient to provide a confident estimate of either territory boundaries. Therefore, our territory numbers should be treated as rough approximations, rather than indications of actual population estimates. To allow for the most useful comparisons with prior surveys, we follow Hamilton's (2009) definition of a "territory" to include any discrete location where a territorial bird (male, in the case of the gnatcatcher) or pair was present on at least one visit. Locations where we detected an obviously unmated adult bird of either species (even if it was vocalizing), or juvenile(s) of either species well away from adults, were not considered "territories". In mapping locations of birds, we noted movements with arrows on our field maps, but mapped only the site of initial detection on the digital maps (otherwise, they would be nearly impossible to read, particularly given multiple visits).



Figure 1. Reserves in the Palos Verdes Nature Preserve in Rancho Palos Verdes surveyed during this study (and prior ones). Figure courtesy PVPLC.

Table 1. Reserve acreage and total survey hours, 2012-21. Note that multiple sites were surveyed on some days (see Table 2 for additional detail).

Reserve	Acres	Days 2012	Time afield 2012	Days 2015	Time afield 2015	Days 2018	Time afield 2018	Days 2021	Time afield 2021
Abalone Cove	64	3	7:10	6	5:17	4	4:28	2	5:35
Agua Amarga	59	2	5:05	3	3:21	3	3:26	2	4:38
Alta Vicente	55	2	4:35	4	4:52	2	6:04	3	6:34
Forrestal	155	4	8:40	4	4:05	2	6:02	4	8:47
Portuguese Bend	399	4	12:00	5	6:51	2	11:42	4	7:20
San Ramon	95	3	4:10	2	2:05	2	3:07	2	4:55
Three Sisters/ Filiorum	300	4	10:35	7	9:43	2	10:01	5	10:58
Vicente Bluffs	84	2	4:40	2	2:42	2	2:28	3	6:50
Vista del Norte	14	2	1:05	1	0:20	0	0	2	2:10
TOTAL	1,225	26	58 hrs	34	40 hrs³	19	47 hrs⁴	27	57 hrs⁶

³ Actual time surveying: 39:16

⁴ Actual time surveying: 46:58

⁶ Actual time surveying: 56:47

Table 2. Summary and description of survey effort in 2021. Number of birds listed is the maximum number of adults estimated (both visits).

Date	Survey round	Time	T. start (F)	T. end (F)	Sky/ Wind	Subarea	# CAGN	# CACW	
Abalone Cove									
26 Feb	1	8:20-11:20	57	66	Clear/3-5 mph		4	1	DC, AP
7 May	2	08:05-10:40	58	65	OC/calm		3	1	AP
Agua Amarga									
17 Feb	1	08:07-10:55	50	58	Clear/3-5 mph		1	0	DC, AP
10 May	2	08:15-10:00	56	58	OC/calm		0	0	AP
Alta Vicente									
15 Feb	1	08:01-10:40	52	62	PC/3-5 mph		12	1	DC, AP
16 Apr	2	07:20-0930	51	61	PC/Calm		9	3	AP
18 May	3	09:00-11:05	61	70	PC/calm		10	1	AP
Forrestal									
6 Mar	1	10:20-12:10	61	61	Clear/calm		1	0	DSC
22 Mar	2	07:40- 10:45	55	56	PC/ Calm		1	0	AP
3 May	2	07:15-09:20	55	70	Clear/calm		1	0	AP
4 May	2	07:00-08:57	56	70	Clear/calm		1	0	AP
Portuguese Bend									
26 Mar	1	8:05-09:55	48	56	PC/3-5 mph	North	1	0	DC, AP
26 Mar	1	10:20-12:05	57	58	Clear/3-8 mph	South	4	0	DC, AP
12 May	2	07:45-09:30	55	60	OC/3-5 mph	North	1	0	AP
13 May	2	07:45-09:45	56	63	OC/calm	South	4	0	AP
San Ramon									
25 Feb	1	9:10-10:35	59	64	Clear/3-10 mph		1	0	DC
30 Apr	2	07:05-08:35	64	73	Clear/calm		0	0	AP
Three Sisters									
1 Mar	1	8:33-10:20	57	64	Clear/3-5 mph		0	3	DC, AP
7 Apr	2	8:00-10:05	57	63	Clear/3-5 mph		3	5	AP
17 May	3	09:15-10:55	60	59	OC/3-8mph		2	4	AP
Filiorum									
17 Mar	1	8:00-10:40	48	58	Clear/calm		2	2	DC, AP
5 May	2	07:30-10:05	57	63	OC/calm		2	2	AP
Vicente Bluffs									
5 Mar	1	07:45-10:10	56	60	Clear/calm		4	0	AP
15 Apr	2	08:40-11:15	55	63	PC/3-5 mph		5	0	AP
14 May	3	08:00-09:50	57	62	PC/0-5 mph		7	0	AP
Vista del Norte									
5 Mar	1	08:00-09:15	60	62	PC/3-5mph		0	0	AP
26 Apr	2	08:45-09:40	54	55	PC/0-10mph		0	0	AP

Results

We increased survey effort in 2021, with a more than 40% increase in days afield (19 to 27), and a more than 20% increase in hours. Given how unpredictably vocal our two focal species can be during the breeding season, our increased presence in 2021 may have contributed to more sightings, and more territories estimated than in 2018.

We estimate 24 breeding territories of California gnatcatcher, and six territories of cactus wren, during the 2021 breeding season (Table 3). This represents an increase from the prior survey in 2018, but still a decrease from the 2009-2015 average. Cactus Wren territories were again estimated to be in the single-digits, as they were in 2018, and we had birds likely breeding only at three reserves, Three Sisters and Filiorum and Alta Vicente.

The pattern noted in 2015 and in 2018, that cactus wren was not recorded at any reserve where absent on the prior survey, was reversed somewhat in 2021. For example, a CACW, while likely an unmated male, was observed multiple times in the Abalone Cove Reserve subsequent to the initial visit. Additional observations of cactus wrens were confirmed by the Land Conservancy's CACW community science program where undetected by our initial visits, and are incorporated into the estimates in Table 3. We have provided maps showing all locations of California gnatcatcher and cactus wren observations, including nests, from the 2021 survey in the Discussion below (Figs. 2-9), and are detailed in a table in Appendix A. No brown-headed cowbirds were noted during the 2021 surveys.

Table 3. Estimates of territories of California gnatcatcher (CAGN) and cactus wren (CACW), by reserve. These numbers represent likely nesting territories of pairs, rather than single individuals and obviously unmated birds, unless noted otherwise.

		Abalone Cove	Agua Amarga	Alta Vicente	Forrestal	Port. Bend	San Ramon	Three Sisters	Filiorum	Vicente Bluffs	Vista del Norte
2006 (65 CAGN/c. 30 CACW⁵)											
	CAGN	8	4	8	12	14	7	8	N/A	4	0
	CACW	9 ad.	4 ad.	4 pr, 7 ad.	6 ad.	4 ad.	10 ad.	7 pr., 1 ad.	N/A	0	0
2009 (40 CAGN/18 CACW)											
	CAGN	3	3	5	5	7	4	4	N/A	10	0
	CACW	0	4	4	2	2	1	5	N/A	0	0
2012 (33 CAGN/38 CACW)											
	CAGN	5	1	5	9	6	1	2	0	4	0
	CACW	3	6	13	1	3	2	10	9	0	0
2015 (33 CAGN/19 CACW)											
	CAGN	1	3	4	7	6	2	2	4	4	0
	CACW	0	3	5	0	0	3	8	6	0	0
2018 (19 CAGN/5 CACW)											
	CAGN	2	0	2	2	3	1	2	4	3	0
	CACW	0	0	0	0	0	0	3	2	0	0
2021 (24 CAGN/6 CACW)											
	CAGN	3	0	6	2	4	1	2	1	5	0
	CACW	0 ⁶	0	2	0	0	0	3	1	0	0

⁵ Assuming two adults per territory. Note that Dudek (2007) conducted three visits during the 2006 survey, while subsequent surveys made two.

⁶ A vocalizing, apparently unmated adult Cactus Wren was detected here in 2021, which was not sufficient to suggest a breeding territory, by our definition.

Discussion

Overall, 2021 found a slight increase in territory numbers from the 2018 survey, which had the lowest numbers of both California gnatcatchers and cactus wrens in the study since required every-three-year monitoring began in 2006. The reasons for the increase are likely a combination of the following factors:

- The crippling drought that started after 2012 and which continued into 2018, finally let up and precipitation returned, albeit slightly, with multiple above-average rain years since about 2017;
- An increase in survey days and hours afield in 2021 vs. 2018;
- Habitat restoration continuing in areas such as Alta Vicente and Portuguese Bend Reserves, where an NCCP-supported restoration effort has been undertaken since about 2009; and
- The ongoing removal of invasive shrubs such as acacia (*Acacia* spp.) and others throughout the study area.

Still, threats are still putting pressure on the CACW and CAGN populations in the study area. These threats include:

- The recent “pulse” of heavy precipitation in 2019-2020 that resulted in an explosion of weedy growth across the peninsula (esp. black mustard *Brassica nigra*) and that altered the structure of the native low scrub habitat, rendering it less suitable for the two focal species;
- The continuing increase in predators such as Cooper’s hawk (*Accipiter cooperii*) peninsula-wide (and region-wide).
- The continuing decline in height and condition of cactus patches and individual plants from persistent drought and insect pests;

As stated in the 2018 report, it is also possible that the dramatic loss of cactus wrens since 2015 is being accelerated by a genetic bottleneck, where viable young are not being produced at a rate that would sustain the population, and with essentially no immigration of new individuals, we’re simply waiting for the remaining adults to die. Thus, these seemingly adverse environmental conditions may not be operating on a “normal” population, but one already struggling with low population size.

The following is a more detailed description of observations of California gnatcatcher and cactus wren by site, with reference to results from prior surveys.

Abalone Cove

Encouragingly in 2021 we observed three pairs of CAGN throughout the Abalone Cove Reserve, compared to two in 2018 and just one in 2015. These new pairs were observed in a newer restoration area of the reserve where the Land Conservancy has been clearing weeds and planting native shrubs. Another pair was observed in a small patch of intact coastal sage scrub habitat near the road, just east of a point where the original pair was observed during the last two survey years (CGAC3, Fig. 2).

The area around the main parking lot, and the trail down to the beach, continues to be unsuitable for either species, due to invasion by both non-natives such as acacia and large

evergreen native shrubs such as lemonadeberry (*Rhus integrifolia*). Areas up on the bluff to the East of the parking lot are currently in restoration by the Land Conservancy and could eventually host CAGN pairs.

For cactus wrens, we noted in the 2018 report that while wrens were absent in 2009, they recolonized it in 2012, so it is probable that Abalone Cove is a somewhat peripheral site, supporting the species when the population on the peninsula is high, and winking out when fewer pairs are around. It is possible that (at least during “good years”) it supports spillover pairs from the adjacent Filiorum and Three Sisters Reserves, located just to the north across Palos Verdes Dr. An observation of a single calling cactus wren appearing mid-season at the west end of Abalone Cove in 2021 may have represented a “spillover” individual from an adjacent reserve. Encouragingly, the bluff area on the west end of the Reserve is with an upcoming Land Conservancy’s target for restoration (“Phase 4”) for both CACW and CAGN habitat, which will hopefully improve conditions for both species here.



Figure 2. California gnatcatcher and cactus wren territories, Abalone Cove 2021. We have shown the location of the single cactus wren (not considered a breeding territory) in violet.

Agua Amarga

While no territories were identified for either species, the habitat looks essentially unchanged in the “southern arm” (Agua Amarga Canyon). The “northern arm” of the reserve (Lunada Canyon) is planned to be restored by the Land Conservancy for Palos Verdes Blue butterfly habitat as well as expanding the riparian habitat downstream. The CSS in Lunada Canyon is

of apparently good quality and could host a territory of California gnatcatcher. One female CAGN was observed in the first survey in Agua Amarga, but was not observed in the subsequent surveys. While it is possible a breeding pair exists in this canyon and was not observed, we have not noted it here on surveys nor in supplemental visits by PVPLC volunteers.

Alta Vicente

After a disappointing 2018 survey season, the Alta Vicente CAGN population seemingly recovered in 2021. While only observing two, and possibly just one breeding pairs of CAGN in 2018, we confirmed six pairs of CAGN throughout the Reserve in 2021. This reassuring increase is likely due to a combination of events such as the increase in precipitation since the drought of the mid 2010's (particularly in the 2019-20 season), the success of the CSS restoration in the southern portion (Phases 1+2) of the Reserve and the newly established CSS restoration efforts in the northern portion, which included irrigation during an exceptionally dry 2020-21 winter and continuing through the survey. The restoration in the northwestern portion of the reserve (Phases 3+4) was established in 2017-2018, and hosted two pairs of CAGN in 2021, while not even reaching their final success criteria.

The CACW also increased in 2021 over 2018. As compared to just one pair in 2018, we were able to confirm two pairs in 2021. The CACW pairs were observed in historical locations, as CWAV1 has been one of the most reliable locations for CACW territories in the last decade, while CWAV2 was a historical location but has not been consistently observed in recent survey periods.

This increase in CACW is likely due to the same events mentioned above for CAGN. While this is a welcomed turn of events, the threats that face both species are still present. While slightly reduced in extent, the non-native acacia shrubs are still persistent on the edges of the Reserve, non-native annual plants like mustard still invade and over top the cactus patches, and Cooper's hawks (*Accipiter cooperii*) still actively hunt in Alta Vicente.

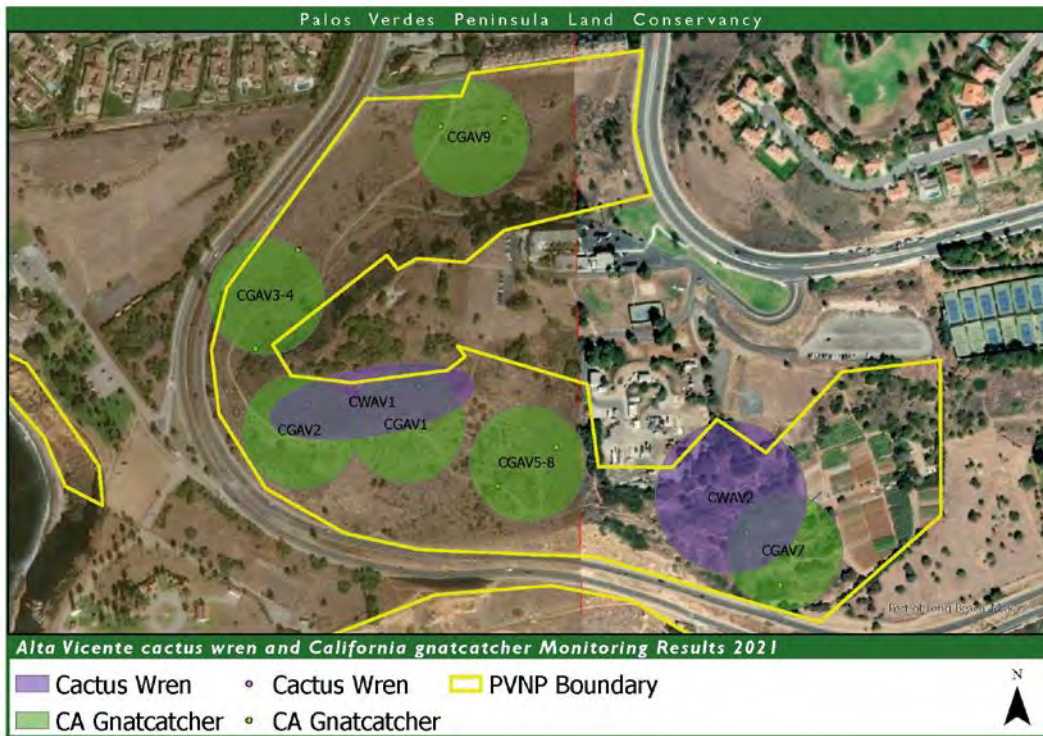


Figure 3. California gnatcatcher and Cactus Wren territories Alta Vicente Reserve

Forrestal

Forrestal continues to support puzzlingly low numbers of both target species. The decline here was first noted in the 2018 survey, when just two active California gnatcatcher territories were mapped (Figure 4), down from the 5-12 territories estimated since 2006. Two pairs of CAGN were observed in 2021 as well. The habitat in Forrestal is largely intact, and holds large swaths of CSS that could and frankly should host CAGN pairs, and their absence is a mystery.

As in 2015 and 2018, cactus wren was entirely missed here, and the species is therefore considered extirpated from the reserve, with no old or new wren nests observed. The last pair reported to ebird was in March 2011 (<https://ebird.org/view/checklist/S7806016>), with the last single here in March 2016.



Figure 4. California gnatcatcher territories Forrestal

Portuguese Bend

The 2021 survey documented four pairs of CAGN throughout the Reserve. This Reserve used to be, until the 2015 surveys, a local stronghold of the species. In 2018, only two or three territories were observed. While the lower portion of Portuguese Bend held three of the four territories, which is consistent with recent historical findings, what is notable is the territory (CGPB1) in the northern portion was observed in the Land Conservancy's NCCP restoration area that was completed in 2019-2020. This appears to be an example of the species establishing a new territory within restored scrub that had been unsuitable in prior years.

The territory on the far Eastern end of the Reserve (CGPB4) was the first observation of CAGN in this area since the 2015 survey. While this is an encouraging sign, the threats of drought, invasive species, and predation are still prevalent. Cactus wren remain absent here.

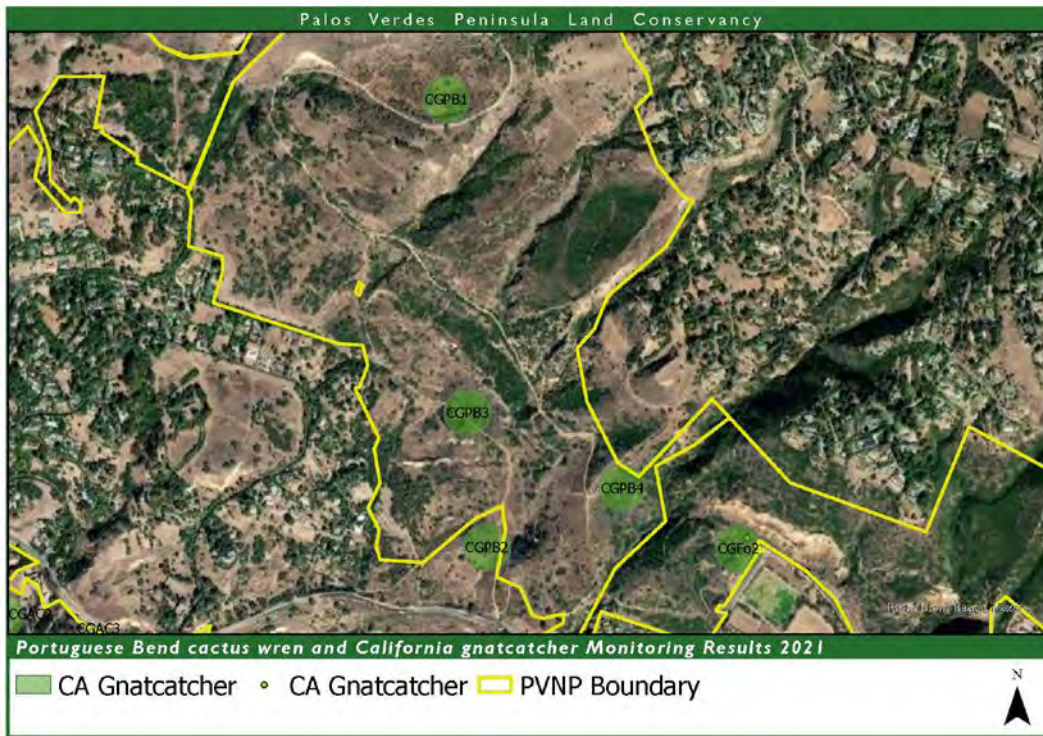


Figure 5. California gnatcatcher territories in Portuguese Bend Reserve

San Ramon

One of the smallest reserves with relatively little coastal sage scrub, San Ramon was down to a single pair of California gnatcatcher 2018 and again in 2021 (Figure 6). Cactus wren again went undetected in the reserve. Whether traffic noise was a factor in this decline (as speculated on in 2015) is unknown, but given the steep declines since the mid 2010's at every other reserve, it would only be a contributing factor at most.



Figure 6. California gnatcatcher territories San Ramon

Three Sisters/Filiorum

Note: These reserves are directly adjacent to one another, and so will be discussed together here.

These two adjacent reserves have supported the greatest abundance of pairs of cactus wrens on the peninsula, as well as an estimated three territories of California gnatcatchers (down from an estimated six in 2018.) Cactus Wren pairs declined from six in 2015 to two in 2018. This year, however, we were able to estimate that there are four breeding pairs of cactus wrens between the two Reserves, with three in Three Sisters and one in Filiorum (Fig. 7). The persistence of the cactus scrub in these areas is encouraging but the threats still remain. Acacia and annual non-native plant species are particularly prevalent here, and this area is frequented by raptors such as Cooper's hawks and Northern harriers (*Circus hudsonius*) as well.

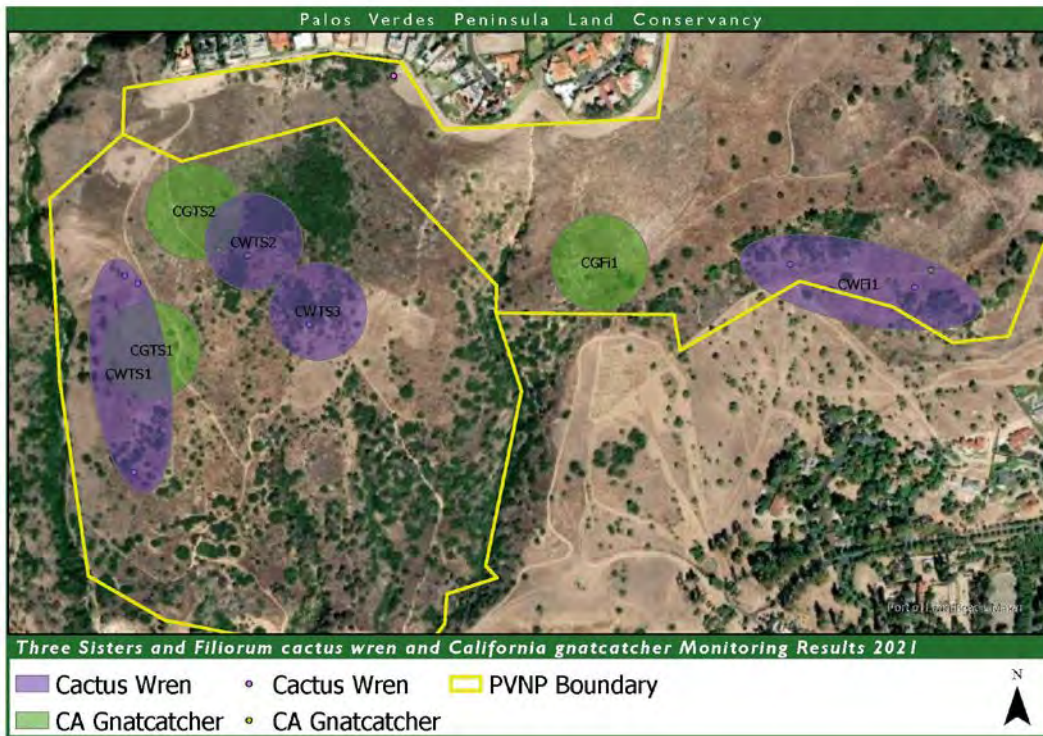


Figure 7. California gnatcatcher and cactus wren territories Three Sisters (left) and Filiorum Reserves (right).

Vicente Bluffs

Vicente Bluffs saw its population of California gnatcatcher territories increase from three in 2018 to five in 2021 (Fig. 8). The eastern portion of the reserve was inaccessible due to abundant mustard (*Brassica nigra*) and acacia in 2018 and was not surveyed. In 2021, after acacia and mustard removal by the Land Conservancy and Americorps, one gnatcatcher pair (CGVB4) was located in good CSS habitat that had been surrounded by mustard. One pair (CGVB3) was also observed in 2021 in the small patch of CSS that is not connected to the main portion of the Reserve, the first year that a pair was documented using this small fragment.

Cactus wren were again absent here, and with no large cactus patches, will likely remain so.



Figure 8. California gnatcatcher territories Vicente Bluff Reserve



Figure 9. California gnatcatcher and cactus wren territories Palos Verdes Nature Preserve

Additional notes

The 2021 estimate of 24 territories of gnatcatchers falls just short of Atwood’s low of 26 pairs in 1995 (Atwood 1998), and a handful of pairs are present on the peninsula in areas not visited by our survey (e.g., Trump National Golf Course/Ocean Trails, Terranea, and Shoreline Park, etc.). We are cautiously optimistic that at least gnatcatchers may be starting to rebound from their low in 2018. However, they are not “holding their own” at Agua Amarga or San Ramon (as we speculated they were in 2015), but rather have retreated to a handful of the densest, most extensive vegetation at a handful of restoration areas (e.g., Vicente Bluffs) and in the most extensive blocks of natural habitat such as Three Sisters/Filiorum.

For cactus wrens, the situation can again be described as dire, with an increase of at most one pair from the extremely low count of five pairs in 2018. This population is mathematically unlikely to sustain itself without immediate immigration of new individuals. In the case of the Palos Verdes peninsula, given its isolation, this seems essentially impossible in the long term (coastal cactus wren sightings away from nesting territories are virtually unknown in the Los Angeles area, even though stray gnatcatchers are fairly regular and widespread, albeit in low numbers).

We would recommend the following measures be considered to attempt to save this population:

- Continued removal (i.e., including the roots) of large acacia, *Caesalpinia*, *Echium*, and other invasive non-native trees and shrubs at Three Sisters, Filiorum, and Alta Vicente (the three last reserves that support/supported cactus wren);
- Installation of cactus wren nest boxes (e.g., similar to those deployed by Irvine Ranch Conservancy and other reserves in Orange County);
- Limiting human use of certain trails that run through prime cactus wren habitat, such as at Alta Vicente and Three Sisters, to reduce stress on the remaining pairs;
- Removal of tall (non-native) trees on the periphery of the preserve known or likely to support nesting Cooper's hawks (e.g., pines, ficus); and
- (if necessary) Translocation of birds from Orange County or Ventura County populations to supplement the breeding population on the peninsula.

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APPENDICES

Appendix A. List of all California gnatcatcher (“CAGN”; shaded) and coastal cactus wren (“CACW”; unshaded) observations during 2021 survey, by reserve.

“Status”: P = Pair; S = Single; F = Family group; J = Juvenile; N = Nest; m/f = male/female; CF = Carrying food; NM = (Carrying) nesting material

Abalone Cove						
Subarea	Date	Species	Status	Time	Notes	
	26 Feb.	CAGN	P	9:29	Pair responded to recording – CGAC1	33.738205°, -118.373884°
	26 Feb.	CAGN	P	9:47	Pair responded to Recording – CGAC2	33.740156°, -118.375308°
	7 May.	CAGN	Sm	9:13	Male scolding – CGAC2	33.740156°, -118.375308°
	7 May	CAGN	Sm, N?	9:51	Male Scolding, Poss. Nest? – CGAC1	33.737933°, -118.374223°
	7 May	CAGN	M, N?	10:12	Male responded to recording, poss. Nest. – CGAC3	33.739227°, -118.372234°
	26 Feb.	CACW	Sm?	8:31	Calling from off preserve cactus patch (unseen) - CWAC1	33.742593°, -118.384534°
	7 May	CACW	Sm?	10:35	Heard within preserve in cactus on West edge – CWAC1	33.743028°, -118.382673°
Agua Amarga						
Subarea	Date	Species	Status	Time	Notes	
	17 Feb	CAGN	Sf	10:45	Scolding, not seen again	33.765057°, -118.398011°
Alta Vicente						
Subarea	Date	Species	Status	Time	Notes	
	15 Feb	CAGN	P	N/A	Harsh alarm call - CGAV1	33.743922°, -118.407061°
	15 Feb	CAGN	P	8:27	Foraging - CGAV2	33.743624°, -118.408116°
	15 Feb	CAGN	S	8:41	Foraging - CGAV3	33.745370°, -118.408146°
	15 Feb	CAGN	Sf	8:52	Foraging - CGAV4	33.744416°, -118.408637°
	15 Feb	CAGN	P	9:08	Calling - CGAV5	33.743097°, -118.405829°
	15 Feb	CAGN	Sf	9:21	Calling – CGAV6	33.742644°, -118.402954°
	15 Feb	CAGN	S	9:30	Calling - CGAV7	33.742144°, -118.402569°
	15 Feb	CAGN	P	10:06	Foraging - CGAV8	33.743470°, -118.405158°
	16 Apr	CAGN	P	N/A	Foraging - CGAV1	33.743922°, -118.407061°
	16 Apr	CAGN	P	N/A	Foraging – CGAV2	33.743624°, -118.408116°
	16 Apr	CAGN	P	N/A	Foraging/Calling – CGAV7	33.742144°, -118.402569°
	16 Apr	CAGN	P	N/A	Alarm call – CGAV8	33.743470°, -118.405158°
	16 Apr	CAGN	Sm	7:42	Foraging – CGAV9	33.746443°, -118.406497°
	18 May	CAGN	P	N/A	Foraging - CGAV1	33.743922°, -118.407061°
	18 May	CAGN	P	N/A	Foraging – CGAV2	33.743624°, -118.408116°
	18 May	CAGN	P	N/A	Foraging, - CGAV3/4	33.744416°, -118.408637°
	18 May	CAGN	P	N/A	Calling (quiet) – CGAV5	33.743097°, -118.405829°
	18 May	CAGN	P	N/A	Foraging/Scolding – CGAV7	33.742144°, -118.402569°
	18 May	CAGN	P	N/A	Foraging - AVCG8	33.743470°, -118.405158°

	18 May	CAGN	P	N/A	Scolding Poss. Nest? – AVCG9	33.746630°, -118.405758°
	15 Feb	CACW	PN	8:12	Foraging – CWAV1	33.744057°, -118.406746°
	16 Apr	CACW	S	7:55	Foraging – CWAV1	33.743873°, -118.408045°
	16 Apr	CACW	PN	8:30	Foraging – CWAV2	33.742466°, -118.402521°
	18 May	CACW	N	N/A	Nest – CWAV1	33.743845°, -118.407526°
	18 May	CACW	S	N/A	Harsh Call – CWAV2	33.742466°, -118.402521°
Filiorum						
Subarea	Date	Species	Status	Time	Notes	
	17 Mar.	CAGN	Sm	8:27	Calling – CGFi1	33.752104°, -118.381697°
	5 May	CAGN	P	N/A	Pair scolding – CGFi1	33.752104°, -118.381697°
	17 Mar	CAGN	S	9:20	Foraging/ Calling – CGFi2	33.752011°, -118.376707°
	17 Mar.	CACW	S	N/A	Singing – CWF2	33.754442°, -118.384799°
	17 Mar	CACW	S, NM	9:19	2 nests found, quiet – CGFi1	33.752083°, -118.378826°
	5 May	CACW	P	8:22	Foraging – CGFi1	33.751795°, -118.376955°
Forrestal						
Subarea	Date	Species	Status	Time	Notes	
West	6 Mar	CAGN	Sm	11:27	Responded to recording – CGFo2	33.741960°, -118.351691°
East	22 Mar	CAGN	S	8:27	Unidentified ind. Calling – CGFo1	33.738947°, -118.344783°
East	1 May	CAGN	S	N/A	Harsh call, sex not confirmed – CGFo1	33.738947°, -118.344783°
West	4 May	CAGN	Sm	9:53	Harsh calls, nest poss. – CGFo2	33.742165°, -118.351973°
West	4 May	CAGN	Sm	10:13	Foraging, same as previous obs. – CGFo2	33.741295°, -118.350110°
Portuguese Bend						
North	26 Mar	CAGN	P	08:49	Nesting probable – CGPB1	33.753554°, -118.361370°
North	12 May	CAGN	M	N/A	Scolding – CGPB1	33.753554°, -118.361370°
South	26 Mar	CAGN	P	10:48	Foraging – CGPB3	33.745428°, -118.360704°
South	13 May	CAGN	P	N/A	Harsh scold, Nest? - CGPB3	33.745428°, -118.360704°
South	26 Mar	CAGN	P	10:31	Foraging – CGPB2	33.741931°, -118.360101°
South	13 May	CAGN	Sm	N/A	Scolding – CGPB2	33.741931°, -118.360101°
South	26 Mar	CAGN	P	11:45	Pair calling – CGPB4	33.743473°, -118.355879°
South	13 May	CAGN	S	N/A	Harsh response to recording – CGPB4	33.743473°, -118.355879°
Vicente Bluffs						
Subarea	Date	Species	Status	Time	Notes	
	5 Mar	CAGN	Sf	8:41	Responded to recording – CGVB1	33.751647°, -118.413597°
	5 Mar	CAGN	S	8:59	Calling – CGVB2	33.749065°, -118.411651°
	5 Mar	CAGN	S	9:11	Calling - CGVB3	33.748566°, -118.408706°
	5 Mar	CAGN	Sm	9:43	Responded to recording – CGVB4	33.751550°, -118.409734°
	15 Apr	CAGN	S	N/A	Calling – CGVB1	33.751647°, -118.413597°
	15 Apr	CAGN	Sm	N/A	Scolding – CGVB2	33.749065°, -118.411651°
	15 Apr	CAGN	S	N/A	Scolding – CGVB3	33.748566°, -118.408706°
	15 Apr	CAGN	S	N/A	Scolding – CGVB4	33.751550°, -118.409734°
	15 Apr	CAGN	Sm	N/A	Scolding, Poss. Nest – CGVB5	33.746988°, -118.412466°

	14 May	CAGN	P	N/A	Scolding – CGVB1	33.751647°, -118.413597°
	14 May	CAGN	P	N/A	Scolding, Poss. Nest – CGVB2	33.749065°, -118.411651°
	14 May	CAGN	S	N/A	Scolding – CGVB3	33.748566°, -118.408706°
	14 May	CAGN	Sm	N/A	Responded to recording – CGVB4	33.751550°, -118.409734°
	14 May	CAGN	Sm	N/A	Responded to recording	33.746988°, -118.412466°
San Ramon						
Subarea	Date	Species	Status	Time	Notes	Lat/Long
	25 Feb	CAGN	Sf	11:24	Foraging/Scolding	33.728334°, -118.335103°
Three Sisters						
Subarea	Date	Species	Status	Time	Notes	
	7 Apr	CAGN	S	8:54	Calling, Nest poss. - CGTS1	33.751006°, -118.388436°
	7 Apr	CAGN	P	9:46	Foraging – CGTS2	33.752262°, -118.387429°
	17 May	CAGN	P	N/A	Harsh call, prob. Nest – CGTS1	33.751006°, -118.388436°
	1 Mar	CACW	S	9:07	Calling - CWTS1	33.751847°, -118.388651°
	1 Mar	CACW	P	N/A	Partial Nest under construction -CWTS3	33.751333°, -118.386073°
	1 Mar	CACW	S	N/A	Foraging – CWTS4	33.752383°, -118.387236°
	7 Apr	CACW	P	N/A	Foraging, calling - CWTS1	33.751847°, -118.388651°
	7 Apr	CACW	S	9:09	Heard calling, prob. Same as TS1 - CWTS2	33.749480°, -118.388702°
	7 Apr	CACW	S	N/A	Heard calling from below - CWTS3	33.751333°, -118.386073°
	7 Apr	CACW	S	9:47	Heard calling - CWTS4	33.752191°, -118.386993°
	17 May	CACW	P,N	9:38	Harsh chucking/scolding. Nest - CWTS1	33.751946°, -118.388845°
	17 May	CACW	S	N/A	Calling, harsh scold as AP left - CWTS3	33.751333°, -118.386073°
	17 May	CACW	S	10:39	Foraging, scolding – CWTS4	33.752748°, -118.387797°

2.3 EL SEGUNDO BLUE BUTTERFLY SURVEYS



MEMORANDUM

To: Palos Verdes Peninsula Land Conservancy
(Austin Parker)

U.S. Fish and Wildlife Service
(Stacey Love)

From: Irena Mendez, PhD

Date: September 30, 2019

Subject: Results of 2019 Surveys for the El Segundo Blue Butterfly at Vicente Bluffs, Alta Vicente and Abalone Cove, Palos Verdes Peninsula, Los Angeles County, CA

Attachment: Exhibits 1 and 2

Executive Summary

This Memorandum documents surveys performed for the El Segundo Blue butterfly (*Euphilotes battoides allyni*) during the 2019 flight season pursuant to U.S. Fish and Wildlife Service (USFWS) Recovery Permit TE218630-2 (Recovery Permit) issued to Irena Mendez. Surveys were conducted at the request of the Palos Verdes Peninsula Land Conservancy (PVPLC) within three reserves of the approximately 1,382-acre Palos Verdes Nature Preserve (PVPLC 2015) located on the Palos Verdes Peninsula: Vicente Bluffs, Alta Vicente, and Abalone Cove.

- Six surveys were conducted between July 19 and August 17, 2019 at 10 survey sites within Vicente Bluffs (five survey sites), Alta Vicente (two survey sites), and Abalone Cove (three survey sites).
- One of the three survey sites at Vicente Bluffs is a new sites established this year; one of the two survey sites at Alta Vicente is a new survey site established this year.
- 51 ESB butterflies were observed in 2019 in close association with sea-cliff buckwheat (*Eriogonum parvifolium*) the ESB host plant. The 51 butterflies were observed at three of the 10 survey sites with 98 percent of the butterflies observed at two survey sites at Vicente Bluffs. At least one ESB butterfly was observed on each of the six surveys performed.

- No incidental take is authorized by the recovery permit; no incidental take occurred during 2016 surveys.
- No larval surveys are authorized by the permit and no larval surveys were conducted.

Introduction

Irena Mendez, PhD conducted distribution surveys for the El Segundo Blue (ESB) butterfly within the Palos Verdes Nature Preserve during the ESB 2019 flight season at the request of the Palos Verdes Peninsula Land Conservancy (PVPLC). Surveys were conducted in support of triennial reporting responsibilities by the PVPLC consistent with requirements set forth in the City of Rancho Palos Verdes Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP).

The PVPLC is a certified 501(c)(3) nonprofit corporation and conservation organization that has been actively working to preserve undeveloped land as open space for historical, educational, ecological, recreational and scenic purposes. Since its founding in 1988, the Conservancy has successfully preserved 1,600 acres of open space on the Palos Verdes Peninsula (PVPLC Website)¹. The City of Ranch Palos Verdes (City) and PVPLC have entered into the Palos Verdes Nature Preserve Management Agreement (Management Agreement) that allows the PVPLC to act as the City's designated NCCP/HCP Preserve Habitat Manager and is the entity responsible for overseeing the day-to-day operations and long-term preserve management activities including management of resources, restoration of habitat, reporting and enforcement of open space restrictions (Rancho Palos Verdes 2018).

The Palos Verdes Nature Preserve consists of 10 reserves along the southern bluffs and marine terraces of the Palos Verdes Peninsula. Three of the 10 reserves support sea-cliff buckwheat, the sole larval food plant for the ESB butterfly: Vicente Bluffs, Alta Vicente, and Abalone Cove. Vicente Bluffs and Abalone Cove are characterized by steep coastal bluffs that characterize the peninsular coastline; the Alta Vicente Reserve consists of marine terrace habitat, one of approximately 13 staircase-like terraces that characterize the Palos Verdes Peninsula (USGS online publication)².

ESB butterfly surveys have previously been conducted in 2014 and 2016 at up to 15 sites within the specified reserves (Dalkey 2016). At most of these sites, habitat for the ESB consists of sea-cliff buckwheat that has been planted as part of on-going habitat restoration efforts by the PVPLC, particularly at Alta Vicente, however, at a few sites, naturally occurring sea-cliff buckwheat individuals can be found on vertical rocky bluffs that face the Pacific Ocean (in Dalkey 2016). Some of the historical survey sites have been eliminated as of this year's survey either because sea-cliff buckwheat is no longer present (Sites 1 and 10) or because their bluff location is unsafe to access (Sites 2, 3, 4/5, and 6 and 7). See Dalkey (2016) for more information about these historical sites.

¹ <https://pvplc.org>

² <https://pubs.usgs.gov/of/2004/1050/Geology.htm>

Project Location

The Palos Verdes Nature Preserve (Nature Preserve) is located in the City of Rancho Palos Verdes on the southern slopes of the Palos Verdes Peninsula in southwestern Los Angeles County. The approximately 1,382-acre Nature Preserve is found on portions of four U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangles: Redondo Beach, San Pedro, Torrance and Rancho Palos Verdes (PVPLC 2015). The ESB survey sites that are the subject of this report are found on three reserves managed or partly managed³ by the PVPLC: Vicente Bluffs, Alta Vicente, and Abalone Cove (**Exhibit 1**, ESB Survey Sites at Vicente Bluffs, and Alta Vicente) (**Exhibit 2**, ESB Survey Sites at Abalone Cove Reserve).

Methods

This section summarizes coordination efforts with the U.S. Fish and Wildlife Service (USFWS), establishment via a Geographic Positioning System (GPS) and photo-documentation of the ten survey sites, as well as survey methods employed for counting ESB butterfly individuals during the 2019 flight season.

Agency Coordination

The USFWS was notified on July 11, 2019 that sites within the Palos Verdes Nature Preserve would be evaluated for the presence of sea-cliff buckwheat and any ESB butterflies observed recorded. The USFWS was notified again on August 7, 2019 of the intent to extend the survey window into mid-August due to the presence of ESB individuals despite the late start date for the surveys along the peninsula (ESB butterflies were observed in mid-June further north at the Ballona Wetlands Ecological Preserve)⁴. A request was also made to the USFWS to allow Austin Parker, staff scientist with the PVPLC to be present during the surveys to gain experience to support his own Recovery Permit application to the USFWS. During each survey, Austin Parker was under the direct on-site supervision of Irena Mendez consistent with permit conditions; with on-site supervision being defined as “an unauthorized person conducting activities within 3 meters (9.8 feet) of an authorized individual.”

GPS Documentation of Survey Sites

To further document ESB survey sites, GPS data was collected for ten ESB survey sites that include survey sites established in previous ESB survey efforts (Dalkey 2016). Of the ten sites documented, 2 are newly established survey sites due to the presence of sea-cliff buckwheat. One is at the interpretive garden at Vicente Bluffs (Site 17) and the other is at restored habitat at Alta Vicente (Site 18). Geographic coordinates were documented on July 19, 2019 by PVPLC Biologist Austin Parker and Irena Mendez as follows:

A total of five sites were recorded at Vicente Bluffs. Three survey sites were recorded at Vicente Bluffs proper; two of which were previously established survey sites (Dalkey 2016): Sites 14, and 15.

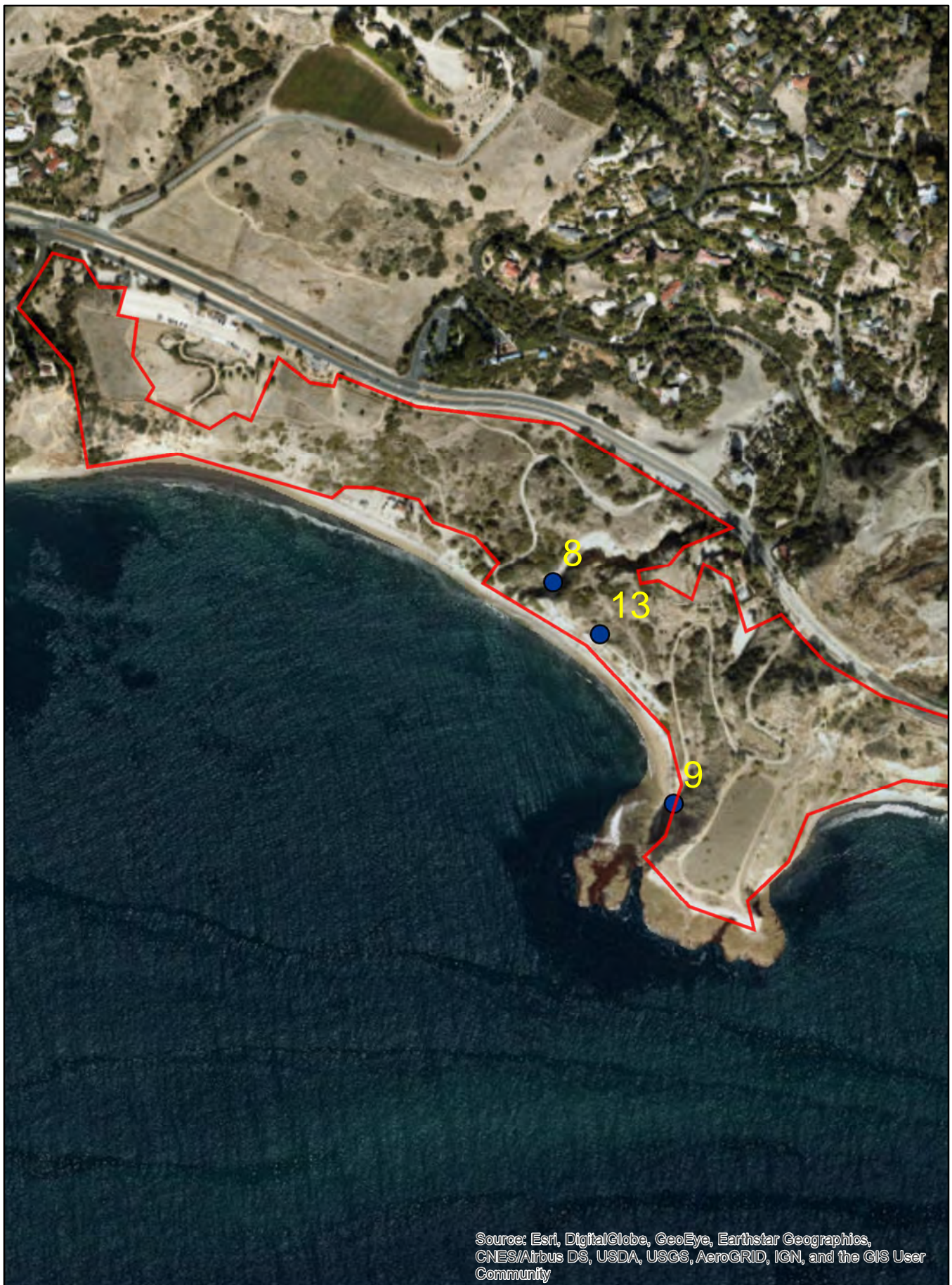
³ The Pelican Cove extension of the Vicente Bluffs is partly managed by the Terranea Resort.

⁴ Personal observation.

Exhibit 1, ESB Survey Sites at Vicente Bluffs and Alta Vicente Reserves



Exhibit 2, ESB Survey Sites at Abalone Cove Reserve



Site 17 is a newly recorded survey site. Two additional survey sites were recorded at the Pelican Cove extension of Vicente Bluffs, all of which were previously established survey sites (Dalkey 2016): Sites 11 and 12.

Two survey sites were recorded at Alta Vicente, one of which was a previously established survey site (Dalkey 2106): Site 16. Site 18 is a newly recorded survey site.

Three survey sites were recorded at Abalone Cove, all of which were previously established survey sites (Dalkey 2016): Sites 8, 9 and 13.

Survey Method

Surveys were conducted using point count observations walking by the clusters of sea-cliff buckwheat closely observing each plant for the presence of ESB butterflies. The surveyors approached the vegetation with care to not disturb ESB butterflies that could be present. A sex determination was made when the top side of the wings were visible; when not visible, the butterfly was recorded as undetermined. Weather conditions recorded included air temperatures, wind and cloud cover to ensure that no site survey was performed with rain or drizzle, air temperatures less than 65 degrees Fahrenheit and winds of less than 5 miles per hour. All surveys were performed between approximately 9:00am and 4:00pm local time consistent with special terms and condition specified in the Recovery Permit. Six surveys were performed.

Results

This section provides a description of the survey sites; photo-documentation at established photo stations, weather conditions/survey personnel and numbers of ESB individuals observed at each survey site. Tables 1 through 3 summarize the description of survey sites at each of the three reserves: Vicente Bluffs, Alta Vicente, and Abalone Cove. Photo-documentation at established photographic stations serve to compare each site with photographs taken in previous years.

Almost all of the ESB butterflies (98 percent) were observed at Vicente Bluffs (Sites 14 and 17). Only one ESB butterfly was observed at Alta Vicente. No ESB butterflies were observed at the Pelican Cove extension of Vicente Bluffs or at Abalone Cove, consistent with observations made by Dalkey (2016).

ESB butterflies were observed on all six surveys:

- ◆ 43 percent (22 butterflies) were observed on the first survey day (July 17)
- ◆ 29 percent (15 butterflies) observed on the second survey date (July 23)
- ◆ 16 percent (8 butterflies) on the third survey (July 31)
- ◆ 8 percent (4 butterflies) on the fourth survey date (August 7)
- ◆ 2 percent (1 butterfly) on the fifth survey date (August 11)
- ◆ 2 percent (1 butterfly) on the sixth survey date (August 17)

Table 1. Description of Vicente Bluffs ESB Survey Sites



1. Survey Site Number: 11	
2. Date: July 17, 2019	
3. Coordinates: 33.74180N; 118.40392 W	
4. Photographer: Austin Parker	
5. Description: disturbed bluff habitat at Pelican Cove extension of the Vicente Bluffs Reserve; managed by PVPLC. 8 small <i>E. parvifolium</i> with sparse blooms along the trail with <i>Dudleya virens</i> , <i>Opuntia littoralis</i> & <i>Encelia californica</i> . Non-native species dominate: <i>Centaurea melitensis</i> , <i>Salsola tragus</i> , <i>Picris echioides</i> , <i>Atriplex semibaccata</i> and others.	
1. Survey Site Number: 12	
2. Date: July 17, 2019	
3. Coordinates: 33.74166 N, 118.40359 W	
4. Photographer: Austin Parker	
5. Site Description: bluff habitat with native landscaping consisting primarily of <i>Encelia californica</i> at Pelican Cove extension of the Vicente Bluffs Reserve. One <i>Eriogonum parvifolium</i> growing with the mass planting of <i>Encelia californica</i> . <i>Artemisia californica</i> is also present to a lesser extent. Site is managed by the Terranea Resort.	

Table 1. Description of Vicente Bluffs ESB Survey Sites



1. Survey Site Number: 14	
2. Date: July 17, 2019	
3. Coordinates: 33.74679 N; 118.41305 W	
4. Photographer: Austin Parker	
5. Description: disturbed bluff habitat along the trail. Several dozen <i>E. parvifolium</i> have been planted along with <i>D. virens</i> , <i>Rhus integrifolia</i> , <i>Lycium californica</i> and <i>Deinandra fasciculata</i> . A drainage feature at the edge of the bluff supports a cluster of robust plants with abundant blooms; others are small. <i>Centaurea melitensis</i> , <i>S. tragus</i> , <i>P. echinoides</i> , and others .	
1. Survey Site Number: 15	
2. Date: July 17, 2019	
3. Coordinates: 33.74421 N; 118.41122 W	
4. Photographer: Austin Parker	
5. Site Description: disturbed bluff habitat adjacent to the trail: supports several <i>E. parvofolium</i> and one <i>Peritoma arborea</i> . The site is dominated by non-natives: <i>Chrysanthemun coronarium</i> , <i>S. tragus</i> , <i>Mesembryanthemum crystallinum</i> , and non-native annual grasses,	

Table 1. Description of Vicente Bluffs ESB Survey Sites


1. Survey Site Number: 17 (new site)	
2. Date: July 17, 2019	
3. Coordinates: 33.74679 N; 118.41305 W	
4. Photographer: Austin Parker	
5. Description: landscaped garden habitat on upland side of trail; disturbed bluff habitat on ocean side of trail. The garden supports robust <i>E. parvifolium</i> plants together with a suite of other native species: <i>E. cinerium</i> , <i>E. fasciculatum</i> , <i>Salvia mellifera</i> , <i>S. leucophylla</i> , <i>Encelia californica</i> , <i>Artemisia californica</i> , <i>Eschscholzia californica</i> , <i>Asclepias fascicularis</i> , <i>Isocoma menziesii</i> among others.	

Table 2. Description of Alta Vicente ESB Survey Sites



1. Survey Site Number: 16	
2. Date: July 17, 2019	
3. Coordinates: 33.74355 N; 118.40768 W	
4. Photographer: Austin Parker	
5. Description: terrace habitat undergoing restoration by the PLPLC with a suite of coastal sage scrub plants: well-established <i>E. parvifolium</i> in various stages of bloom, <i>E. cinerium</i> , <i>Malosma laurina</i> , <i>Encelia californica</i> , <i>Salvia mellifera</i> , <i>S. leucophylla</i> , <i>Artemisia californica</i> , <i>Opuntia littoralis</i> , and others. Recruits observed for <i>E. parvifolium</i> .	
1. Survey Site Number: 18 (new)	
2. Date: July 17, 2019	
3. Coordinates: 33.74421 N; 118.41122 W	
4. Photographer: Austin Parker	
5. Description: terrace habitat undergoing restoration by the PLPLC with a suite of coastal sage scrub plants: well-established <i>E. parvifolium</i> in various stages of bloom, <i>E. cinerium</i> , <i>Malosma laurina</i> , <i>Encelia californica</i> , <i>Salvia mellifera</i> , <i>S. leucophylla</i> , <i>Encelia californica</i> , <i>Artemisia californica</i> , <i>Opuntia littoralis</i> , among others. Seedlings recruits observed for <i>E. parvifolium</i> and others.	

Table 3. Abalone Cove ESB Survey Site


1. Survey Site Number: 8	
2. Date: July 17, 2019	
3. Coordinates: 33.74090 N; 118.37653 W	
4. Photographer: Austin Parker	
5. Description: rocky escarpment along an encised drainage flowing to the ocean. Sparse vegetation with evidence of erosion visible in the shale debris at the base of the escarpment. One small <i>E. parvifolium</i> individual observed. At higher elevation: <i>E. cinerium</i> , <i>Artemisia californica</i> , <i>Peritoma arborea</i> , <i>Rhus intergrifolia</i> and <i>Malacothrix saxatilis</i> .	
1. Survey Site Number: 9	
2. Date: July 17, 2019	
3. Coordinates: 33.73841 N; 118.37489 W	
4. Photographer: Austin Parker	
5. Description: bluff habitat adjacent to rocky shore. Portions show signs of erosion as evidenced by loosened shale and sparse vegetation. About nine small <i>E. parvifolium</i> in bloom a dozen feet or so above the shore; also <i>Peritoma arborea</i> , <i>Marah macrocarpa</i> , <i>Malacothrix saxatilis</i> . Non-native species include <i>Carpobrotus edulis</i> , <i>Acacia</i> sp. and <i>Nicotiana glauca</i> .	

Table 3. Abalone Cove ESB Survey Site


1. Survey Site Number: 13	
2. Date: July 17, 2019	
3. Coordinates: 33.74033 N; 118.37588 W	
4. Photographer: Austin Parker	
5. Description: Bluff habitat with approximately six large and robust <i>E. parvifolium</i> individuals with many flowers were observed growing on rocky substrate together with <i>Lycium californicum</i> and <i>Atriplex lentiformis</i> . Site is heavily invaded by <i>Brassica nigra</i> , <i>Carpobrotus edulis</i> , <i>Centaurea melitensis</i> , and non-native annual grasses.	

Table 4 documents the weather conditions and survey personnel and Table 5 provides the numbers of ESB butterflies observed at each survey site for each of the six surveys performed. Surveys were discontinued at sites where no ESB butterflies were observed in two or more weeks of consecutive surveys: Sites 11, 12 at Pelican Cove; and Sites 8, 9 and 13 at Abalone Cove. Although no ESB butterflies were observed at Alta Vicente after the first survey on July 17, surveys never-the-less continued for an additional four consecutive weeks before ceasing due to the high quality of the habitat. High quality habitat is defined as abundant sea-cliff buckwheat planted in clusters with significant numbers of flowers.

Table 4
Summary of 2019 ESB Survey Data

Survey Date	Weather Conditions and Time	Survey Personnel
7/19/2019	11:05am: 75 °F, 0% cloud cover; light air 3:50pm: 70 °F, 40% cloud cover; light air	Irena Mendez & Austin Parker
7/23/2019	1:45pm: 82 °F, 5% cloud cover; light air 4:18pm: 82 °F, 5% cloud cover; light air	Irena Mendez & Austin Parker
7/31/2019	9:30am: 71 °F, 100% cloud cover; light air 12:43pm: 80 °F, 100% cloud cover; light air	Irena Mendez & Austin Parker
8/7/2019	9:30am: 68 °F, 100% cloud cover, light air to light breeze 11:10 am: 73 °F, 40% cloud cover; light-gentle breeze	Irena Mendez & Austin Parker
8/11/2019	12:07pm: 75 °F; 0% cloud cover; light air to light breeze 1:10pm: 80 °F, 80% cloud cover; light air to gentle breeze	Irena Mendez & Austin Parker
8/17/2019	12:30pm: 70 °F; 5% cloud cover; light air to light breeze 1:30pm: 70 °F, 5% cloud cover; light air	Irena Mendez

Table 5
Results of 2019 ESB Butterfly Surveys

Date (2019)	19-Jul			23-Jul			31-Jul			7-Aug			11-Aug			17-Aug		
Vicente Bluffs																		
Survey Site #	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U
11	0	0	0	0	0	0	0	0	0	*	*	*	*	*	*	*	*	*
12	0	0	0	0	0	0	0	0	0	*	*	*	*	*	*	*	*	*
14	5	0	2	3	4	0	0	1	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	8	5	1	5	3	0	2	2	3	1	2	1	0	0	1	1	0	0
Alta Vicente																		
16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*
Abalone Cove																		
8	0	0	0	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*
9	0	0	0	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*
13	0	0	0	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*
TOTAL	14	5	3	8	7	0	2	3	3	1	2	1	0	0	1	1	0	0
M = male ESB																		
F = female ESB																		
U = undetermined																		
* = no survey																		

Recommendations

At the Palos Verdes Peninsula, the ESB flight season begins in late May/early June with noted variability in the blooming period for sea-cliff buckwheat (Dalkey 2016). Based on this, it is recommended that the survey period extend from June through August to capture the peak in the flight season at each survey site. Due to the diverse habitats with a range of habitat quality and variability in host plant blooming, understanding the peak in the flight season for each survey site could prove useful to inform management strategies for maximum efficiency such as:

- ◆ Prioritization of sites for restoration
- ◆ Timing and methods for weed abatement
- ◆ Informing planting schemes; as well as to gauge the success of current day strategies.

References

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- Palos Verdes Peninsula Land Conservancy (PVPLC). 2015. Comprehensive Management and Monitoring Report 2013-2015 and 2015 Annual Report for the Rancho Palos Verdes Draft Natural Communities Conservation Plan and Habitat Conservation Plan. PVPLC, Rolling Hills Estates, CA. 537 p.
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2.4 WILDLIFE MONITORING

2.5 PALOS VERDES BLUE BUTTERFLY MONITORING

SURVEY REPORT FOR THE PALOS VERDES BLUE
BUTTERFLY (*GLAUCOPSYCHAE LIGDAMUS*
PALOSVERDESENSIS)
IN THE PALOS VERDES NATURE PRESERVE

FEBRUARY 18 – APRIL 28, 2021

Prepared by
Austin Parker (TE-73946B-2), PVPLC Biologist
June 9, 2021



INTRODUCTION

In April of 2020, captive bred Palos Verdes Blue Butterflies (*Glaucopsyche lygdamus palosverdensis*, PVB) were released into the Palos Verdes Nature Preserve (PVNP) by Dr. Jana Johnson of Moorpark College in collaboration with the PVB working group which includes the US Fish and Wildlife Service, California Department of Fish and Wildlife, the Palos Verdes Peninsula Land Conservancy (Land Conservancy) and the Urban Wildlands group. This was the first time PVB were flying in Palos Verdes since they were determined to be extirpated from the Preserve in the 1980s. The two sites within the PVNP that were determined to be the best habitat for PVB by the PVB partners were multiple locations within the Alta Vicente Reserve and one site in the Filiorum Reserve (Fig. 1). The Alta Vicente Reserve is currently under restoration but exhibits both species of host plant in three different locations. The Filiorum site is a historic occurrence of the *Astragalus trichopodus* var. *lonchus* and is not visible from the trail. The purpose of this effort was to monitor for free flying PVB in and around all of the release sites at both Reserves.

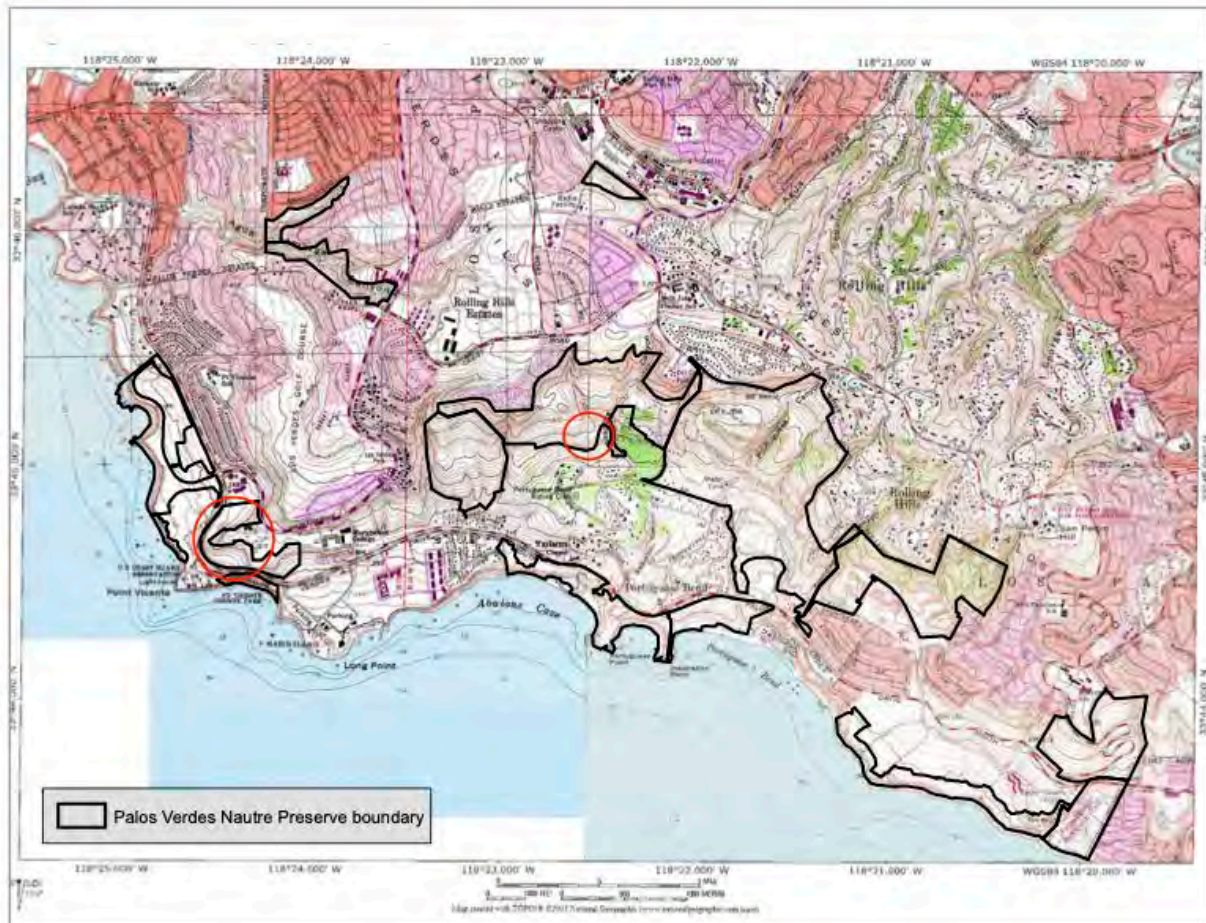


Figure 1. Topographic map of the PVNP with PVB Release sites

METHODS

This effort was conducted under Austin Parker's USFWS 10(a)(1)(A) Recovery Permit, number TE-73946B-2, for the purpose of monitoring the sites of the release of captive-bred PVB individuals in April 2020. Both locations were mapped utilizing field-captured GPS data by Austin Parker.

Two sites were included in the surveys:

- Palos Verdes Nature Preserve – Alta Vicente Reserve, 50.7 ac located in the City of Rancho Palos Verdes and managed by PVPLC. PVPLC has conducted restoration projects to convert this formerly ruderal site to coastal sage scrub and, most recently, early successional habitat for the PVB with both deerweed and milkvetch stands. This Reserve was one site of captive-reared PVB releases on April 18th, 2020.
- Palos Verdes Nature Preserve – Filiorum Reserve, 190.1 ac located in the City of Rancho Palos Verdes and managed by PVPLC. This site was small, approximately .1 acres, contains a naturally growing milkvetch stand surrounded by both cactus scrub, Acacia, and large mustard stands. Captive-reared PVBs were also released here on April 18th, 2020.

At both reserves surveys were conducted utilizing Pollard transects throughout the butterfly's flight period (Pollard 1977, Pollard and Yates 1983). Surveys were conducted over ten days from February 18th through April 28, 2021. The surveys extended past April 15th due to the lack of PVB observation throughout the flight season. Numbers of PVB butterflies, including female, male, or unknown sex, were recorded as well as other butterfly species. Host plants were also randomly examined for the presence of larvae. On February 18th, the number of deerweed and milkvetch present within view of each transect was recorded.

RESULTS

Table 1. A summary of survey dates including date, time weather, and number of Palos Verdes blue butterflies observed.

Date	Preserve	Start	End	Temp	Cloud Cover	Wind	PVB	Other butterfly sp.	Notes
2/18/2021	Alta Vicente	1308	1430	65		0 0-5 mph	0	2 Gray Hairstreaks, 1 Marine Blue	Host plant count
2/18/2021	Filiorum	1245	1530	65		0 5-7 mph	0	None	Host plant count
2/23/2021	Alta Vicente	1030	1115	70		0 0-5 mph	0	None	Host plants mostly dormant
2/23/2021	Filiorum	1153	1217	70		0 0-5 mph	0	None	Host plants mostly dormant
3/5/2021	Filiorum	1030	1100	65		0	0	1 Sara Orangetip	
3/5/2021	Alta Vicente	1120	1200	66		0	0	None	Acmgla flowering is better, but still not optimal
3/12/2021	Filiorum	1015	1050	62		50 5-10 mph	0	1 Western Tiger Swallowtail	
3/12/2021	Alta Vicente	1100	1210	63		40 5-10 mph	0	None	
3/18/2021	Alta Vicente	1230	1320	71		10 5-10 mph	0	1 Western Tiger Swallowtail	
3/18/2021	Filiorum	1340	1425	72		10 5-15 mph	0	None	
3/25/2021	Alta Vicente	1115	1205	68		40 5-10 mph	0	None	
3/25/2021	Filiorum	1225	1300	68		25 0-5 mph	0	1 Sara Orangetip	
3/31/2021	Alta Vicente	1130	1220	77		10 5-10 mph	0	None	Acmgla flowering very high
3/31/2021	Filiorum	1240	1315	78		0 5-10 mph	0	None	
4/16/2021	Alta Vicente	1130	1215	62		50 5-10 mph	0	None	Acmgla flowering is still high
4/16/2021	Filiorum	1235	1315	63		25 5-10 mph	0	None	Still low Asttrilon flowering
4/21/2021	Alta Vicente	1100	1205	65		50 5-10 mph	0	None	Acmgla flowering is still good, decline has started.
4/21/2021	Filiorum	1230	1310	66		50 5-10 mph	0	None	
4/28/2021	Alta Vicente	1030	1130	65		75 5-10 mph	0	None	Asttrilon never really revived in 2021 season. Very low BF activity in 2021 season.
4/28/2021	Filiorum	1200	145	65		50 5-10 mph	0	None	Host plants never really revived in 2021. Very low BF activity in 2021

Table 2. The total counts of PVBs and host plants for each transect in the Palos Verdes Nature Preserve.

Transect	PVB Male	PVB Female	PVB Unknown	PVB Host plants (2/18/21)	
				<i>Astragalus trichopodus</i> var. <i>lonchus</i>	<i>Acmispon glaber</i>
AV1	0	0	0	8	13
AV2	0	0	0	0	36
AV3	0	0	0	26	0
Fi1	0	0	0	125	0



Figure 2. Map of Alta Vicente Reserve including transects surveyed

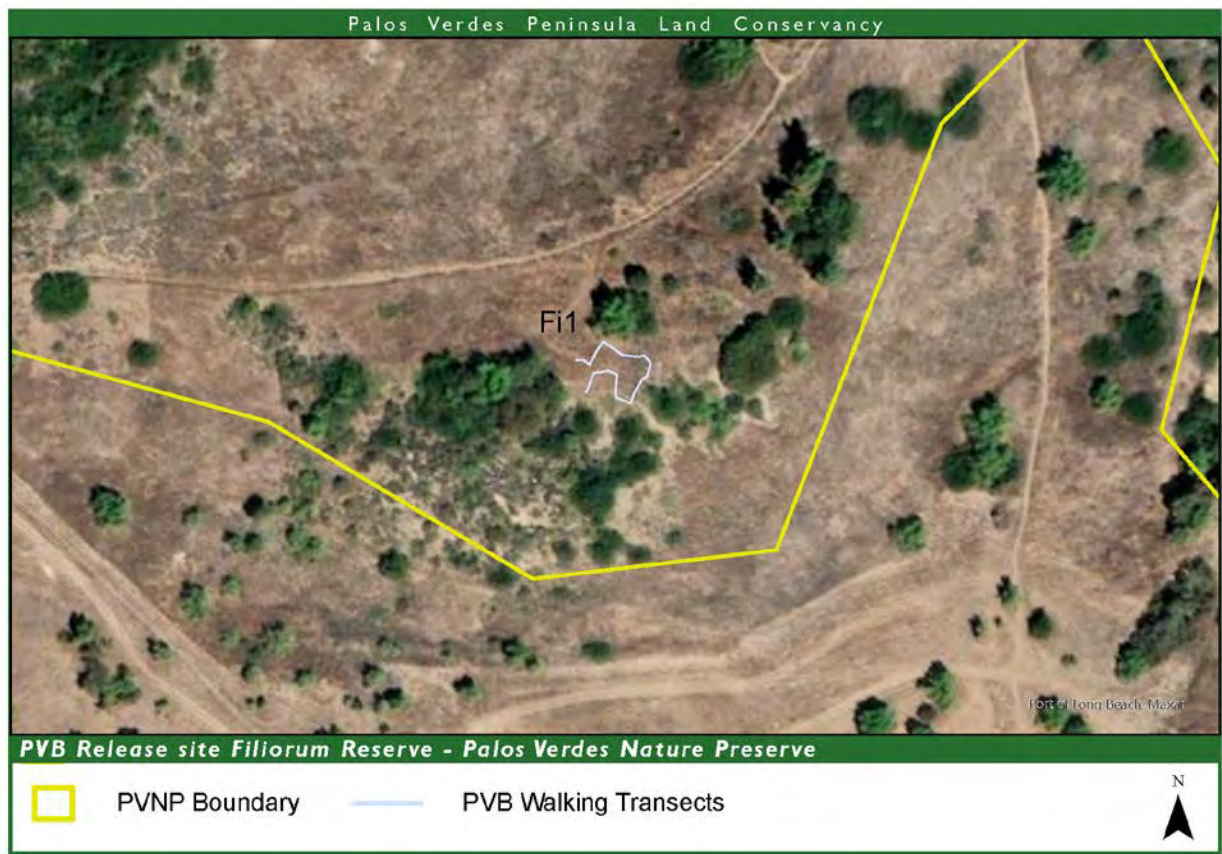


Figure 3. Map of Filiorum Reserve including transect surveyed

Photos of Transects are provided in Appendix A.

ID	Location	OCT 2020	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	WY to Date	Pct Avg to Date	Pct Tot WY
LAX	LA INT'L AIRPORT	0	0.1	1.65	1.98	0.21	1.33	0	5.27	43	41
LGB	LONG BEACH	0.03	0.04	1.49	1.37	0.05	1.47	0.02	4.47	38	36

Figure 4. Regional precipitation from Oct 2020 – April 2021 (NOAA)

Alta Vicente Reserve

No PVBs had been observed at the Alta Vicente Reserve since before the first “extinction.” However, PVPLC has installed host plants at the site where captive-reared individuals were released on April 18th 2020. No PVB individuals were observed on either deerweed or milkvetch in 2021.

Filiorum Reserve

Similar to Alta Vicente Reserve, no PVBs had been observed in the Filiorum Reserve. This was a naturally occurring milkvetch stand away from regular trails. No PVB individuals were observed at the site in 2021.

CONCLUSIONS AND RECOMMENDATIONS

The 2021 PVB flight season in the PVNP was unfortunately not successful. There were no PVB observed within the two release sites. This is believed to be largely due to the very low precipitation during the flight season (Fig. 4; NOAA). Due to the low precipitation, the *Astragalus trichopodus* var. *lonchus* stayed mostly dormant at both sites. The *Acmispon glaber* did have a decent flowering season at the Alta Vicente Reserve, but PVB were not observed on these host plants.

The Land Conservancy believes that with an increase in precipitation in coming years along with efforts to enhance the PVB habitat through manual and mechanical weed abatement and infill planting of both PVB host plants at Alta Vicente and the *A. trichopodus* var. *lonchus* at and around the Filiorum site, the initial release of PVB could still be successful. The Land Conservancy also believes that with increased precipitation, continued releases of PVB is a viable option for species revival in the PVNP. The Land Conservancy’s conservation efforts by expanding habitat to different locations throughout its preserves are important for supporting the PVB recovery.

Recommendations include:

- Continue expansion of PVB habitat sites in the Palos Verdes Nature Preserve, including:
 - Habitat enhancement at the release sites in Alta Vicente and Filiorum Reserves
 - Habitat creation and enhancement at historic PVB sites, including Lunada Canyon and Portuguese Bend and San Ramon Reserves
- Continue on-going weeding efforts at all potential PVB habitat sites throughout PVNP
- Follow best practices when working in PVB areas by:
 - Apply tenants of Working Safely in the Butterfly Zone by
 - Stand outside the Butterfly Zone (see handout on PVPLC server).
 - Look for an open patch of dirt to stand on.
 - Use only clippers to cut weeds in the in the Cut-only Zone.
 - Collect seed once the permitted biologist has determined the flight season is over.
 - Carry weeds off site.

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.



Austin Parker

June 9th, 2021

Date

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Federal Register. 1980. Listing the Palos Verdes Blue Butterfly as an Endangered Species with Critical Habitat, Final Rule. Vol. 45 No. 129.

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Pollard, E., and T. J. Yates. 1983. *Monitoring butterflies for ecology and conservation*. Chapman & Hall, London.

[USF&WS] United States Fish and Wildlife Service. 2014. Palos Verdes Blue Butterfly (*Glycopsyche lygdamus palosverdensis*) 5-year review: Summary and evaluation. Carlsbad Fish and Wildlife Office, Carlsbad, CA: 31 pp.

APPENDIX A

AV1 PP1 (March 26, 2021)



AV1 PP2 (March 26, 2021)



AV2 PP1 (March 26, 2021)



AV2 PP2 (March 26, 2021)



AV3 PP1 (March 26, 2021)



AV3 PP2 (March 26, 2021)



Fi1 PP1 (April 22, 2021)



Fi1 PP2 (April 22, 2021)



SECTION 3

HABITAT RESTORATION PLAN



Habitat Restoration Plan for the

Abalone Cove Ecological Reserve in the Palos Verdes Nature Preserve



FEBRUARY 2016

PREPARED BY:



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HABITAT RESTORATION PLAN
for the
Abalone Cove Reserve
in the
Palos Verdes Nature Preserve

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FEBRUARY 2016

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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A Soil Test Results	
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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

1 INTRODUCTION

This Habitat Restoration Plan (HRP) was prepared for the Abalone Cove Reserve within the Palos Verdes Nature Preserve (PVNP) located in the City of Rancho Palos Verdes, California (Figures 1 and 2). The Abalone Cove Reserve is one of ten ecological reserves within the approximately 1,400-acre PVNP. The PVNP is owned by the City of Rancho Palos Verdes and managed by the Palos Verdes Peninsula Land Conservancy (PVPLC).

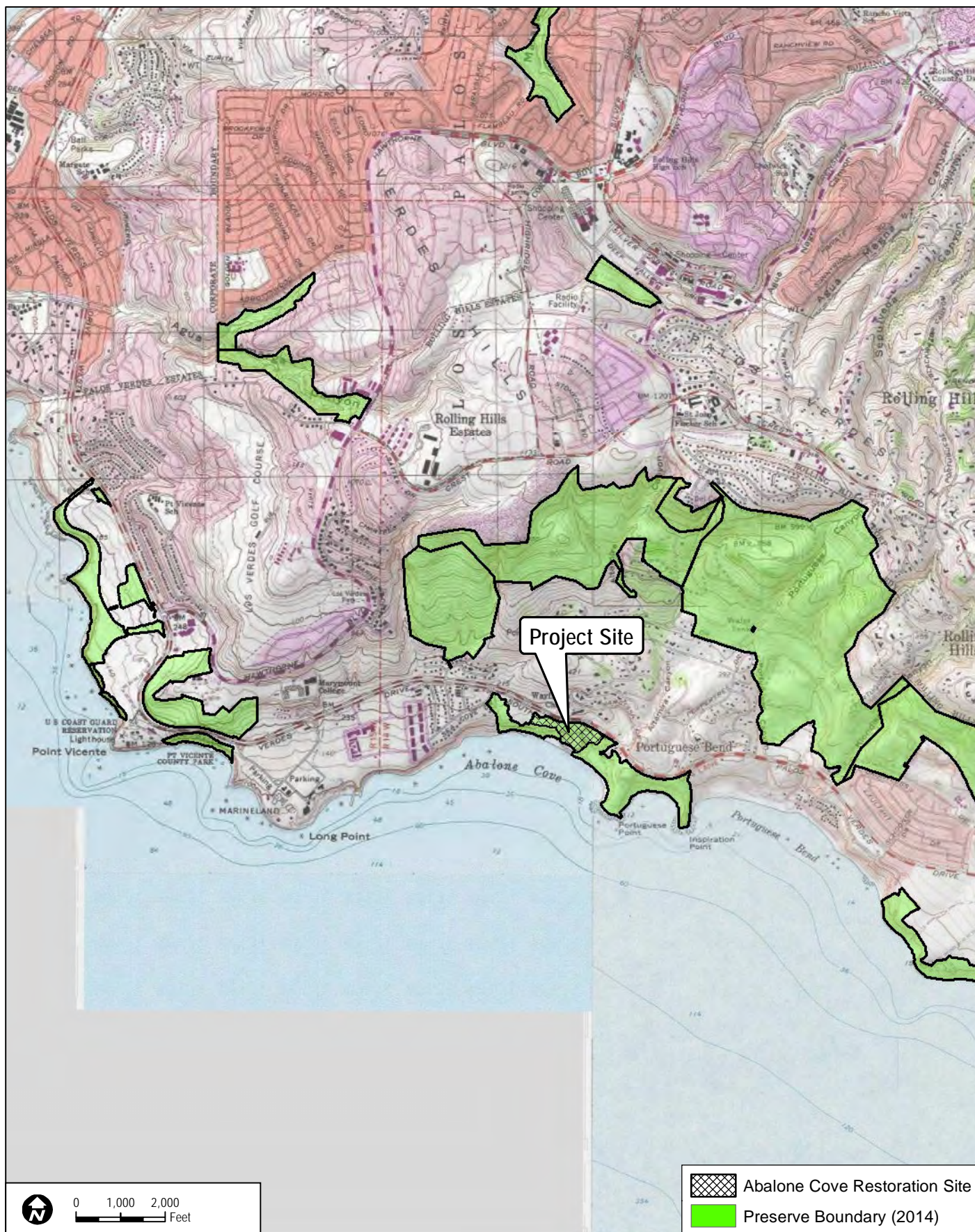
This HRP discusses implementing restoration of approximately 3.5 acres of coastal sage scrub, 1.1 acre of cactus scrub, 0.2 acre of mulefat scrub, and the enhancement of approximately 8.3 acres of mixed coastal scrub in a disturbed area of the Abalone Cove Reserve. Portions (approximately 2.2 acres) of the habitat enhancement area were identified for planting additional cactus. The HRP addresses restoration design, planting recommendations, installation procedures, maintenance requirements, monitoring methodology, and performance standards.

**Habitat Restoration Plan for the Abalone
Cove Reserve in the Palos Verdes Nature Preserve**

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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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DUDEK

9085

SOURCE: USGS 7.5-Minute Redondo Beach, San Pedro Series Quadrangles.

Habitat Restoration Plan for the Abalone Cove Ecological Reserve in the Portuguese Bend Nature Preserve

FIGURE 2
Vicinity Map

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

2 EXISTING CONDITIONS

2.1 Site Description

The Abalone Cove Reserve is located on the southern portion of the Palos Verdes Peninsula. The entire Abalone Cove Reserve is approximately 64 acres and is located south of Palos Verdes Drive South along the shoreline of the peninsula. There are two promontories, Portuguese and Inspiration Points, which bound the cove within the Abalone Cove Reserve. The proposed restoration area is located upslope from the Portuguese Bend Nursery School (Beach School) in the central part of the reserve.

2.2 Vegetation Communities

Plant communities and land covers within the Abalone Cove Reserve are typical of plant communities found in this region, exhibiting various levels of disturbance, but containing elements of the native plant communities. Vegetation mapping of the reserve was prepared by the PVPLC and the California Native Plant Society (CNPS) (PVPLC and CNPS 2010). According to the vegetation mapping conducted by PVPLC and CNPS, the proposed restoration area consists of California coastal sage scrub, mixed coastal scrub, and non-native grassland, comprised of several subtypes (e.g., alliances and associations). The existing vegetation communities present in the restoration/enhancement area are described below.

2.2.1 Coastal Sage Scrub

The coastal sage scrub on site was mapped by CNPS as *Encelia californica* association, *Encelia californica* alliance, *Encelia californica-Artemisia californica* association, and *Rhus integrifolia* (strongly dominant) association (PVPLC and CNPS 2010). Coastal sage scrub is composed of low, subshrubs approximately 1 meter (3 feet) high, many of which are facultatively drought-deciduous (Holland, 1986). Dominant shrub type varies across this vegetation type, depending on localized factors and levels of disturbance, but often includes California Sagebrush (*Artemisia californica*) and California Brittlebush (*Encelia californica*). In this community the shrub layer primarily forms a continuous canopy, but there are areas with a more open canopy, widely spaced shrubs, and fairly well-developed understory. Within the site non-native species, including black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), wild oat (*Avena barbata*, *A. fatua*) and other non-native grasses have invaded the coastal sage scrub community.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

2.2.2 Mixed Coastal Scrub

The mixed coastal scrub on site was mapped by CNPS as disturbed *Rhus integrifolia* association, and urban trees (PVPLC and CNPS 2010). Though these areas are dominated by lemonadeberry (*Rhus integrifolia*) they are disturbed and contain many non-native shrubs and trees, including coastal wattle (*Acacia cyclops*) spiny holdback (*Caesalpinia spinosa*), and Phoenix palm (*Phoenix canariensis*).

2.2.3 Non-native Grassland

Non-native grassland within the project site was mapped by CNPS as cleared land, and California annual and perennial grassland macrogroup (PVPLC and CNPS 2010). Non-native grassland is typically characterized by dense to sparse cover of weedy, introduced annuals including wild oat, brome grasses (*Bromus diandrus*, *B. madritensis*, *B. hordeaceus*) and black mustard. Annual grassland often occurs in areas where there has been some historic disturbance to the natural community. At the proposed restoration site, non-native grassland is heavily dominated by wild oat, brome grasses, black mustard, fennel, tocalote (*Centaurea melitensis*), and false brome (*Brachypodium distachyon*).

2.3 Geology and Soils

The Palos Verdes Peninsula is primarily an old marine terrace with relatively steep eroded canyons which drain southwesterly into the Pacific Ocean. The underlying geologic material consists of marine sedimentary and basaltic rocks. The area is seismically active, with active Palos Verdes and San Pedro fault zones that have caused the peninsula to uplift relative to the adjacent Los Angeles Basin and the offshore bedrock.

According to the Report and General Soil Map for Los Angeles County (USDA 1969), the soils within the Abalone Cove Reserve are composed of the Altamont-Diablo association (30–50% slopes). Soils of the Altamont-Diablo association occur on gently sloping to rolling foothills throughout the Los Angeles basin as far north as Point Dume. The Altamont-Diablo association is comprised of approximately 60% Altamont soils and 30% Diablo soils. Diablo soils are described to be 22–52 inches deep, are well drained, and have slow subsoil permeability. Altamont soils are described to be 24–36 inches deep, are well drained, and have slow subsoil permeability. They have dark brown, neutral, clay surface layers about 12 inches thick underlain by a brown, calcareous clay subsoil.

The proposed restoration area is primarily a terrace above the coastal bluffs. The terrace appears to have been used for agriculture in the 1950's and 1960's, but has lain fallow for several decades. Three soil samples were collected from the proposed restoration area. The soil samples

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

were collected from three areas proposed for restoration (Figure 3). Each of the soil samples was composed of 3-4 subsamples consisting of the 12-16-inch deep soil profile from each location to create a composite soil sample for analysis. The composite soil samples are representative of the general soil conditions on site within the rooting zone of the target plant species. The soil samples were submitted to Wallace Laboratories for analysis of standard soil constituents, agricultural suitability, texture, and cation exchange capacity. The results of the analysis show that, the soils are clay, with a slow/fair infiltration rate and fair organic matter (Appendix A). The soils on site are slightly alkaline (pH = 7.69-7.76) and the salinity is low (ECe = 0.44-0.72). Major nutrients (nitrogen and phosphorus) are low.

Plant establishment is not expected to be significantly inhibited due to the soil chemistry described above. The soils appear to be suitable for the establishment of the target habitats without soil remediation or extensive soil amendments. However, container plants may struggle to become established and grow healthfully without supplemental watering, and amendments may be necessary if plants are struggling to become established. While the soils on site pose no significant problems to establishment of native habitat, as native soils they have low levels of major nutrients. Native species are adapted to lower nutrient soils, but will benefit from some supplemental nutrient augmentation during planting to initiate establishment (e.g., slow-release fertilizer packet).

2.4 Special-Status Species

Two special-status wildlife species have been documented within or nearby the restoration and enhancement areas. Coastal California gnatcatcher (*Poliophtila californica californica*) (CAGN) and the cactus wren (*Campylorhynchus brunneicapillus*) (CAWR) have been observed in the coastal sage scrub enhancement area, as well as on the southern border of the coastal sage scrub restoration area (PVPLC 2012) (Figure 3).

No special-status plant species have been documented within the specific area identified for restoration in the HRP. However, four special-status plant species have been documented nearby, including aphanisma (*Aphanisma blitoides*), south coast saltscale (*Atriplex pacifica*), woolly sea-blite (*Suaeda taxifolia*), and sea dahlia (*Coreopsis maritima*) (Dudek and PVPLC 2007; CNPS 2015). In addition to special-status plant species, the host plant seacliff buckwheat (*Eriogonum parvifolium*) for the federally listed, endangered, El Segundo blue butterfly (*Euphilotes battoides allyni*) is known to occur in the vicinity of the proposed restoration areas. Observation of the El Segundo blue butterfly has not been reported at the Abalone Cove Reserve.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

2.5 Non-Native Invasive Species

Non-native species are abundant within the area identified for restoration, making up the majority of the existing vegetative cover. Non-native species are also common in the area proposed for enhancement. Controlling non-native species during the plant establishment phase will present a significant challenge, and should be prioritized as the most critical aspect of the maintenance program. The most predominant non-native species observed on-site include black mustard, coastal wattle, spiny holdback, Peruvian pepper, Brazilian pepper, and non-native grasses. These species, as well as additional non-native species observed or expected on site, are provided in Table 1 with their associated rating in the California Invasive Plant Council's (Cal-IPC) Inventory of Invasive Plant Species (2015).

Table 1
Non-Native Plant Species and Associated Cal-IPC Ratings

High
<i>Bromus madritensis</i> ssp. <i>madritensis</i> —compact brome
<i>Carpobrotus edulis</i> —hottentot fig
<i>Foeniculum vulgare</i> —fennel
Moderate
<i>Atriplex semibaccata</i> —Australian saltbush
<i>Avena barbata</i> —slender oat
<i>Brassica nigra</i> – black mustard
Moderate
<i>Bromus diandrus</i> —ripgut brome
<i>Centaurea melitensis</i> —Maltese star-thistle
<i>Glebionis coronaria</i> —crowndaisy
<i>Hordeum murinum</i> —mouse barley
<i>Mesembryanthemum crystallinum</i> —common iceplant
<i>Myoporum laetum</i> —myoporum
<i>Pennisetum setaceum</i> —crimson fountaingrass
<i>Euphorbia terracina</i> —Geraldton carnation weed
Limited
<i>Bromus hordeaceus</i> —soft brome
<i>Erodium cicutarium</i> —redstem stork's bill
<i>Marrubium vulgare</i> —horehound
<i>Olea europaea</i> —olive
<i>Phoenix canariensis</i> —phoenix palm
<i>Ricinus communis</i> —castorbean
<i>Salsola tragus</i> —prickly Russian thistle
<i>Schinus molle</i> – Peruvian peppertree
<i>Schinus terebinthifolius</i> —Brazilian peppertree

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

Table 1
Non-Native Plant Species and Associated Cal-IPC Ratings

None
* <i>Acacia cyclops</i> —coastal wattle
<i>Caesalpinia spinosa</i> —spiny holdback
<i>Erigeron bonariensis</i> - asthmaweed
<i>Lactuca serriola</i> – prickly-lettuce
<i>Malva parviflora</i> —cheeseweed mallow
* <i>Melilotus indicus</i> —annual yellow sweetclover
** <i>Pinus</i> sp.—pine
<i>Solanum elaeagnifolium</i> – silverleaf nightshade
<i>Sonchus oleraceus</i> —common sowthistle
* <i>Tropaeolum majus</i> —nasturtium
<i>Yucca gloriosa</i> – Spanish dagger

* Note that while there are several species on the list that do not have a Cal-IPC rating for the state of California, that some of these species can be locally invasive. Species with an asterisk are considered to be moderately invasive within the region and should be aggressively controlled. The Targeted Exotic Removal Program for Plants (TERPP) provides additional target invasive species (PVPLC 2013) that may occur on-site

** Note that some trees taller than 5 feet will be left in place and not removed. Seedlings and young saplings less than 5 feet tall will be removed.

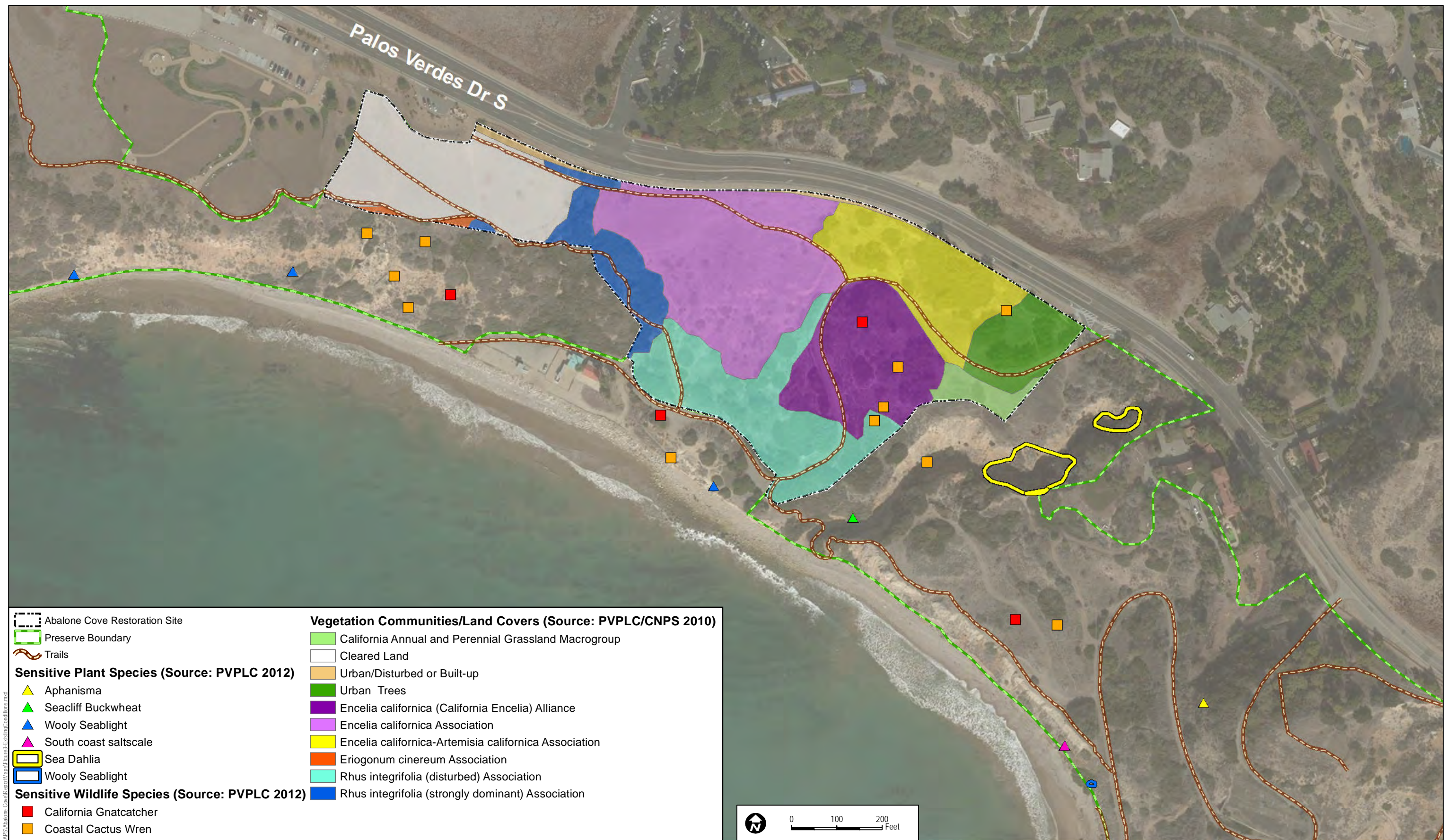
2.6 Additional Considerations

The City of Rancho Palos Verdes has plans for a stabilization project on the walls of the steep, highly eroded canyon on the eastern border of the enhancement area. To allow a buffer for stabilization activities, the enhancement area will leave a buffer of at least 30 feet along the canyon rim, where no enhancement activities will be undertaken.

Additionally, two or more electric utility poles intersect the enhancement area in transit to the Beach School. Restoration and enhancement activities will allow a 15 foot buffer around utility poles, allowing only the management and control of particularly invasive species within these zones (i.e., no planting or seeding).

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

3 RESTORATION PROGRAM

This HRP outlines the restoration and enhancement implementation strategy for upland habitat at the Abalone Cove Reserve and proposes to provide for the restoration of approximately 4.8 acres of habitat restoration, and the enhancement of approximately 8.3 acres of mixed coastal scrub. This HRP uses a restoration approach that emphasizes the recovery of the degraded ecosystem through planting and seeding to re-establish or enhance biological functions and services within portions of the Abalone Cove Reserve.

3.1 Restoration Site Goals and Objectives

The disturbed and fragmented habitat existing in the proposed restoration and enhancement locations limit the magnitude of potential wildlife use and provide opportunities for the further spread and establishment of invasive weed species in the area. The planting of native coastal sage scrub, cactus scrub, mulefat scrub, and enhancement of mixed coastal scrub will provide contiguous native habitat that includes a mosaic of shrub cover which will resist the invasion of invasive weed species and provide increased nesting, cover, and foraging opportunities for wildlife. In particular, the overarching goal of the restoration program is to provide habitat for coastal California gnatcatcher and the cactus wren.

The habitat restoration program will focus on the creation of habitat for covered species with the objective of increasing the overall habitat carrying capacity for the target species populations. Coastal scrub restoration is intended to provide improved foraging habitat for resident and migrating wildlife species, and potential nesting and foraging habitat for the coastal California gnatcatcher, and other sensitive wildlife species. Achievement of the performance standards described herein would create suitable habitat for these species. However, occupation of the site by these species is not a requirement for successful project completion.

In addition to these broad goals, the following site-specific objectives for the Abalone Cove Reserve restoration site have been incorporated into this HRP in the interest of minimizing adverse impacts to biological resources:

- Avoid additional or unplanned disturbance to existing native habitats during implementation of the project construction and long-term maintenance activities;
- Prevent any impacts to sensitive plant or wildlife species during implementation of the project construction and long-term maintenance activities;
- Control non-native invasive weed species considered to be highly or moderately invasive on the Cal-IPC Invasive Plant Inventory (2015), and others identified by PVPLC as locally invasive (PVPLC 2013);

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- Utilize erosion control measures in the form of “Best Management Practices” (BMPs) on the site as conditions necessitate;
- Reintroduce special-status plant species and/or host plants of special-status wildlife species as components of the planting plans where feasible and as appropriate.

3.2 Habitats to be Established or Enhanced

The habitat restoration program consists of site preparation (primarily non-native plant species removal), native planting, seeding, supplemental watering, maintenance, and monitoring. Proposed planting for the target habitat types will focus primarily on the installation of container plants to achieve the project goals. A native seed mix will also be applied as a supplemental measure to increase cover and diversity.

The habitat restoration areas are currently dominated by non-native species. The existing habitat in the restoration areas contains many non-native annual herbs, including black mustard, Russian thistle, and bromes (Figure 4, Photos 1 and 2). Non-native perennials, such as fennel, spiny holdback, Peruvian pepper, and Brazilian pepper also exist within the restoration areas.

Coastal sage scrub habitat will make up the majority of the restored habitat, followed by cactus scrub. Mulefat scrub is planned for approximately 0.2 acre within the restoration area. Each specific habitat type to be restored is described below. It is expected that all planting shall be installed to mimic the natural distribution and vegetation mosaic of adjacent healthy habitats.



Photo 1: Representative view of western restoration area (facing west)



Photo 2: Non-native plants in the western restoration area (black mustard, brome grasses, Russian thistle)



Photo 3: Trail lined by invasive spiny holdback (*Ceanothus spinosa*)



Photo 4: Invasive perennial weeds in the habitat enhancement zone (Coastal wattle, Brazilian pepper)



Photo 5: Representative view of the eastern restoration area (facing west)



Photo 6: Invasive annual weeds in the restoration site (black mustard, wild oat)

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3.2.1 Coastal Sage Scrub

The restoration strategy for coastal sage scrub habitat on the Abalone Cove Reserve restoration site includes reintroducing regionally appropriate native coastal sage scrub species that are currently present in adjacent native habitats. The plant palette includes a container plant and seed mix composition (Table 2) that has been designed to replicate the native composition of a healthy coastal sage scrub plant community similar to existing coastal sage scrub habitat present on the Abalone Cove Reserve site, and with the specific intent to provide habitat suitable for occupation by coastal California gnatcatcher. The planting palette has thus been designed to contain a composition of shrub species that are dominant in coastal sage scrub habitat occupied by coastal California gnatcatcher (Atwood et al. 1994). On the Palos Verdes Peninsula, the primary coastal sage scrub dominants include California sagebrush, California brittlebush, and coastal buckwheat, with coast goldenbush, lemonadeberry, California buckwheat, sages, bladderpod, coast prickly-pear, and wishbone bush as common constituents.

The plant palette provides a quantity of container plants (perennial species) that is estimated to establish approximately 75% cover for coastal sage scrub, 60% cover for cactus scrub, and 100% for mulefat scrub once the plants reach maturity. The seed mix is provided to address erosion control and enhance species diversity, and will be applied as needed, and as determined necessary by the PVPLC.

Table 2
Proposed Coastal Sage Scrub Planting Palette (Approximately 3.5 Acres)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Container Plants</i>						
<i>Artemisia californica</i>	California sagebrush	D40	5	5	348	1,220
<i>Astragalus trichopodus</i> var. <i>lonchus</i>	Ocean locoweed	D40	3	7	184	645
<i>Baccharis pilularis</i>	Coyote brush	D40	5	3	87	305
<i>Brickellia californica</i>	California bricklebrush	D40	5	3	87	305
<i>Corethrogyne filaginifolia</i>	Common sandaster	D40	3	3	24	85
<i>Cylindropuntia prolifera</i>	Coastal cholla	1-gallon	4	5	27	95
<i>Dudleya virens</i>	Bright green dudleya	D40	3	3	24	85
<i>Elymus condensatus</i>	Giant wildrye	D40	6	3	24	85
<i>Encelia californica</i>	California brittlebush	D40	5	5	261	915
<i>Eriogonum cinereum</i>	Coastal buckwheat	D40	5	5	87	305
<i>Eriogonum fasciculatum</i>	California buckwheat	D40	5	5	157	549

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Table 2
Proposed Coastal Sage Scrub Planting Palette (Approximately 3.5 Acres)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Eriogonum parvifolium</i>	Seacliff buckwheat	D40	5	5	87	305
<i>Eriophyllum confertiflorum</i>	Golden yarrow	D40	3	3	145	508
<i>Isocoma menziesii</i>	Coast goldenbush	D40	5	3	87	305
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	5	54	191
<i>Opuntia littoralis/oricola</i>	Chaparral prickly-pear	1-gallon	6	3	24	85
<i>Peritoma arborea</i>	Bladderpod	D40	5	5	35	122
<i>Rhus integrifolia</i>	Lemonadeberry	D40	15	1	4	14
<i>Salvia leucophylla</i>	Purple sage	D40	5	5	87	305
<i>Salvia mellifera</i>	Black sage	D40	5	3	87	305
Total Container Plants					1,920	6,734
Seed Mix						
Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre		Total Lbs.	
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	85	2		7	
<i>Lupinus bicolor</i>	Miniature lupine	90	2		7	
<i>Lupinus succulentus</i>	Arroyo lupine	90	4		14	
<i>Stipa lepida</i>	Foothill needlegrass	65	1		3.5	
<i>Stipa pulchra</i>	Purple needlegrass	75	6		21	
Total Lbs.			15		52.5	

3.2.2 Cactus Scrub

The restoration strategy for cactus scrub is comparable to that described for coastal sage scrub, except that the composition of species was modified to be dominated by prickly-pear cactus (*Opuntia littoralis*, *O. oricola*). The plant palette includes a container plant and seed mix composition (Table 3) that has been designed to replicate the native composition of a healthy cactus scrub plant community similar to existing cactus scrub habitat present on the Abalone Cove Reserve site, and with the specific intent to provide habitat suitable for occupation by cactus wren. In addition to areas identified for cactus scrub restoration, approximately 2.2 acres of the habitat enhancement area were designated for planting additional cactus. These areas were previously documented to support cactus wren and have since been overgrown with non-native trees and shrubs and lemonadeberry

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Table 3
Proposed Cactus Scrub Planting Palette (1.1 Acres)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Container Plants</i>						
<i>Artemisia californica</i>	California sagebrush	D40	5	5	227	249
<i>Astragalus trichopodus</i> var. <i>lonchus</i>	Ocean locoweed	D40	3	7	111	123
<i>Brickellia californica</i>	California bridlebush	D40	5	3	52	57
<i>Corethrogyne filaginifolia</i>	Common sandaster	D40	3	3	24	27
<i>Cylindropuntia prolifera</i>	Coastal cholla	1-gallon	4	10	272	299
<i>Encelia californica</i>	California brittlebush	D40	5	5	87	96
<i>Eriogonum fasciculatum</i>	California buckwheat	D40	5	3	174	192
<i>Isocoma menziesii</i>	Coast goldenbush	D40	5	3	35	38
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	5	54	60
<i>Opuntia littoralis/ oricola</i>	Coast prickly-pear	1-gallon	6	30	363	399
<i>Peritoma (=Isomeris) arborea</i>	Bladderpod	D40	6	5	36	40
<i>Rhus integrifolia</i>	Lemonadeberry	D40	15	1	2	2
<i>Salvia mellifera</i>	Black sage	D40	5	3	87	96
Total Container Plants (per acre)					1,524	1,678
<i>Seed Mix</i>						
Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre		Total Lbs.	
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	74	2		2.2	
<i>Lupinus bicolor</i>	pygmy lupine	78	2		2.2	
<i>Lupinus succulentus</i>	arroyo lupine	81	4		4.4	
<i>Phacelia ramosissima</i>	branching phacelia	80	0.25		0.275	
<i>Stipa lepidia</i>	foothill needlegrass	54	1		1.1	
<i>Stipa pulchra</i>	purple needlegrass	42	6		6.6	
Total Lbs. Per Acre			15.25		16.8	

3.2.3 Mulefat Scrub

The restoration strategy for mulefat scrub habitat on the Abalone Cove Reserve restoration site includes reintroducing regionally appropriate native mulefat scrub species. A small drainage within the restoration area has been selected as being compatible with mulefat scrub based on the vegetation that currently inhabits the channel and its apparent hydrology. The mulefat scrub restoration area within the Abalone Cove Reserve will contain the native

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species mulefat (*Baccharis salicifolia*), giant wildrye (*Elymus condensatus*), and blue elderberry (*Sambucus nigra*) as dominant species (Table 4).

Table 4
Proposed Mulefat Scrub Planting Palette (Approximately 0.2 Acre)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
Container Plants						
Artemisia dracunculus	Tarragon	D40	4	3	136	27
Baccharis pilularis	Coyote bush	D40	5	3	87	17
Baccharis salicifolia	Mulefat	1-gallon	6	3	605	121
Elymus condensatus	Giant wildrye	D40	5	3	174	35
Isocoma menziesii	Coast goldenbush	D40	5	3	87	17
Muhlenbergia rigens	Deergrass	D40	3	3	242	48
Sambucus nigra	Blue elderberry	1-gallon	8	1	102	20
Verbena lasiostachys	Western vervain	D40	3	3	242	48
Total Container Plants (per acre)					1,675	333
Seed Mix						
Botanical Name	Common Name	Pure Live Seed		Lbs. Per Acre		Total Lbs.
Ambrosia psilostachya	Western ragweed	8		2		0.4
Artemisia douglasiana	Mugwort	5		1		0.2
Eschscholzia californica var. maritima	California poppy	78		2		0.4
Isocoma menziesii	Coast goldenbush	80		1		0.2
Lupinus succulentus	Arroyo lupine	54		2		0.4
Stipa pulchra	Purple needlegrass	42		4		0.8
Total Lbs. Per Acre				12.0		2.4

3.3 Habitat to be Enhanced

The habitat enhancement program consists of site preparation (primarily non-native plant species removal), maintenance, monitoring, and potential native planting or seeding. The habitat enhancement area is currently dominated by a mix of native and non-native species. Although the enhancement area currently supports native species, including lemonadeberry (*Rhus integrifolia*) and coast brittlebush (*Encelia californica*), a number of non-native perennials, such as coastal wattle, phoenix palm, spiny holdback, Peruvian pepper, and Brazilian pepper are also common.

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Habitat enhancement generally includes control of non-native weed species and reliance on natural succession to fill the gaps left by removal. In the case of the enhancement area in Abalone Cove Reserve it is likely that most locations in the enhancement zone will improve naturally after initial removal of invasive species. However, in locations that a significant area is cleared, in-planting of native species may be necessary. The area north of the access road, nearest to Palos Verdes Drive South in particular may necessitate additional planting after removal activities occur.

The planting palette in Table 2 for coastal sage scrub habitat and Table 3 for cactus scrub provide options for installing supplemental plants in areas that require selective planting to fill in gaps created from invasive species removal. Note that Tables 2 and 3 do not account for the quantity of container plants that will be needed for the enhancement areas, as the acreage of invasive species removal is not known. However, the number of container plants is expected to be relatively low compared to the restoration areas. Selective in-planting shall mimic the natural distribution and vegetation mosaic of adjacent native habitats.

3.4 Revegetation Materials

Plant materials for the restoration planting areas will include container stock and seed of coastal scrub species, as indicated in the plant palettes provided in Tables 2–4. As much as feasible, the container plant materials will be grown from native seed collected on the Palos Verdes Peninsula. The plant nursery will grow the plants primarily in D40 Deepots, with some smaller and larger sizes depending on the species (as indicated in Tables 2–4). Additionally, for the seed mixes, PVPLC will coordinate collection of available seed from the peninsula for application at the restoration site. If some species cannot be grown as container stock at the nursery, or local seed is not available for collection, the planting palettes may be adjusted, or another source may be used for acquiring locally sourced plant materials.

DriWater may also be used to aid plant establishment. DriWater is a time released natural cellulose gum gel that retains moisture which is slowly released into the soil when the gel is broken down by naturally occurring enzymes. The moisture released from the DriWater gel becomes available for uptake by developing plant roots. DriWater can be applied in cardboard cartons or in plastic tubes with gel packs. DriWater can be costly to utilize on large scale restoration projects, and therefore would only be used in special cases where supplemental watering was insufficient to promote plant establishment. DriWater may be most useful within the enhancement area if supplemental watering is infeasible.

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3.5 Target Functions and Values

The primary functional goal of the restored coastal sage scrub, cactus scrub, and mulefat scrub and the enhanced mixed coastal scrub is to restore vegetation that contains a diversity of native coastal scrub plant species and that provides habitat value for sensitive wildlife species, particularly for coastal California gnatcatcher and cactus wren. Additionally, a secondary consideration is to create contiguous and intact habitat which resists the re-establishment of invasive plant species.

3.6 Time Lapse

The length of time necessary to develop high quality habitat depends on a variety of factors including weather, soil conditions, herbivory protection, weed competition, and maintenance quality. Under optimal conditions, coastal sage scrub, cactus scrub, and mulefat scrub may take approximately three from the installation of container plants and application of seed to develop the appropriate structure to provide the functions and values needed for habitation of wildlife, including suitable nesting habitat for California gnatcatcher and other scrub species. In an unirrigated setting, and with drought conditions, scrub development may take longer than three years to mature enough to be suitable for nesting. As a hedge against drought, the addition of supplemental watering would increase plant survival, improve establishment, and hasten habitat development. This plan allows for five years of maintenance and monitoring to establish the target habitats.

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4 IMPLEMENTATION PLAN

4.1 Rationale for Expecting Success

The identified locations for restoration on the Abalone Cove Reserve are directly adjacent to viable and self-sustaining target habitats, indicating appropriate environmental conditions to support the intended habitats. This HRP includes a provision for supplemental watering to promote establishment and survival of native species included in the plant palette. The HRP also includes a 5-year maintenance plan, wherein invasive non-native weeds within the restoration site will be controlled to aid native plant establishment. Additionally, native plant materials will be grown or collected from sources on the Palos Verdes Peninsula, thus preserving genetic integrity and increasing the potential for long-term success.

4.2 Preliminary Schedule

Appropriate timing of planting and seeding will minimize the need for supplemental watering and will increase the survival rate of the installed plants. The best survival rates are achieved when container plants and seed are installed at the onset of the rainy season or soon thereafter (November through February). Planting and seeding at the site should be timed to take advantage of seasonal rainfall patterns and most appropriate growing season temperatures (see Charts 1–2 and Table 5).

Table 5
Preliminary Restoration Project Schedule

Task	Date
Site clearing	Fall prior to first year
Invasive weed species control and grow-kill cycles	Winter and Spring of first year
Installation of supplemental watering system	Summer of first year
Planting container stock	Fall and Early Winter of second year
Seed application	Fall and Early Winter of third year
Monitoring and maintenance	To begin upon successful installation of container plants

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Chart 1
Average Monthly Precipitation for the Portuguese Bend Nature Preserve

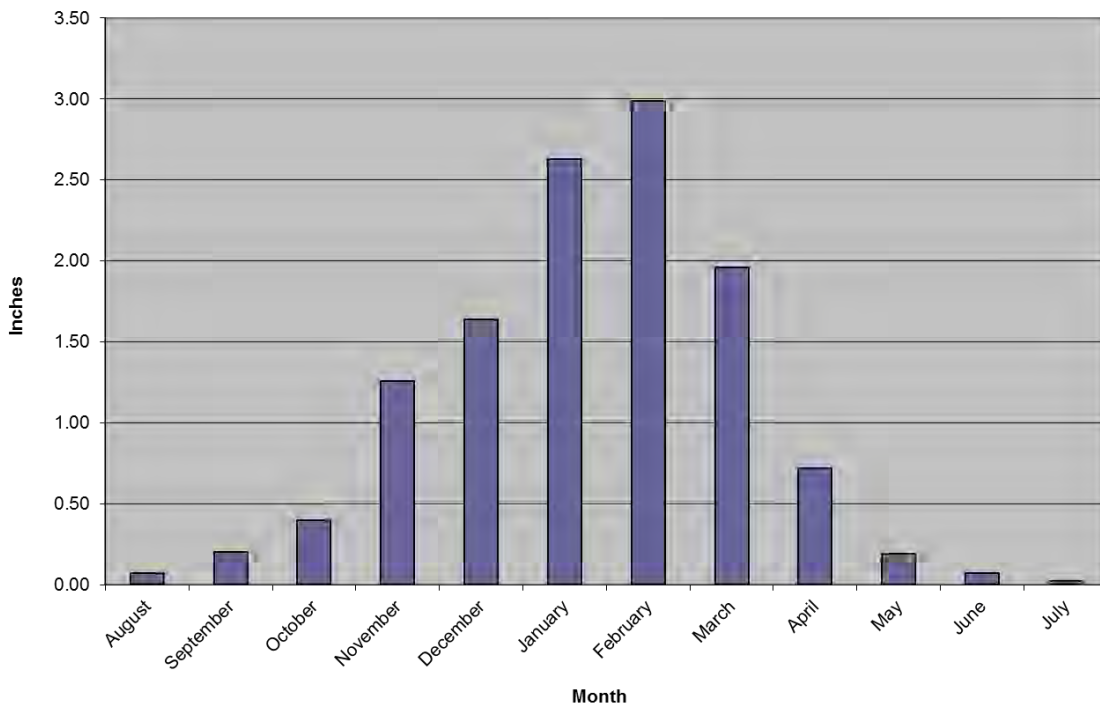
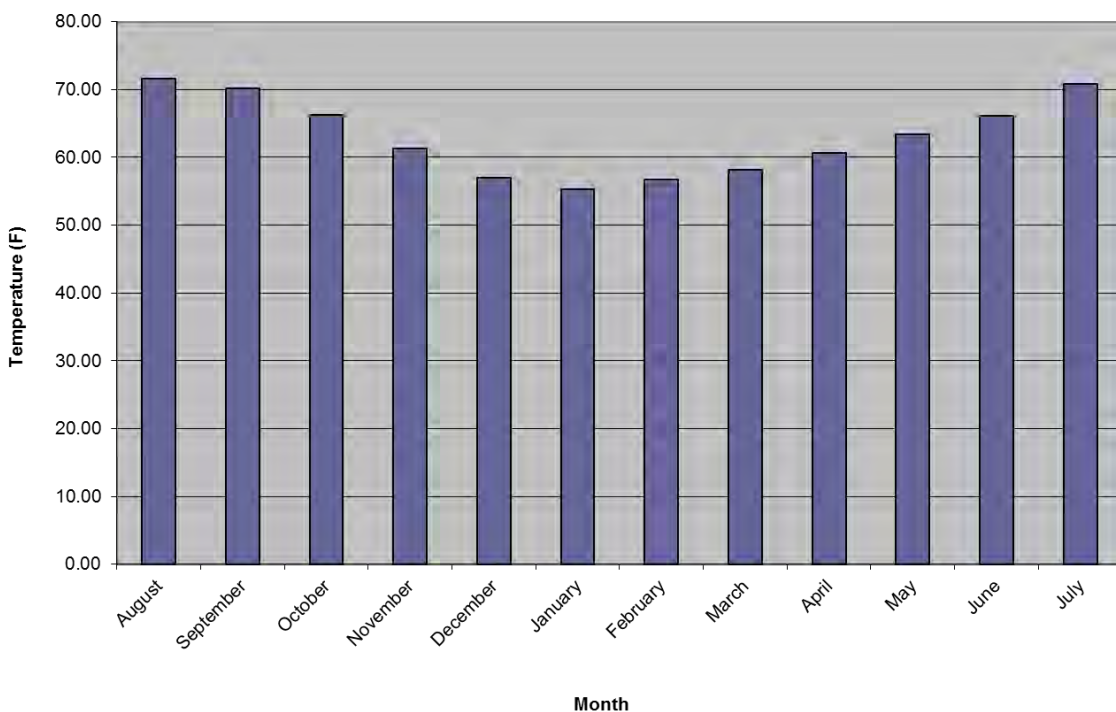


Chart 2
Average Monthly Temperatures for the Portuguese Bend Nature Preserve



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4.2.1 Site Preparation

Site preparation includes control of invasive weed species and soil preparation in the restoration areas. If clearing of weeds is planned to be performed during the migratory bird nesting season (February 15–September 15), a nesting bird survey should be conducted by a qualified wildlife biologist within 72 hours prior to vegetation removal in accordance with the Migratory Bird Treaty Act (16 U.S.G. 703-712).

During site preparation, all invasive weed species, particularly non-native annual grasses, black mustard, and fennel, should be killed and removed from the restoration areas. Invasive species control should also include exotic trees and shrubs such as spiny holdback, Peruvian pepper, Brazilian pepper, coastal wattle, pine trees, and palms, as directed by PVPLC staff.

The initial weed control effort will involve a combination of chemical and mechanical treatment. Prior to the installation of native plant materials, “grow and kill” weed removal treatments should be conducted by allowing non-native seedling emergence in the winter and spring. When weeds have begun to grow, and before they begin to develop flowers or flowering structures, a foliar application of an appropriate systemic herbicide should be applied to kill target weeds. If adequate rainfall occurs during this period, multiple grow-kill cycles should be repeated. The restoration ecologist will provide weed control recommendations to the restoration maintenance staff that are specific to the target weed species identified for control. Any use of herbicides shall be in accordance with label instructions, following the recommendations of a licensed Pest Control Advisor, and any application shall be applied under the direction of a state-certified Qualified Applicator.

4.2.2 Supplemental Watering System

The planned method of providing supplemental watering at the proposed restoration area is with a temporary above-ground drip irrigation system. This will help ensure that native container plants and seed installed on site will become adequately established. The supplemental watering system would only be used until the plants are established such that they can survive on their own between periods of rainfall. It is expected that, depending upon the level of plant establishment, the watering system would be removed after two to three years of use. Watering on site will gradually be decreased prior to the removal of the system so the plants can become acclimated to the site’s natural conditions.

The habitat enhancement area may prove infeasible for installation of a temporary watering system. Areas that require planting within the enhancement area will be considered for supplemental watering from a water truck or the use of alternative methods such as DriWater.

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There is a fire hydrant located immediately north of the proposed restoration site along Palos Verdes Drive South that may function as a point of connection for a temporary irrigation system (Figure 5). The irrigation system should be designed by a landscape architect to ensure that the system has adequate water pressure to supply water to all areas of the proposed restoration site. The supplemental watering system would be installed as an above-ground system, so that irrigation equipment may be removed once the system has been decommissioned.

4.2.3 Erosion Control

Where needed, erosion control measures, such as the installation of sandbags, fiber rolls, silt fencing, and/or erosion-control matting may be necessary to control erosion until target vegetation is established. At a minimum, silt fencing should be installed at the toe of slopes that are unvegetated after removing non-native species. Additionally, erosion control materials may be needed at the edge of the coastal bluff, particularly in the locations where surface runoff coalesces and runs off the bluff. No erosion control materials should be used that contain seed from non-native plants. The need and location of erosion control will be determined in the field by the project's restoration ecologist.

4.2.4 Plant Installation

Standard planting procedures will be employed for installing container stock. Planting holes shall be approximately twice the width of the rootball, and as deep. If dry soil conditions exist at the time of plant installation, planting holes will be filled with water and allowed to drain immediately prior to planting. A fertilizer packet with controlled-release fertilizer (e.g., Best Paks 20-10-5) will be placed in the bottom of each hole prior to planting.

4.2.5 Seed Application

Seed will be hand broadcast throughout the restoration site. The seed mix is primarily a supplemental feature to increase diversity and will not occur until the second year of the Restoration Program. The seeding sites should be prepared by removing weedy vegetation to expose the soil surface. The seed should be raked into the soil so there is good seed-soil contact. Seeding should be timed to occur prior to or early in the rainy season.



SOURCE: Palos Verdes Peninsula Land Conservancy, 2014; Bing Maps, 2015

FIGURE 5
Abalone Cove Restoration Area

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5 MAINTENANCE PLAN

The purpose of the maintenance plan is to provide guidelines for long-term maintenance of the restoration site during the establishment period. Maintenance activities will be initiated during the weed reduction period (i.e., grow-kill cycles), and will occur at the direction of the project's restoration ecologist on an as-needed basis. The maintenance period will intensify after the installation of the container plants. Maintenance will be necessary until the habitats are fully established, which is estimated to take approximately five years.

Because the goal of this project is to establish a natural system that can support itself with little or no maintenance, the primary focus of the maintenance plan is concentrated in the first few seasons of plant growth following the revegetation effort, when weeds can easily out-compete native plants. The intensity of the maintenance activity is expected to subside each year as the native plants become established, and local competition from non-native plants for resources is minimized through direct removal and treatment of non-native plants.

5.1 Maintenance Activities

Maintenance activities will be primarily related to non-native invasive plant species control. Supplemental watering, supplemental planting, trash removal, and erosion control will also be conducted, as necessary.

- Non-native plant species should be controlled as soon as they begin to establish. Recommended control methods should be tailored to each specific weed species and should include the most effective control measures for the species and time of year. Control methods may include a combination of manual, mechanical, and chemical control.
- Container plants should be watered when natural rainfall is not adequate to sustain the establishing plants. The project's restoration ecologist will be responsible for scheduling the supplemental watering to promote plant establishment. Supplemental watering should be conducted as deep, soaking watering to promote deep rooting.
- Generally, the site will not be fertilized during the maintenance period unless determined necessary by the project's restoration ecologist as a remedial measure to correct soil nutrient deficiencies.
- Deadwood and leaf litter of native vegetation should not be removed. Deadwood and leaf litter provide valuable microhabitats for invertebrates, reptiles, small mammals, and birds. Non-organic trash and debris should be removed from the revegetation areas on a regular basis.

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- Erosion control materials should be maintained in working order until they are deemed no longer necessary by the project's restoration ecologist. Maintenance of erosion control materials may include repairing or replacing dilapidated, damaged, or ineffective materials.

5.2 General Habitat Maintenance Guidelines

5.2.1 Weed Control

Weeds are expected to be the primary pest problem in the restoration area during the first several years of the maintenance period. Weeds should be controlled so they do not prevent the establishment of the native species or invade adjacent areas. A combination of physical removal, mechanical treatments (weed whipping) and appropriate herbicide treatments should be used to control the non-native/invasive plant species. Weeds should be controlled prior to setting seed, and should be removed from the site if they become large enough to block sunlight to developing native plants.

Re-establishment of non-native plants onto the site can be adequately minimized by regular and timely maintenance visits with implementation of effective weed control measures. Weed control will require constant diligence by the maintenance personnel. Invasive plant species, such as those listed in Table 1 should be controlled wherever possible within the restoration area. Mature invasive tree species will be retained at the discretion of the PVPLC though the majority of individuals should be removed to reduce the spread of weed propagules.

Removal of weeds by hand where practicable and effective is the most desirable method of control and should be done around individual plantings and native seedlings to avoid inadvertent damage to the native species. However, several of the invasive species may be more effectively controlled with herbicide due to their tenacious and spreading root systems, their size, or their ability to re-sprout from root fragments. All herbicides shall be used in accordance with label instructions, following the recommendations of a licensed Pest Control Advisor, and any application shall be applied under the direction of a state-certified Qualified Applicator. The project's restoration ecologist should monitor control efforts to ensure that the target weed species are being adequately addressed without impacting the native plants.

The non-native Bagrada bug (*Bagrada hilaris*) has been documented on the Palos Verdes Peninsula, and is known to cause substantial damage to plant species from the mustard family (*Brassicaceae*) (County of Los Angeles 2013; University of California, Riverside 2013). As black mustard is one of the predominant species within the proposed coastal sage scrub restoration area, the Bagrada bug may occur; however, it is expected that the damage

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caused by this insect would be to non-native mustard species, and not native plants. Despite this, if the species becomes problematic as a pest species on the native plants, then the restoration ecologist will evaluate whether or not control measures are necessary. Similarly, if other deleterious pests (e.g., beetles on bladderpod) become problematic enough to cause container plant mortality, the restoration ecologist may recommend measures to minimize pests and promote healthy plant establishment.

5.2.2 Supplemental Watering System

Supplemental watering will be provided for two to three years after planting to help the container plants become established. Supplemental watering will be provided through a drip irrigation system. Supplemental watering would likely be necessary every 3–4 weeks during the dry season, and more frequently immediately after installation if natural rainfall does not provide adequate moisture. If a temporary, on-grade supplemental watering system is installed in the restoration area as described in Section 4.4, it would need to be maintained and repaired as necessary.

The watering system shall be checked regularly to ensure proper operation and adequate coverage of the restoration areas. Problems with the watering system shall be repaired immediately to reduce potential plant mortality or erosion. The frequency and duration of irrigation applications shall be adjusted seasonally in coordination with the project's restoration ecologist to meet habitat needs.

Supplemental watering will be terminated when deemed appropriate by the project's restoration ecologist. All above-ground components of the watering system should be removed from the site at the successful completion of the project. The timing for cessation and removal of the irrigation system shall be determined by the project's restoration ecologist.

5.2.3 Clearing and Trash Removal

Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed into, or left within the restoration area. Pruning or clearing of native vegetation is not anticipated to be necessary within the restoration area, unless extensive growth is causing a maintenance problem for a utility or for an area outside of the restoration area. Any pruning or clearing of native vegetation should be approved by the project's restoration ecologist. Deadwood and leaf litter of native vegetation will be left in place to replenish soil nutrients and organic matter.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

5.3 Schedule of Maintenance Inspections

The project's restoration ecologist will perform quarterly maintenance/monitoring inspections during the scheduled maintenance and monitoring period. Recommendations for maintenance efforts will be based upon these site observation visits. Weed control shall be conducted as needed to ensure adequate control to promote healthy establishment of the target habitat types. It is anticipated that weed control will be necessary on a monthly basis during the winter and early spring when weeds are vigorously growing. Weed control during other times of the year will likely be diminished, but conducted as necessary, and as directed by the project's restoration ecologist.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

6 MONITORING PLAN

Monitoring of the restoration site has a two-fold purpose: **(1)** To monitor the progress of the Abalone Cove Reserve restoration areas by assessing native habitat establishment relative to the established performance standards; and **(2)** To direct and monitor the maintenance activities and determine remedial actions in a manner that ensures that appropriate maintenance occurs in a timely manner. The monitoring will be performed by the project's restoration ecologist.

The project's restoration ecologist will be responsible for monitoring activities of all the work crews during preparation of the restoration area including site clearing and soil preparation, weed control, container plant and seed application, and quarterly monitoring for the duration of the 5-year maintenance and monitoring period.

Reports will be prepared annually for the restoration areas after installation is complete. Each report will include qualitative data, photo documentation, and future recommendations for site maintenance as described below.

6.1 Performance Standards

Performance standards have been established for the habitat restoration area based on the guidelines in the draft NCCP and on expected vegetative development relative to undisturbed habitat of the same type (Table 6). The following performance standards apply to the Abalone Cove restoration site:

1. Soil at the site is stable and shows no significant erosion.
2. After five years, non-native plant cover is less than 25% with less than 15% cover of invasive perennial species. After five years, there will be no presence of species on Cal-IPC List A with the possible exception of Cal-IPC List A non-native annual grasses.
3. Native plant cover after three years in the CSS community should be greater than 40% with at least 30% cover from perennial species. At five years, total native cover should be greater than 50% with appropriate species diversity.
4. Native plant cover after three years in the cactus scrub community should be greater than 30% with at least 20% cover from perennial species and 5% cover from cactus species. Native plant cover after five years in the cactus scrub community should be greater than 40% with at least 10% cover from cactus.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

Table 6
Performance Standards

Year	Percent Cover of Native Species (%) [*]			Non-native Cover (for all habitat types)	
	<i>Coastal Sage Scrub</i>	<i>Cactus Scrub</i>	<i>Mulefat Scrub</i>	<i>Invasive Perennial Species Cover</i>	<i>Total Non-native Species Cover</i>
Year 3	>40% (>30% perennial)	>30% (>20% perennial and >5% cacti)	>40%	<15% (0% of Cal-IPC List A) [*]	<25%
Year 5	>50%	>40% (>10% cacti)	>50%	<15% (0% of Cal-IPC List A) [*]	<25%

^{*} The NCCP success criteria allow an exception to the requirement for 0% Cal-IPC List A for non-native annual grasses. In other words, Cal-IPC List A grass species would not count toward the 0% criteria, but would count toward the 25% criteria for total non-native species cover.

The Year 3 performance standards will be utilized to assess the annual progress of the restoration area, and are regarded as interim project objectives designed to reach the final Year 5 goals. Fulfillment of these standards will indicate that the restoration area on the project site is progressing toward the habitat type and functions that constitute the long-term goals of the plan. If the restoration efforts fail to meet the performance standards in any year, the project's restoration ecologist may recommend remedial action to be implemented the following year with the intent to enhance the vegetation to a level of conformance with the original standard. These remedial actions may include re-seeding, re-planting, applying soil amendments, additional weed control measures, erosion control, or adjustments to the watering and maintenance practices.

6.2 Monitoring Methods and Schedule

Annual qualitative assessments will be conducted through visual analysis of the restoration area to assess vegetation development, weed presence, and plant establishment. Qualitative monitoring will include reviewing the health and vigor of container plants and seed germination/establishment, assessing survival/mortality, checking for the presence of pests and disease, soil moisture content, and the effectiveness of the supplemental watering, erosion problems, invasion of weeds, and the occurrence of trash and/or vandalism. Representative photographs of the restoration site from stationary photo points will be taken annually.

Permanent vegetation sampling sites will be established within the coastal sage scrub and cactus scrub restoration areas at randomized representative locations. A minimum of one transect will be established for each two acres of restoration area, and at least one transect for each habitat type. The mulefat scrub area is too small to establish quantitative sampling sites and will be evaluated with visual estimates of cover. Transect data will be collected in Years 3 and 5 from the restoration sites in the spring and will be used to determine compliance and achievement of

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

the restoration performance standards. Transect data will be collected using the point-intercept method to determine percent target vegetation cover and weed cover. If the restoration project is in compliance with the Year 5 performance standards in an earlier monitoring period, then qualitative assessments may be substituted for the quantitative monitoring until the end of the 5-year restoration program. If the restoration site is performing below the interim performance standards, the project's restoration ecologist will determine if remedial measures are necessary.

Each monitoring visit will be followed by a summary of observations, recommendations, and conclusions. Results from the annual monitoring will be used to evaluate the progress of each habitat toward the ultimate goals of the project, and to recommend appropriate management actions.

6.3 Monitoring Reports

The designated restoration ecologist will monitor and report on the restoration work underway in the Abalone Cove Reserve. The restoration area will be monitored for five years, with reports prepared in Years 1-3 and Year 5. Monitoring reports should provide concise, meaningful summaries of the restoration progress and provide direction and maintenance recommendations for future work.

Annual reports will include the following:

1. A description of the restoration and maintenance activities (e.g., seeding, irrigation, weed control, trash removal) conducted on the site during the previous year including the dates the activities were conducted.
2. A description of existing conditions within the restoration site, including descriptions of vegetation composition, weed species, and erosion problems, if any.
3. Qualitative and quantitative monitoring data related to proposed target goals including a comparative analysis of data over the years the project has been monitored.
4. Recommendations for remedial measures to correct problems or deficiencies, if any.
5. Representative photographs of notable observations on site and from fixed photo viewpoints.

6.4 Project Conclusion

At the end of the 5-year monitoring period, a final report will be prepared by the restoration ecologist for submittal to PVPLC. The final report will summarize the project relative to project goals. Upon completion, the site will be managed along with other reserve lands in the Palos Verdes Nature Preserve by the PVPLC.

Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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Habitat Restoration Plan for the Abalone Cove Reserve in the Palos Verdes Nature Preserve

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APPENDIX A

Soil Test Results

WALLACE LABS		SOILS REPORT		Print Date	July 17, 2015	Receive Date	7/16/15
365 Coral Circle		Location		Palos Verdes Peninsula, Job No. 9085			
El Segundo, CA 90245		Requester		Andy Thomson and Jake Marcon, Dudek			
(310) 615-0116		graphic interpretation: *		very low, ** low, *** moderate			
ammonium bicarbonate/DTPA		**** high, ***** very high					
extractable - mg/kg soil		Sample ID Number	15-198-07	15-198-08		15-198-09	
Interpretation of data		Sample Description	AC #1	AC #2		AC #3	
low medium high		elements	graphic	graphic		graphic	
0 - 7 8-15 over 15		phosphorus	10.35 ***	10.25 ***		9.20 ***	
0-60 60 -120 121-180		potassium	522.13 *****	318.32 *****		247.26 *****	
0 - 4 4 - 10 over 10		iron	1.38 *	1.45 *		1.38 *	
0- 0.5 0.6- 1 over 1		manganese	2.01 *****	2.01 *****		1.61 *****	
0 - 1 1 - 1.5 over 1.5		zinc	2.45 *****	2.40 *****		11.62 *****	
0- 0.2 0.3- 0.5 over 0.5		copper	6.19 *****	5.50 *****		6.36 *****	
0- 0.2 0.2- 0.5 over 1		boron	0.18 **	0.23 ***		0.17 **	
		calcium	322.10 ***	316.50 ***		326.12 ***	
		magnesium	259.18 *****	304.98 *****		347.17 *****	
		sodium	197.35 ***	212.89 *****		155.06 ***	
		sulfur	20.84 *	20.50 *		27.78 **	
		molybdenum	0.08 ***	0.01 **		0.10 *****	
		nickel	2.51 **	1.85 **		1.74 **	
The following trace		aluminum	n d *	n d *		n d *	
elements may be toxic		arsenic	0.07 *	0.01 *		0.03 *	
The degree of toxicity		barium	2.41 *	1.81 *		2.97 *	
depends upon the pH of		cadmium	1.46 **	0.99 *		1.00 *	
the soil, soil texture,		chromium	n d *	n d *		n d *	
organic matter, and the		cobalt	0.06 *	0.04 *		n d *	
concentrations of the		lead	2.51 **	2.10 **		4.20 **	
individual elements as		lithium	0.40 *	0.40 *		0.43 *	
well as to their interactions.		mercury	n d *	n d *		n d *	
The pH optimum depends		selenium	n d *	n d *		n d *	
upon soil organic		silver	n d *	n d *		n d *	
matter and clay content-		strontium	0.61 *	0.68 *		0.75 *	
for clay and loam soils:		tin	n d *	n d *		n d *	
under 5.2 is too acidic		vanadium	1.28 **	1.20 **		1.38 **	
6.5 to 7 is ideal		Saturation Extract					
over 8.0 is too alkaline		pH value	7.69 *****	7.76 *****		7.68 *****	
The ECe is a measure of		ECe (milli-	0.72 **	0.45 **		0.44 **	
the soil salinity:		mho/cm)					
1-2 affects a few plants		calcium	61.1	3.1	38.8	1.9	41.3
2-4 affects some plants,		magnesium	14.3	1.2	8.7	0.7	9.7
> 4 affects many plants.		sodium	43.6	1.9	32.9	1.4	26.5
		potassium	11.4	0.3	2.3	0.1	2.5
		cation sum	6.4		4.2		4.1
problems over 150 ppm		chloride	128	3.6	48	1.3	49
good 20 - 30 ppm		nitrate as N	12	0.9	7	0.5	5
		phosphorus as P	0.2	0.0	0.3	0.0	0.1
toxic over 800		sulfate as S	7.6	0.5	8.5	0.5	11.3
		anion sum	5.0		2.4		2.4
toxic over 1 for many plants		boron as B	0.28 **	0.16 *		0.22 **	
increasing problems start at 3		SAR	1.3 *	1.2 *		1.0 *	
est. gypsum requirement-lbs./1000 sq. ft.			37	54		58	
relative infiltration rate		slow/fair	sand - 19.6%	slow		sand - 18.0%	slow
soil texture		clay	silt - 34.3%	clay		silt - 33.1%	clay
lime (calcium carbonate)		slight	clay - 46.1%	low		clay - 48.9%	slight
organic matter		fair		fair			fair
moisture content of soil		14.5%	gravel over 2 mm	15.2%		gravel over 2 mm	15.4%
half saturation percentage		41.3%	8.8%	40.8%		8.4%	46.3%
							8.9%

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.
Sand, silt, clay and mineral content based on fraction passing a 2 mm screen.

HABITAT RESTORATION PLAN
for the
Abalone Cove Reserve
Phase 4
in the
Palos Verdes Nature Preserve

Palos Verdes Peninsula Land Conservancy

916 Silver Spur Road, Suite 207

Rolling Hills Estates, California 90274

Contact: Cris Sarabia

August 2021

Introduction

This Habitat Restoration Plan (Plan) was prepared for Phase 4 of the Abalone Cove Reserve NCCP habitat restoration project. The Abalone Cove Reserve is located within the Palos Verdes Nature Preserve (PVNP) which is located within the City of Rancho Palos Verdes. This habitat restoration plan describes how the Land Conservancy will implement two (2) acres of coastal sage scrub and three (3) acres of mixed Southern Coastal Bluff Scrub/Southern Cactus Scrub, and includes details regarding planting palette recommendations, project location, project schedule, and conceptual irrigation plan. This Plan supplements the components of the Abalone Cove Habitat Restoration Plan (Dudek), and remains consistent with those specifications including invasive plant management, maintenance, monitoring protocols and success criteria, etc.

Existing Conditions

Current plant communities in the project vicinity according to vegetation mapping in 2010 consists of Southern Coastal Bluff Scrub, Grassland and CSS undifferentiated. The Southern Coastal Bluff Scrub, Grassland and CSS Undifferentiated have native and non-native plant components. As part of this restoration plan, non-native species will be removed and naturally occurring native plants will be left in place. Current site conditions can be seen in Figure 1.



Figure 1 Site Photographs

Restoration Program

This restoration plan outlines the restoration and enhancement of 2 acres of coastal sage scrub and 3 acres of mixed Southern Coastal Bluff Scrub/Southern Cactus Scrub. Following the previously created restoration plan for Abalone Cove Phases 1 through 3, Phase 4 will continue with the same restoration and implementation program as well as monitoring and maintenance schedule and protocols.

Habitats to be Established or Enhanced

The two habitats to be established are Coastal Sage Scrub and Southern Coastal Bluff Scrub/Southern Cactus Scrub Mix (Figure 2 and Tables 1 and 2)



Figure 2 Abalone Cove Phase 4 Restoration Area

Table 1

Proposed Coastal Sage Scrub Planting Pallette (2 acres)						
Botanical Name	Common Name	Container Size	Spacing(on center)	Group Size	Quantity (per acre)	Total Plants
Artemisia californica	California sagebrush	1 gal	5	5	348	696
Astragalus trichopodus var. lonchus	Ocean locoweed	1 gal	3	7	184	368
Baccharis pilularis	Coyote brush	1 gal	5	3	87	174
Brickellia californica	California bricklebrush	1 gal	5	3	87	174
Corethrogyne filaginifolia	Common sandaster	D-40	3	3	24	48
Cylindropuntia prolifera	Coastal cholla	1 gal	4	5	27	54
Dudleya virens	Bright green dudleya	1 gal	3	3	24	48
Elymus condensatus	Giant wildrye	D-40	6	3	24	48
Encelia californica	California Bush Sunflower	D-40	5	5	261	522
Eriogonum cinereum	Ashy-leaf Buckwheat	1 gal	5	5	87	174
Eriogonum parvifolium	Seacliff buckwheat	1 gal	5	5	87	174
Eriophyllum confertiflorum	Golden Yarrow	D-40	3	5	145	290
Isocoma menziesii	Coast goldenbush	D-40	3	3	87	174
Mirabilis laevis var. crassifolia	Wishbone Bush	1 gal	3	5	54	108
Opuntia littoralis/oricola	Chaparral pricklypear	1 gal	3	3	24	48
Opuntia littoralis/oricola	Chaparral pricklypear	5 gal	5	3	24	48
Opuntia littoralis/oricola	Chaparral pricklypear	15 gal	10	5	5	10
Peritoma arborea	Bladderpod	D-40	5	5	35	70
Rhus integrifolia	Lemonadeberry	D-40	10	1	2	4
Salvia leucophylla	Purple sage	1 gal	5	5	87	174
Salvia mellifera	Black sage	1 gal	3	3	87	174
Stipa cernua	Nodding Needlegrass	D-40	2	3	35	70
Stipa lepida	Foothill Needlegrass	D-40	2	3	35	70
Stipa pulchra	Purple Needlegrass	D-40	2	3	35	70
				Total	1790	3790

Table 2

Proposed Southern Coastal Bluff Scrub/Southern Cactus Scrub Planting Palette (3 acres)						
Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total Plants
Aphanisma blitoides	Aphanisma	as available	3	3	35	105
Atriplex pacifica	South Coast saltscale	as available	3	3	23	69
Cylindropuntia prolifera	Coastal Cholla	1 gal	5	5	122	366
Cylindropuntia prolifera	Coastal Cholla	5 gal	5	3	45	135
Cylindropuntia prolifera	coastal Cholla	15 gal	10	3	12	36
Dudleya virens	Bright Green Dudleya	1 gal	4	3	34	102
Eriogonum parvifolium	Seacliff Buckwheat	D40/4"	5	3	87	261
Lycium brevipes	Baja Desert Thorn	1 gal	10	3	23	69
Lycium californica	California Boxthorn	1 gal	7	3	34	102
Mirabilis laevis var. crassifolia	Desert Wishbone-bush	1 gal	5	3	54	162
Opuntia littoralis	Coastal Pricklypear	1 gal	5	5	157	471
Opuntia littoralis	Coastal Pricklypear	5 gal	5	3	70	210
Opuntia littoralis	Coastal Pricklypear	15 gal	10	3	12	36
Opuntia oricola	Chaparral pricklypear	1 gal	3	3	157	471
Opuntia oricola	Chaparral pricklypear	5 gal	5	3	70	210
Opuntia oricola	Chaparral pricklypear	15 gal	10	3	12	36
Peritoma arborea	Bladderpod	D40/4"	4	3	35	105
Rhus integrifolia	Lemonadeberry	D40/4"	15	1	5	15
Suaeda taxifolia	Wooly Seablite	As available	4	3	34	102
				Total	1021	3063

Irrigation Plan

A temporary irrigation system will be installed to provide supplemental watering when natural precipitation rates are inadequate for plant establishment. The temporary, above ground watering system will have a point of connection at the current restoration site and its watering system. The irrigation will be placed above ground for easy removal when plants have been determined to be established and the project is deemed complete. Pipes will be buried at all trail crossings at the appropriate depth as directed by the project manager. The conceptual routed for the main line is shown in Figure 3.



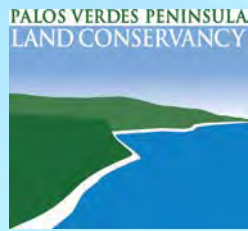
Figure 3 Abalone Cove Phase 4 Restoration Area Conceptual Irrigation mainlines

Table 3

Preliminary Restoration Project Schedule		
Task	Date	
Site clearing	Fall Prior to first year	October 2021
Invasive weed species control and grow-kill cycles	Winter and Spring of first year	October 2021-October 2022
Installation of supplemental watering system	Summer of first year	July 2022
Planting of container stock	Fall and early winter of second year	November 2022
Seed Application	Fall and early winter of 3rd year	November 2022 or before large rain event
Monitoring and Maintenance	To begin upon successful installation of container plants	Five years after planting

SECTION 4

PREDATOR CONTROL PLAN



PREDATOR CONTROL PLAN

Prepared By
Austin Parker

**PALOS VERDES PENINSULA
LAND CONSERVANCY**

November 2021



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4.1 INTRODUCTION

This 2021 Predator Control Plan (PCP) for the Palos Verdes Peninsula Land Conservancy outlines appropriate provisions and measures to adequately comply with the Preserve Management requirements of the NCCP/HCP. The Draft NCCP/HCP requires a Predator Control Plan to be drafted and revised every three years after the results from the comprehensive surveys. This PCP has been written based on the results of regular monitoring taking place from 2019 through 2021, and recommends specific actions to be taken to reduce predation of covered species within the Palos Verdes Nature Preserve for the following three years.

This PCP provides the framework for the pet/feral animal education program and the native predator education program, and establishes the need for monitoring for feral or domestic animals, native large predators, and mesopredators.

4.2 NON-NATIVE ANIMAL SPECIES MANAGEMENT PLANS

Native species are often at a disadvantage after invasive predators are introduced, so special management measures may be needed to control these invading species. Non-native animal species have few natural predators or other ecological controls on their population sizes, and they thrive under conditions created by humans. These species may aggressively out-compete native species or otherwise harm sensitive species. When top predators are absent, intermediate predators can multiply and increase predation on native wildlife species and their nests. Feral and domestic animals, particularly cats, also prey on small native wildlife species. Stables may provide resources for increased populations of parasitic cowbirds, which adversely affect native songbird breeding populations.

4.3 FERAL AND DOMESTIC ANIMALS

Monitoring

Through its Stewardship Program, the Conservancy and associated volunteers conducts regular walks of all properties under management to monitor all resources, including feral and domestic animals, native large predators and mesopredators. These regular visits are conducted through various programs including the Volunteer Trail Watch (VTW) and the Wildlife Tracking community science program, as well as regular staff field visits to the preserve.

Feral cats are defined as cats that have reverted to a wild state and avoid human beings. The conditions of domestication, including contact with human beings, must be duplicated in each generation for domestic behavior to occur. Observations of a feral or domestic animal are recorded by VTW members year-round, by Wildlife Tracking Program volunteers from November to March, and by Cactus Wren volunteer monitors from March to July. Regular monitoring allows the Conservancy to document evidence of predators and become more

informed about which areas have the highest occurrences of feral and/or domestic animal use. Areas determined to be the highest in use may be targeted for specific control measures and education opportunities.

The Conservancy monitors areas in the PVNP that are in proximity to houses, parks and other developed areas. It is recommended that edge effects be monitored over the long term to determine if they become problematic and if so, to document where the problems are occurring.

Pet/Feral Animal Education Program

The Conservancy may establish an education program for homeowners regarding responsible pet ownership if deemed necessary. The program could consist of information distributed via the Conservancy's webpage, signage on the Preserve, informational handouts, and information disseminated during monthly public nature walks and through local cities. This program will encourage:

1. Keeping pets indoors, especially at night;
2. Having pets neutered or spayed to reduce unwanted reproduction and long-range wanderings;
3. Belling of cats to reduce their effectiveness as predators;
4. Keeping dogs on leashes when walking them on trails in Preserves;
5. Discouraging release of unwanted pets into the wild;
6. Prohibiting the feeding of feral animals.

Feral Animal Control Program

Few feral animals have been observed in the Preserve over the last three years. Some cats have been seen near the Rancho Palos Verdes City Hall in the easternmost parking area due to a resident leaving out cat food, although this activity has since stopped. There also is a small colony of feral cats near the beaches of the Ocean Trails Reserve.

The Conservancy will continue to monitor throughout the Preserve, and if a significant impact is determined, staff will consult with the agencies about actions to be taken. A feral animal removal program could be established. This program could consist of trapping and removal at regular intervals throughout the year. It would be based on the latest scientific data to ensure its success. At this time, it is not recommended that a feral animal removal program be conducted.

4.4 COWBIRD MONITORING AND TRAPPING PROGRAM

Observations of cowbird presence and numbers within the Preserve will be provided every three years during the gnatcatcher and cactus wren surveys. Additionally, all incidental sightings will be

reported in the annual reports. No cowbirds were observed during gnatcatcher and cactus wren surveys conducted in 2021, and no incidental cowbird sightings occurred.

If there are incidental observations of cowbird parasitism on a gnatcatcher nest, consultation with Wildlife Agencies and experts will occur to determine if cowbirds are a likely cause of gnatcatcher population decline. If cowbirds are determined a threat to gnatcatcher populations, a cowbird trapping program may be initiated. At this time, there is no recommendation from the Conservancy to initiate a cowbird trapping program.

4.5 NATIVE LARGE PREDATORS

Monitoring

The Conservancy's VTW program and Wildlife Tracking community science program offer a mechanism to monitor the presence and location of large native predators in the Preserve. A monitoring program using wildlife cameras, as well as track and scat analysis has been in place since 2007. Results of the 2019-2021 surveys indicate that wild canid (coyote and fox) observations have modestly declined across previously surveyed reserves. Detailed results can be found in the Wildlife tracking section, (Appendix E) of the 2021 annual report.

Coopers hawks have been known to predate on smaller birds such as cactus wrens. It has been hypothesized that Coopers hawks may be impacting cactus wren populations on the peninsula. PVPLC has been monitoring for any signs of Coopers hawk impacts during the citizen science Cactus Wren monitoring. In previous years, perches near known cactus wren nesting sites have been removed to limit any potential predation. If monitoring shows Coopers hawk predation, those perches will be removed by PVPLC staff.

Native Predator Education Program

The Conservancy will continue to educate the general public regarding the role of native predators by providing information on the Conservancy's webpage, signage on the Preserves, informational handouts, and information disseminated during monthly public nature walks. This program will explain the role and necessity of large native predators, such as coyotes, within the ecosystem, and the need to protect them from disturbance.

Furthermore, the City of Rancho Palos Verdes has implemented a Coyote Management Plan that provides information to the public promoting the coexistence with coyotes in the city. City staff has actively educated city residents about reducing harmful interactions between coyotes and people/pets in the urban areas of the City.

4.6 MESOPREDATOR MONITORING AND CONTROL

Mesopredators are smaller carnivores such as that are principle predators of birds and other small vertebrates. Declines in larger mammalian carnivores due to habitat fragmentation and human interaction can often lead to an increase in mesopredators.

This increase in mesopredators has been implicated in the decline and extinction of prey species, including song birds and potentially the federally threatened California gnatcatcher.

Monitoring

The Wildlife Tracking Program has utilized wildlife cameras and scat analysis since 2007. Detailed results of mesopredator observations can be found in Appendix E of the 2021 annual report.

4.7 CONCLUSION

The Conservancy recommends to implement the Predator Control Plan as follows:

Control

If key native predator species are extirpated from the Preserve and studies indicate that these specific mesopredators are adversely affecting sensitive native wildlife, the Conservancy will consult with the Wildlife Agencies about further actions, which may include initiating a program to control mesopredators, including feral cats and the non-native red fox.

- Note observations and impacts of potential predators within the Preserve as a part of its regular monitoring schedule
- Continue to manage Wildlife Tracking Community Science program
- Provide education programs regarding the impacts of predators on natural open spaces and habitat;
- Consult with the Wildlife Agencies or establish a trapping program for brown-headed cowbirds if deemed necessary in the future;
- Consult with the Wildlife Agencies or control predators such as feral cats and mesopredators if deemed necessary in the future.

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SECTION 5

TARGETED EXOTIC REMOVAL PROGRAM FOR PLANTS (TERPP)

**CUMULATIVE REPORT
FOR THE
TARGETED EXOTIC REMOVAL
PROGRAM FOR PLANTS (TERPP)**

Prepared by:

Palos Verdes Peninsula Land Conservancy

March 2022

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1.0 INTRODUCTION

The Palos Verdes Peninsula Land Conservancy (PVPLC), as manager of the Palos Verdes Nature Preserve (PVNP), conducts strategic weed control activities throughout the year as part of the Targeted Exotic Plant Removal Plan for Plants (TERPP). As directed in the draft Rancho Palos Verdes Natural Communities Conservation Plan (NCCP), PVPLC selects five acres or 20 small sites of invasive plants for removal each year. The overall goal of this program is to systematically target invasive species throughout the PVNP to increase the success of native plant growth and create greater habitat opportunities for wildlife.

The TERPP is an element of the NCCP that includes a specific protocol for ranking exotic species populations and strategically removing those species over time. This TERPP Report documents PVPLC's efforts from 2019 - 2021 to remove exotic plant species that threaten native vegetation in the PVNP. It details the methods of assessing the threat of individual exotic species to native vegetation, field methods for removal and provides site-specific documentation related to every completed removal site.

Each TERPP site is tracked via GIS, a tool that aids in the planning and monitoring efforts. Since 2006, PVPLC has treated 145 TERPP sites, and the program is ongoing. Every year, tracking, documenting and planning for the following year becomes more complex as more sites are added if targeted populations are not entirely eradicated through weed control efforts. Use of GIS allows staff not only to look at the land within the NCCP boundaries, but to view the Palos Verdes Peninsula at a landscape level. In 2012, staff began developing a TERPP GIS mapping system to track weed populations (baseline) and TERPP treatments over time, and this system continues to be implemented during this reporting period. The invasive weed baseline has assisted in determining priority populations to target for treatment.

2.0 SITE ASSESSMENT

Invasive species control is included in PVPLC's annual conservation planning strategy where Stewardship staff prioritize potential TERPP sites and assess best practice methods for removal. Guided by the NCCP, which ranks known exotic species with potential to be found around the PVNP based on State and Federal guidelines, PVPLC staff locate TERPP sites to target for the calendar year, assess the best method for eradication, photo document and map the population/s, and conduct weed removal accordingly.

The PVPLC weighs potential areas for exotic species control based on several criteria:

1. Threat to native vegetation, particularly populations of NCCP-covered species;
2. Feasibility of eradication, which includes limiting disturbance to native habitat and ease of access, and;

-
3. Invasiveness of exotic species, using a synthesized rating system drawn from plant invasiveness rankings from both the California Invasive Plant Council (Cal-IPC) and the California Department of Food and Agriculture (CDFA).

Through regular property reviews and viewing fine scale imagery through the Geographic Information System (GIS), ArcGIS, PVPLC plans for invasive species control across the entire Preserve area.

A sample of the TERPP field data collection form is in Appendix D I. The forms provide basic information about the species targeted, including site identification number and property, approximate location, removal methods used, and general comments related to the removal activities. This form has since been converted over to the ArcGIS program “Survey 123”, which aids in field collection and GIS data collection. PVPLC also includes photo documentation: staff photographs the sites before work takes place and after the removal of the individual or population of exotic species. Photo documentation not only confirms completion of the work, but also provides a snapshot of the surrounding environment at the time of the TERPP-related activities. This record helps to create a historical record of the presence of non-native plant species on the sites, which may inform future restoration efforts.

3.0 FIELD METHODS

PVPLC staff uses best practice, the most effective and least intrusive, methods at all times when conducting TERPP-related activities. High priority areas may occur near rare or endangered biological populations. Care is taken to minimize soil erosion, fire risk, disturbance to surrounding native vegetation and further dispersal of the exotic species. PVPLC utilizes a combination of methods to conduct exotic species removal, generally limited to the following:

- Mechanical removal - staff may use tools with motorized blades to fell larger species;
- Hand removal - staff conduct most removals by hand pulling and/or with small hand tools for pruning and cutting;
- Chemical control - trained staff applies herbicides at the appropriate phase of vegetative growth;
- Growth and seed maturation, and;
- Disposal - City of Rancho Palos Verdes staff coordinate with waste companies to supply green waste and trash containers.

Qualified Licensed Applicator(s) develop all recommendations for chemical pest control and senior staff supervises field staff and contractors in sensitive areas. Additionally, field staff has an integral role in the TERPP and often have crucial, site-specific knowledge related to the sites.

4.0 SUMMARY OF ACTIVITIES FROM 2019 TO 2021

4.1 2019 TERPP

In 2019, PVPLC treated 7 populations of invasive plants across four reserves (Table I, photopoints in Appendix D9) and approximately 38 acres of *Acacia*. Of the 7 treated populations, 6 were populations of *Euphorbia terracina* (Geraldton spurge, Euphorbia). Euphorbia grows rapidly in disturbed areas, is a prolific seeder and is rapidly expanding its distribution in southern California. Invaded areas show reduced ecological quality and reduced habitat quality compared to un-invaded areas. Euphorbia shows a broad habitat tolerance in southern California, invading both cool coastal areas and hot, dry, interior areas. Most of the populations of Euphorbia have been treated for several years, in attempts to keep it from spreading further into the Preserve. In addition to Euphorbia treatments, the 2019 TERPP treated approximately 38 acres of *Acacia cyclops* (Coastal Wattle) at Portuguese Bend.

4.2 2020 TERPP

In 2020, PVPLC treated 6 populations of *Acacia* which totaled approximately 14 acres and mowed an additional 10.8 acres of mustard at 3 locations.

4.3 2021 TERPP

In 2021, PVPLC treated 9 populations of *Acacia* which totaled approximately 14 acres and mowed and additional 5.5 acres of mustard.

PVPLC treated one population of *Phoenix canariensis* (Canary Island Date Palm) at Vicente Bluffs.

PVPLC treated 4 locations previous locations of *Acacia* removal in Filiorum.

PVPLC treated all previous *Euphorbia terracina* treatment sites and hand pulled seedlings.

5.0 REFERENCES

- California Invasive Plant Council 2006. California Invasive Plant Inventory. February. California Invasive Plant Council: Berkley, CA.
- Palos Verdes Peninsula Land Conservancy 2007a. 2007 Targeted Exotic Removal Plan for Plants for the Portuguese Bend Nature Preserve For the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan. April.
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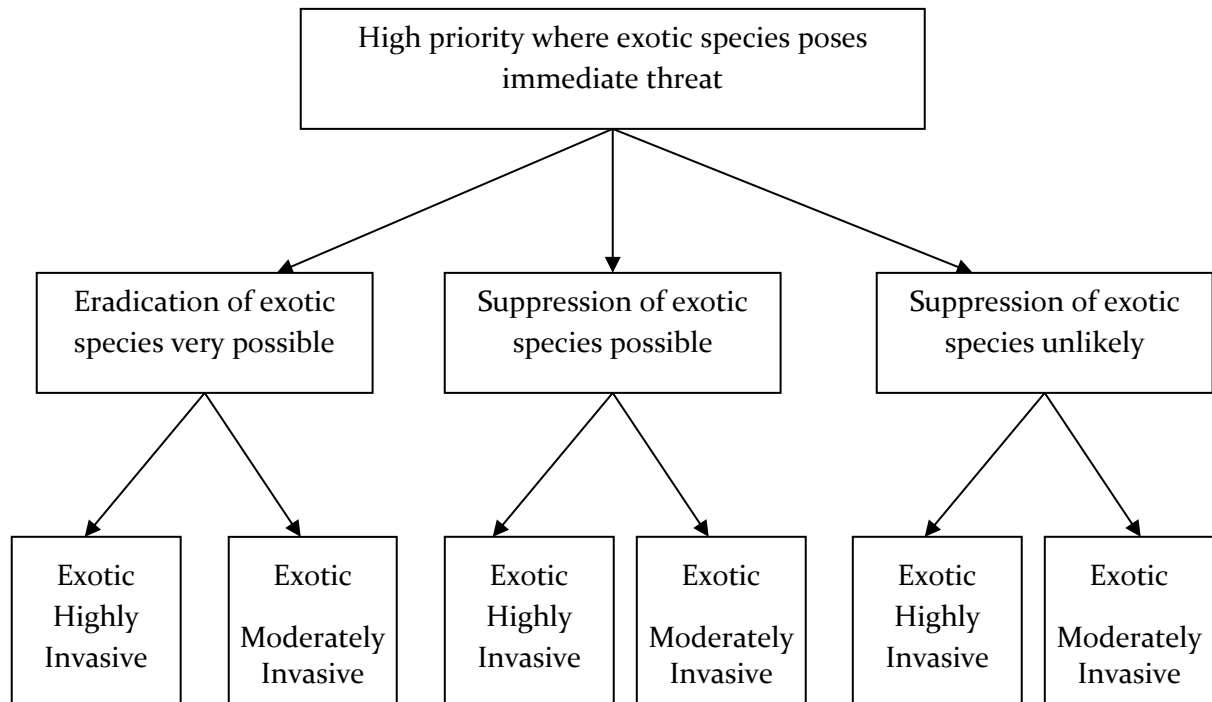
APPENDIX D1: SAMPLE TERPP FORM

Invasive Weed Mapping Field Datasheet

Survey Type New Infestation Assessment Treatment			Surveyor's Name		
Date			Location Description:		
Species					
Preserve					
Stand ID			Surrounding Vegetation Type: cactus scrub coastal sage scrub riparian bluff grassland non-native plants trail non-native annual grass (NNAG) Other		
Stand Size 1 ft ² - 10 ft ² 10 ft ² - 100 ft ² 100 ft ² - 300ft ² 300 ft ² - 600 ft ² 600 ft ² - 1000 ft ² > 1000 ft ²			Stand Comments:		
No. Individuals 1-10 10-50 50-100 100-200 200-500 500-1000 >1000					
Percent Canopy Cover 1-5% 5-10% 10-25% 25-50% 50-75% +75%					
Plant Phenology Flowering Non-Flowering Fruiting					
Plant Age Seedling Juvenile Mature Dead					
Treatment Type Hand pull Herbicide Hand-pull/Herbicide Weed-whip Mulch Tree removal Other					
Area Treated 1 ft ² - 10 ft ² 10 ft ² - 100 ft ² 100 ft ² - 300 ft ² 300 ft ² - 600 ft ² 600 ft ² - 1000 ft ² > 1000 ft ²			Treatment Comments:		
Percent of Infestation Treated 0-25% 25-50% 50-75% 75-100%					
Photo Image Numbers:			Additional Comments:		
Stand ID Example: AC_EuTe_01_YYYY.MM.DD.jpg Preserve abbreviations: AA - Agua Amarga AC - Abalone Cove AV - Alta Vicente CP - Chandler Preserve DF - DFSP GF - George F FI - Filiorum FO - Forrestal OT - Ocean Trails PB - Portugeuese Bend SR - San Ramon TS - Three Sisters VB - Vicente Bluffs VN - Vista del Norte WP - White Point OR - Other					

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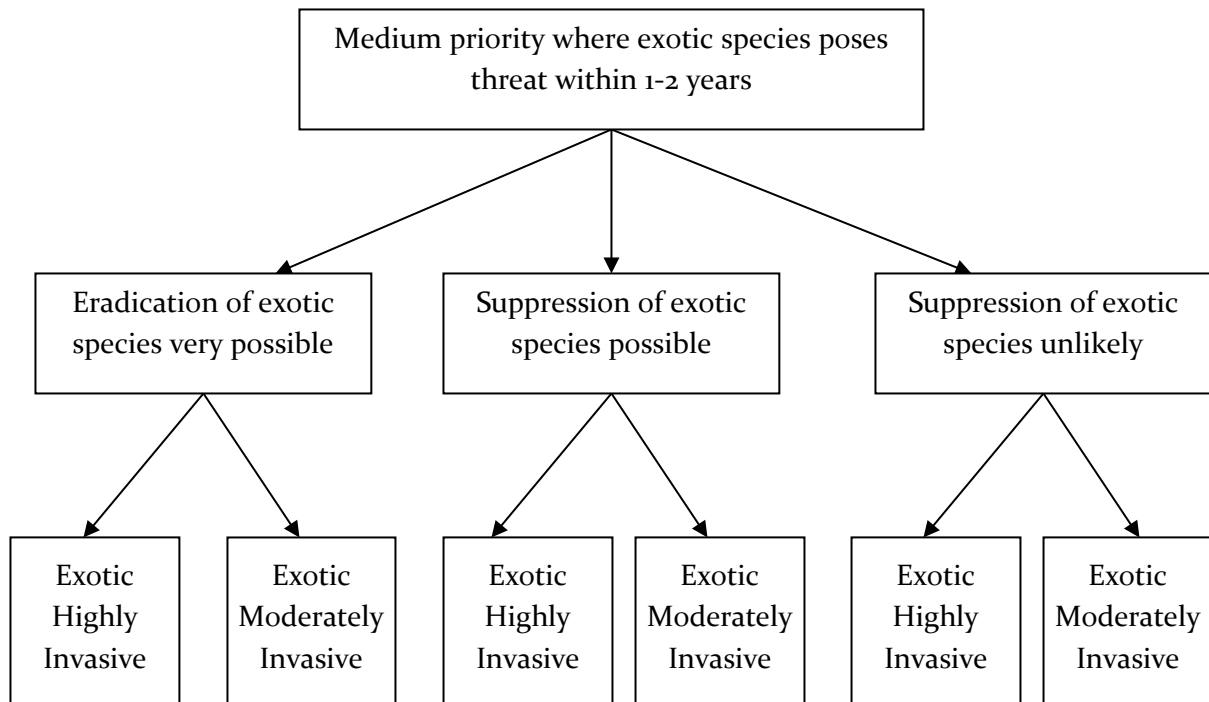
APPENDIX D2: FLOWCHART FOR HIGH PRIORITY THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

1-3= Low priority 4-7= Medium priority 8-10= High priority

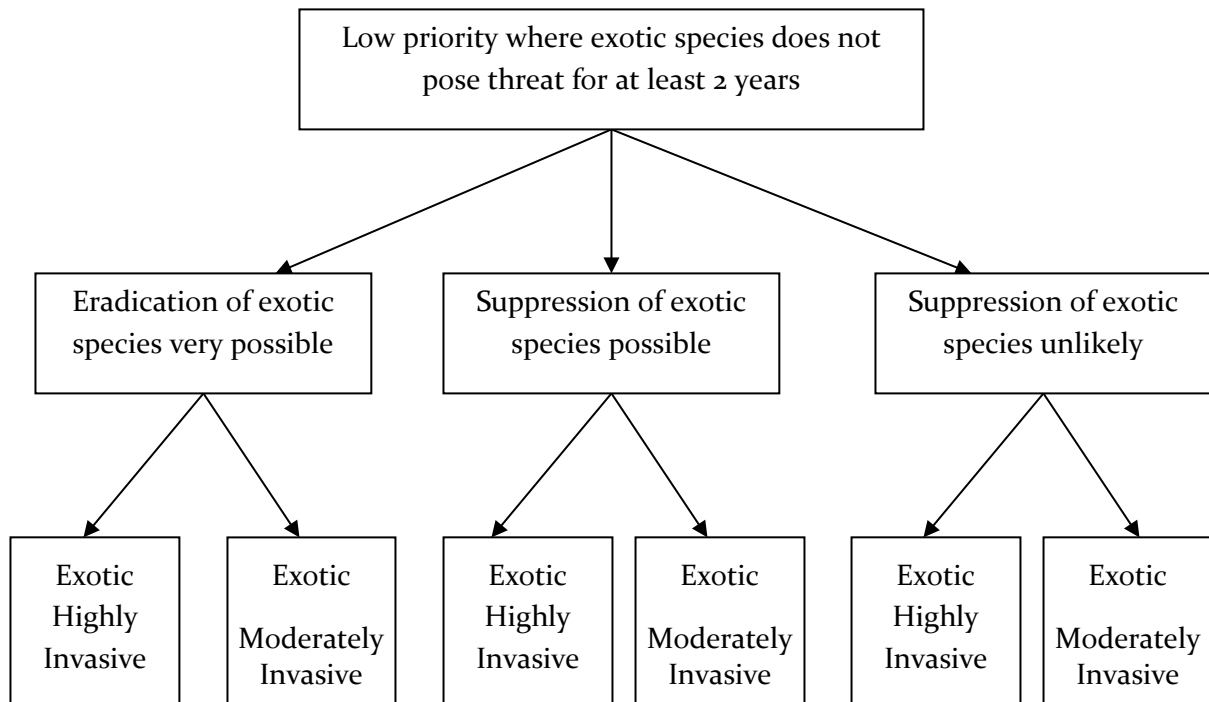
APPENDIX D3: FLOWCHART FOR MEDIUM PRIORITY DEGREE OF THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

1-3= Low priority 4-7= Medium priority 8-10= High priority

APPENDIX D4: FLOWCHART FOR LOW PRIORITY DEGREE OF THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

1-3= Low priority 4-7= Medium priority 8-10= High priority

APPENDIX D5: HIGHLY INVASIVE SPECIES

<u>Genus species</u>	<u>Common name</u>
<i>Arundo donax</i>	Giant reed
<i>Asparagus asparaagoides</i>	Bridal creeper
<i>Avena barbata</i>	Slender oat
<i>Avena fatua</i>	Wild oat
<i>Brachypodium distachyon</i>	False brome
<i>Brassica nigra</i>	Black mustard
<i>Bromus diandrus</i>	Ripgut grass
<i>Bromus madritensis ssp. rubens</i>	Red brome
<i>Carpobrotus edulis</i>	Hottentot fig
<i>Caesalpinia spinosa</i>	Spiny holdback
<i>Centaurea melitensis</i>	Tocalote
<i>Chrysanthemum coronarium</i>	Garland chrysanthemum
<i>Cortaderia selloana</i>	Pampas grass
<i>Cynodon dactylon</i>	Bermuda grass
<i>Euphorbia terracina</i>	Spurge
<i>Foeniculum vulgare</i>	Fennel
<i>Malva nicaeensis</i>	Bull mallow
<i>Malva parviflora</i>	Cheeseweed
<i>Malva sylvestris</i>	Mallow
<i>Mesembryanthemum crystallinum</i>	Annual iceplant
<i>Nicotiana glauca</i>	Tree tobacco
<i>Pennisetum clandestinum</i>	Kikuyu grass
<i>Pennisetum setaceum</i>	Fountain grass
<i>Picris echioides</i>	Bristly ox-tongue
<i>Pistacia atlantica</i>	Pistachio

<i>Pittosporum undulatum</i>	Pittosporum
<i>Raphanus sativus</i>	Wild radish
<i>Ricinus communis</i>	Castor bean
<i>Salsola tragus</i>	Russian thistle
<i>Silybum marianum</i>	Milk thistle
<i>Sonchus asper</i>	Prickly sow thistle
<i>Sonchus oleraceus</i>	Sow thistle
<i>Spartium junceum</i>	Spanish broom
<i>Tamarix species</i>	Tamarisk
<i>Tropaeolum majus</i>	Garden nasturtium

APPENDIX D6: MODERATELY INVASIVE SPECIES

<u>Genus species</u>	<u>Common Name</u>	<u>Genus species</u>	<u>Common Name</u>
<i>Acacia cyclops</i>	Acacia	<i>Limonium perezii</i>	Sea lavender
<i>Acacia species</i>	Acacia	<i>Limonium sinuatum</i>	Sea lavender
<i>Aegilops cylindrica</i>	Jointed goat grass	<i>Lobularia maritima</i>	Sweet alyssum
<i>Ageratina adenophorum</i>	Eupatory	<i>Lolium multiflorum</i>	Italian rye
<i>Atriplex semibaccata</i>	Australian saltbush	<i>Lolium perenne</i>	Perennial ryegrass
<i>Bassia hyssopifolia</i>	Five-Hook bassia	<i>Marrubium vulgare</i>	Horehound
<i>Bromus hordeaceus (mollis)</i>	Soft brome	<i>Medicago polymorpha</i>	Bur clover
<i>Bromus catharticus</i>	Rescue grass	<i>Medicago sativa</i>	Alfalfa
<i>Cakiel maritime</i>	Sea rocket	<i>Melilotus albus</i>	White sweet clover
<i>Carduus pycnocephalus</i>	Italian thistle	<i>Melilotus indicus</i>	Yellow sweet clover
<i>Carpobrotus aequilaterus</i>	Sea Fig	<i>Myoporum laetum</i>	Myoporum
<i>Carpobrotus chilensis</i>	Fig-Marigold	<i>Olea europea</i>	Olive
iceplant		<i>Oxalis pes-caprae</i>	Bermuda buttercup
<i>Conium maculatum</i>	Poison hemlock	<i>Pelargonium zonale</i>	Zonal geranium
<i>Convolvulus arvensis</i>	Bindweed	<i>Phalaris minor</i>	Phalaris
<i>Erodium cicutarium</i>	Red stem filaree	<i>Phoenix canariensis</i>	Phoenix palm
<i>Eucalyptus camaldulensis</i>	Red gum tree	<i>Piptatherum miliacea</i>	Smilo grass
<i>Eucalyptus globulus</i>	Blue gum tree	<i>Pittosporum undulatum</i>	Pittosporum
<i>Eucalyptus species</i>	Gum tree	<i>Plantago lanceolata</i>	English plantain
<i>Hirschfeldia incana</i>	Annual mustard	<i>Polygonum aviculare</i>	Knotweed
<i>Hordeum murinum leporinum</i>	Foxtail barley	<i>Polypogon monspessulensis</i>	Rabbitsfoot
<i>Hordeum vulgare</i>	Common barley	<i>Pyracantha sp.</i>	Firethorn
<i>Lactuca serriola</i>	Compass plant	<i>Rumex crispus</i>	Curly dock
<i>Lathyrus tangianus</i>	Tangier pea		

<i>Schinus molle</i>	Mexican pepper	<i>Washington robusta</i>	Mexican fan palm
<i>Schinus terebinthifolius</i>	Brazilian pepper	<i>Vicia sativa</i>	Spring vetch
<i>Sisymbrium irio</i>	London rocket	<i>Vulpia myuros varhirsuta</i>	Annual fescue
<i>Trifolium hirtum</i>	Rose clover	<i>Vulpia myuros var myuros</i>	Rattail fescue

APPENDIX D7: EXOTIC, NON-INVASIVE SPECIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Genus species</u>	<u>Common Name</u>
<i>Amaranthus albus</i>	Tumbleweed	<i>Gnaphalium luteo-album</i>	White cudweed
<i>Anagallis arvensis</i>	Pimpernel	<i>Koehltreuteria species</i>	Koehltreuteria
<i>Apium graveolens</i>	Celery	<i>Lamarckia aurea</i>	Goldentop
<i>Aptenia cordifolia</i>	Baby sun-rose	<i>Lantana montevidensis</i>	Lantana
<i>Atriplex glauca</i>	Saltbush	<i>Lathyrus odoratus</i>	Sweet pea
<i>Bidnes pilosa</i>	Common beggar-ticks	<i>Lycium species</i>	Lycium
<i>Capsella bursa-pastoris</i>	Shepherd's purse	<i>Lycopersicon esculentum</i>	Garden tomato
<i>Centranthus ruber</i>	Red valerian	<i>Malephora crocea</i>	Mesemb
<i>Ceratonia siliqua</i>	Locust bean tree	<i>Melaleuca species</i>	Melaleuca
<i>Chamaesyce maculata</i>	Spotted spurge	<i>Mesembryanthemum nodiflorum</i>	Iceplant
<i>Chenopodium album</i>	Lamb's quarters	<i>Osteoapermu fruticosum</i>	African daisy
<i>Chenopodium ambrosioides</i>	Mexican tea	<i>Oxalis corniculata</i>	Woodsorrel
<i>Chenopodium murale</i>	Nettleleaf goosefoot	<i>Paspalum dilatatum</i>	Dallis grass
<i>Conyza canariensis</i>	Horseweed	<i>Pinus halepensis</i>	Alepppo pine
<i>Coronilla valentina</i>	Coronilla	<i>Plantago major</i>	Plantain
<i>Cyperus involucratus</i>	Umbrella plant	<i>Poa annua</i>	Bluegrass
<i>Digitaria sanguinalis</i>	Hairy crabgrass	<i>Polygonum arenastrum</i>	Knotweed
<i>Echium fastuosum</i>	Pride of madeira	<i>Senecio vulgaris</i>	Groundsel
<i>Erodium botrys</i>	Long-beaked filaree	<i>Silene gallica</i>	Common catchfly
<i>Euphorbia lathyris</i>	Gopher plant	<i>Triticum aestivum</i>	Cultivated wheat
<i>Euphorbia peplus</i>	Petty spurge	<i>Urtica urens</i>	Dwarf nettle
<i>Filago gallica</i>	Narrow-leaf filago	<i>Veronica anagallis-aquatica</i>	Water speedwell
<i>Fraxinus uhdei</i>	Shamel ash	<i>Yucca species</i>	Spanish bayonet
<i>Gazania species</i>	Gazania		
<i>Geranium carolinianum</i>	Geranium		

Table 1. 2019 TERPP Sites and Treatment Description

Stand ID	Reserve	Name	Stand Size	Number Individuals	Treatment	Percent Treated
AA_EuTe_02	Agua Amarga	<i>Euphorbia terracina</i>	10 – 100 ft ²	10 - 50	Hand pull/Herbicide	75 - 100%
AC_CoVa_01	Abalone Cove	<i>Coronilla valentina</i>	10 – 100 ft ²	100 - 200	Herbicide	75 – 100%
AC_EuTe_01	Abalone Cove	<i>Euphorbia terracina</i>	100 – 300 ft ²	50-100	Hand-pull/Herbicide	75 - 100%
PB_EuTe_04	Portuguese Bend	<i>Euphorbia terracina</i>	10 – 100 ft ²	1-10	Herbicide	75 - 100%
TS_EuTe_01	Three Sisters	<i>Euphorbia terracina</i>	10 -100 ft ²	100-200	Hand pull/Herbicide	75 - 100%
TS_EuTe_02	Three Sisters	<i>Euphorbia terracina</i>	10 – 100 ft ²	10-50	Hand Pull	75 - 100%
TS_EuTe_04	Three Sisters	<i>Euphorbia terracina</i>	300 – 600 ft ²	100 - 200	Hand pull/Herbicide	75 – 100%
PB_AcCy_11	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ²	50-100	Tree Removal	75 – 100%
PB_AcCy_12	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ²	50-100	Tree Removal	75 – 100%
PB_AcCy_13	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ²	50-100	Tree Removal	75 – 100%

Table 2. 2020 TERPP Sites and Treatment Description

Stand ID	Reserve	Name	Stand Size	Number Individu als	Treatment	Percent Treated
PB_AcCy_14	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 4 acres	50-100	Tree Removal	75 - 100%
PB_AcCy_15	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 1.5 acres	50-100	Tree Removal	75 - 100%
PB_AcCy_16	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 2 acres	50-100	Tree Removal	75 - 100%
VB_AcCy_04	Vicente Bluffs	<i>Acacia cyclops</i>	>1000 ft ² 4 acres	50-100	Tree Removal	75 - 100%
FO_AcCy_01	Forrestal	<i>Acacia cyclops</i>	>1000 ft ² 1 acre	10-25	Tree Removal	75 - 100%
SR_AcCy_01	San Ramon	<i>Acacia cyclops</i>	>1000 ft ² 1.5 acres	50-100	Tree Removal	75 - 100%
FI_BrNi_01	Filiorum	<i>Black Mustard</i>	>1000 ft ² 4.2 acres	100+	Mowing	75 - 100%
TS_BrNi_01	Three Sisters	<i>Black Mustard</i>	>1000 ft ² .8 acres	100+	Mowing	75 - 100%
SR_BrNi_02	San Ramon	<i>Black Mustard</i>	>1000 ft ² 5.82 acres	100+	Mowing	75 - 100%

Table 3. 2021 TERPP Sites and Treatment Description

Stand ID	Reserve	Name	Stand Size	Number of Individuals	Treatment	Percent Treated
PB_AcCy_17 (Area 1)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 1.56 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_18 (Area 2)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 1.28 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_19 (Area 3)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² .5 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_20 (Area 4)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 5.3 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_21 (Area 5)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² .24 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_22 (Area 6)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 1.3 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_23 (Area 7)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 1.06 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_24 (Area 8)	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² .40 acres	10-25	Tree Removal	75 - 100%
PB_AcCy_25	Portuguese Bend	<i>Acacia cyclops</i>	>1000 ft ² 2 acres	200-500	Tree Removal	75 - 100%
PB_BrNi_01	Portuguese Bend	<i>Brassica Nigra</i>	>1000 ft ² 5.5 acres	1000+	Mowing	75 - 100%
VB_PhCa_01	Vicente Bluffs	<i>Phoenix canariensis</i>	1ft ² -10ft ²	1-10	Tree Removal	75-100%
FI_AcCy_02	Filiorum	<i>Acacia cyclops</i>	300ft ² -600ft ²	200-500	Handpull	75-100%
FI_AcCy_03	Filiorum	<i>Acacia cyclops</i>	300ft ² -600ft ²	100-200	Handpull	75-100%
FI_AcCy_04	Filiorum	<i>Acacia cyclops</i>	100ft ² -300ft ²	200-500	Handpull	75-100%
FI_AcCy_05	Filiorum	<i>Acacia cyclops</i>	>1000 ft ²	500-1000	Handpull	75-100%

SECTION 6

Monitoring and Managing Trail Widening Threats to Habitat Report

LOCAL ASSISTANCE GRANT REPORT

Monitoring and Managing Trail Widening Threats to Habitat

Prepared for:

The California Department of Fish and Wildlife
Local Assistance Grant Agreement # PI850302

Prepared by:

Palos Verdes Peninsula Land Conservancy
Contact: Cris Sarabia

February 28, 2021

I INTRODUCTION

The Palos Verdes Nature Preserve encompasses approximately 1,400 acres and is located on the southern side of the Palos Verdes Peninsula in the City of Rancho Palos Verdes (RPV), California. The Palos Verdes Peninsula Land Conservancy (PVPLC) serves as the management agency for RPV (Figure 1). The Preserve was formed under a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) to maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes and region pursuant to the requirements of the NCCP Act and Section 10(a) of the ESA.

Figure 1. Map of the Palos Verdes Nature Preserve.



Public access to the Preserve is conditionally allowed for passive recreational purposes and to promote understanding and appreciation of the natural resources protected under the NCCP/HCP. However, unregulated trail widening resulting from public use is a management concern and can threaten covered species and their habitats. Managing for the unregulated widening of trails in the Preserve is needed to ensure that trail use does not impact covered plant species, coastal California gnatcatcher (gnatcatcher), cactus wren, Palos Verdes blue butterfly (PVBB) or El Segundo blue butterfly (ESB) populations or their habitats. Section 9.2.2 of the NCCP/HCP details various management actions regarding trails and public use facilities to ensure compatibility with protected resources. The NCCP/HCP provides guidelines for baseline monitoring surveys, which are required within three years of plan completion, and for establishing a long-term trail monitoring program. As the Preserve Habitat Manager, PVPLC is tasked with documenting baseline conditions throughout the trail system and development of the long-term trail monitoring program in coordination with the City and the Wildlife Agencies.

To assist in the establishment of a baseline monitoring program, further development of monitoring protocols and identifying actions to minimize impacts to biological resources, PVPLC was granted a Local Assistance Grant (LAG) from the California Department of Fish and Wildlife. The results of the baseline data collection will lead to informed recommendations for trail widths and priorities for spur trail closures. This information will provide the groundwork for discussions between the Wildlife Agencies, the City, and PVPLC to memorialize trail widths for comparison during future trail monitoring events. As described in the NCCP/HCP, exceedance of memorialized trail widths during any 5-year monitoring event will trigger specific management actions, ensuring that unintentional impacts to covered species and habitat due to public recreation are avoided and minimized.

2 OBJECTIVES

Specific objectives of this project were to:

- 1) Establish a baseline monitoring program with detailed protocols and train staff and volunteers to measure the current trail widths and document all existing unauthorized spur trails;
- 2) Use current, high-resolution aerial imagery to determine if measurements made through GIS provide enough accuracy, as compared to field measurements, to monitor the 32-mile trail system effectively;
- 3) Deploy staff and volunteers to implement monitoring protocols and establish representative waypoints that will be resurveyed every five years after baseline; and
- 4) Develop recommendations for appropriate trail widths and prioritize spur trail closures to protect sensitive trailside resources.

3 BASELINE TRAIL MONITORING PROGRAM (METHODOLOGY)

Following the guidelines set in the Public Use Master Plan (PUMP), a protocol was developed to implement Baseline Trail Surveys. Using ArcMap and 2017 LARIAC arials, measurements were taken through GIS of 3 control points, 3 wide points and 2 random points on every trail in the preserve. The 3 control points were chosen where the trail was most representative of the overall trail and determined the average width. The 3 wide points measured the widest points on the trail, and will help determine if trail widening is occurring over time at these locations. The 2 random points tested for potential bias in the selection process. Random points were selected using a random number generator based on the length of the trail. Some trails were not visible from aerial imagery and were measured in the field. These were measured from one side of trail tread, perpendicular to the other side of trail tread (See Figure 1) using a standard measuring tape.

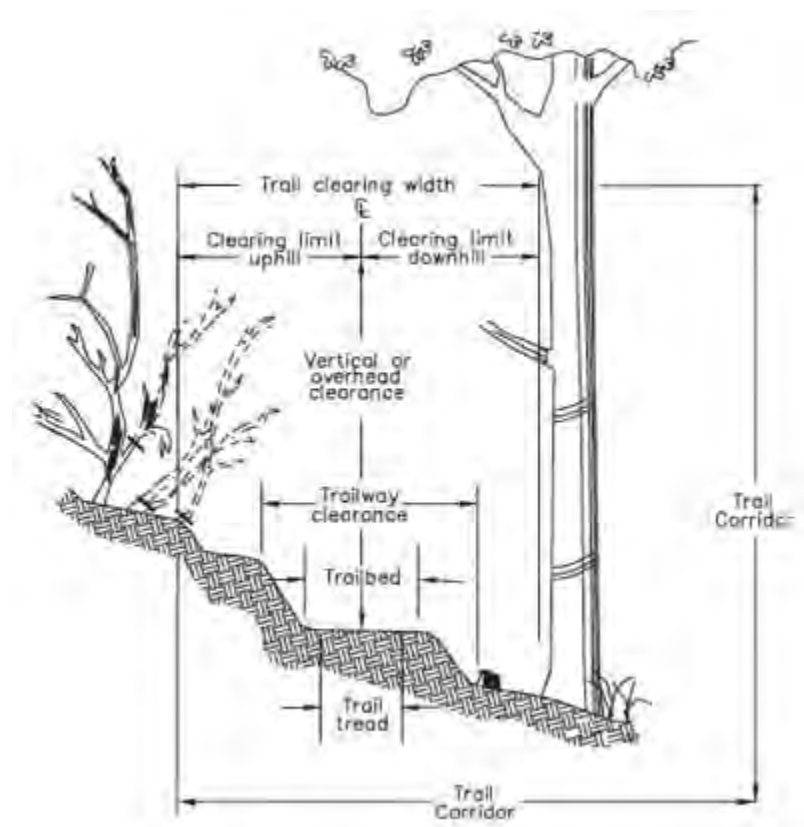


Figure 1. Example of Trail tread within the Trail bed.

Accuracy of the baseline monitoring using LARIAC imagery was compared with in-field surveys at Alta Vicente Reserve and Abalone Cove Reserve, using ESRI's GIS Collector app. ESRI's GIS Collector app is a mobile data collection app used by PVPLC that makes it user friendly to capture accurate data on web maps using mobile devices which then integrates into ArcGIS. We found that depending on the surveyor's phone capabilities, GPS accuracy was on average 1-2 feet within the range of the GIS measurements. We also found that High Accuracy GPS units had comparable

results. To improve accuracy on data collecting phone units, we purchased a Bad Elf GNSS Surveyor which increased individual's phones to within 1 meter accuracy.

The baseline trails monitoring methodology was developed with the intention of using qualified and trained volunteers as implementers of the surveys. Two AmeriCorps team members were trained to conduct the digital measurements and field measurements and staff worked closely with them to manage Quality Assurance/Quality Control (QA/QC). The AmeriCorps members were able to gather data accurately and efficiently. For future monitoring, we encourage well trained volunteers to collect the data as a supplement to PVPLC staff.

Trail Width Monitoring Protocol

1. 2 -3 competent and reliable volunteers and staff are chosen to train for the project.
2. Volunteers and staff are required to read the 2021 LAG Report before beginning training.
3. Volunteers are trained to use LARIAC (or equivalent) imagery and how to use the measuring tool in ArcGIS or equivalent software. Previous data and imagery for reference is located on the PVPLC GIS server.
4. Once volunteers are familiar with the measuring tool, the most up to date imagery is uploaded into ArcGIS and a new excel sheet is started. (Please document metadata of imagery).
5. Volunteers will structure the excel sheet with tabs representing the various preserves and each sheet containing a list of trail names. Please see previous monitoring data sheet for an example.
6. Using the previous GIS data, the 3 control points, 3 widest points and 2 random points will be located on the new LARIAC imagery.
7. Zooming in as close as possible without pixilation, the bare ground portion of the trail will be measured at each GPS point. Measuring in feet, the width is recorded in the GIS points metadata comment/note section as well as in the excel sheet.
8. Once all points are recorded, the data should be saved and compared to previous 5 year reports by the Wildlife Agencies, the City and PVPLC. Management recommendations will be recorded and action plans created to address any areas of concern.

*New trails for monitoring will follow the previous methodology as described above.

4 RESULTS

Trail width and spur trail maps can be viewed on this web map:

<https://pvplc.maps.arcgis.com/apps/webappbuilder/index.html?id=33ac9e2daebc4df99e0832aed4681205>

Trail width data can also be requested from PVPLC by emailing info@pvplc.org

A few of the preserve trails were not visible from aerial imagery, so ground measurements were taken and are recorded in the data sheets. Depending on quality of future imagery, these trails may require field measurements. Various trails also had consistently-wide trail segments or no width variation beyond the control points, and are therefore noted as N/A on the trail width tables. It is recommended that the GIS data for Vista Del Norte trails and San Ramon trails be updated, since those trails are not in alignment with the current trail locations. This is most likely due to the trails being in fuel modification zones, non-native grassland dominated areas and in previously burned areas, whereas trail delineation has shifted from the original alignment recorded for trail maps in 2009. There were also various trails that were closed, either temporarily or indefinitely, at the time of this project. These trails include Vanderlip Trail, Sea Dahlia Trail, Cave Trail, Sacred Cove Trail (west) and Golden Cove Trail. Trail widths for these closed trails should be added to this inventory if they are opened again.

Trail width maps include a color coded legend for the various types of covered species and covered species habitats that are within the reserves. The covered species data includes all historical and current known locations of occurrences. Cactus wren territories may include locations of suitable southern cactus scrub and recorded cactus wren encounters. California gnatcatcher locations include locations of bird sightings. PVBB and ESB locations include release sites, historical locations and suitable host plant populations. These points and locations should be avoided to the best extent possible following the Habitat Impact Avoidance and Minimization Measures for Covered Projects and Activities as listed Section 5.5 of the NCCP.

Abalone Cove Reserve



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Abalone Cove Trail	5.9 ft.	4.2 ft.	4.7 ft.	9.5 ft.	6.7 ft.	7.1 ft.	3.5 ft.	3.4 ft.	1,207 ft.
Beach School Trail	15.8 ft.	17.7 ft.	19 ft.	21 ft.	23.5 ft.	47 ft.	16 ft.	19.5 ft.	1,910 ft.
Bow and Arrow Trail Trail measured manually	1.6 ft.	2.2 ft.	1.5 ft.	2.6 ft.	2.7 ft.	2.3 ft.	1.6 ft.	2.1 ft.	567 ft.
Cave Trail –Trail Closed									
Chapel View Trail	5.1 ft.	6.3 ft.	6.4 ft.	7.7 ft.	6.9 ft.	N/A	6.6 ft.	7.9 ft.	1225 ft.
Cliffside Trail	3.2 ft.	2.8 ft.	2.2 ft.	4.5 ft.	5.8 ft.	6.2 ft.	2.0 ft.	2.2 ft.	535 ft.
Inspiration Point Trail	2.5 ft.	3.6 ft.	3.6 ft.	8.2 ft.	4.7 ft.	4.6 ft.	6.1 ft.	2.2 ft.	550 ft.
Olmsted Trail	13.6 ft.	14.2 ft.	14.1 ft.	20.6 ft.	16.5 ft.	21.8 ft.	14.8 ft.	15.2 ft.	2105
Portuguese Point Loop Trail	13.7 ft.	16.4 ft.	13.8 ft.	17.9 ft.	18.1 ft.	18.4 ft.	13.6 ft.	17.6 ft.	1411 ft.
Sacred Cove Trail	3.1 ft.	3.8 ft.	2.3 ft.	4.4 ft.	7.2 ft.	4.1 ft.	1.9 ft.	2.3 ft.	1336 ft.
Sea Dahlia Trail –Trail Closed									
Smuggler's Trail	2.4 ft.	2.1 ft.	2.3 ft.	3.5 ft.	N/A	N/A	1.9 ft.	1.8 ft.	438 ft.
Via de Campo Trail	8.6 ft.	11.3 ft.	8.8 ft.	14.8 ft.	17.8 ft.	15.7 ft.	16.1 ft.	6.6 ft.	1542 ft.

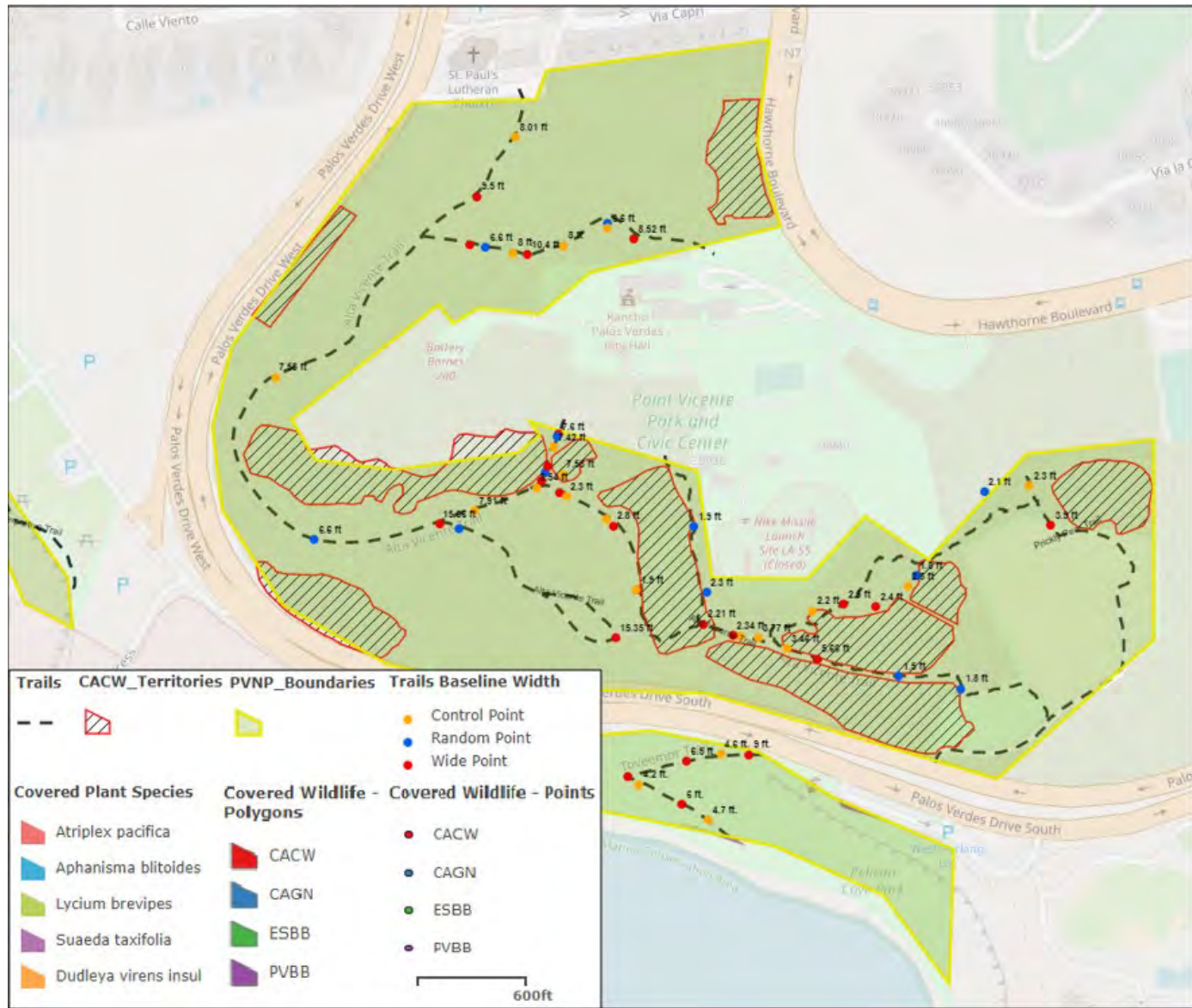
***At the time of this survey, Cave Trail, Sea Dahlia Trail and the western arm of Sacred Cove Trail remained closed.**

Agua Amarga Reserve



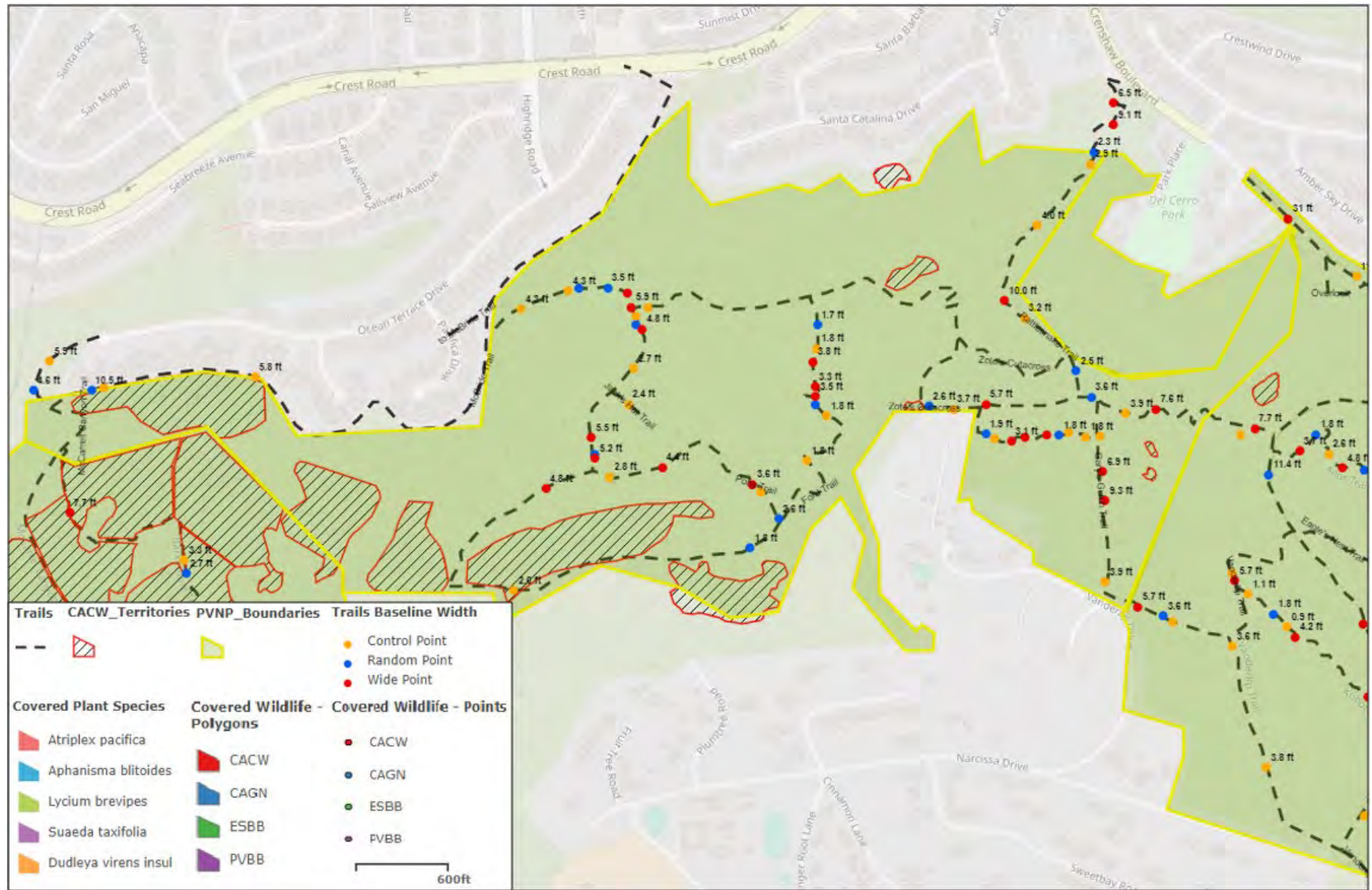
Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Lunada Canyon Trail	1.3 ft.	2.4 ft.	2.1 ft.	5.7 ft.	4.4 ft.	3.3 ft.	2.3 ft.	2.1 ft.	3068 ft.

Alta Vicente Reserve & Toveemor Trail (Pelican Cove)



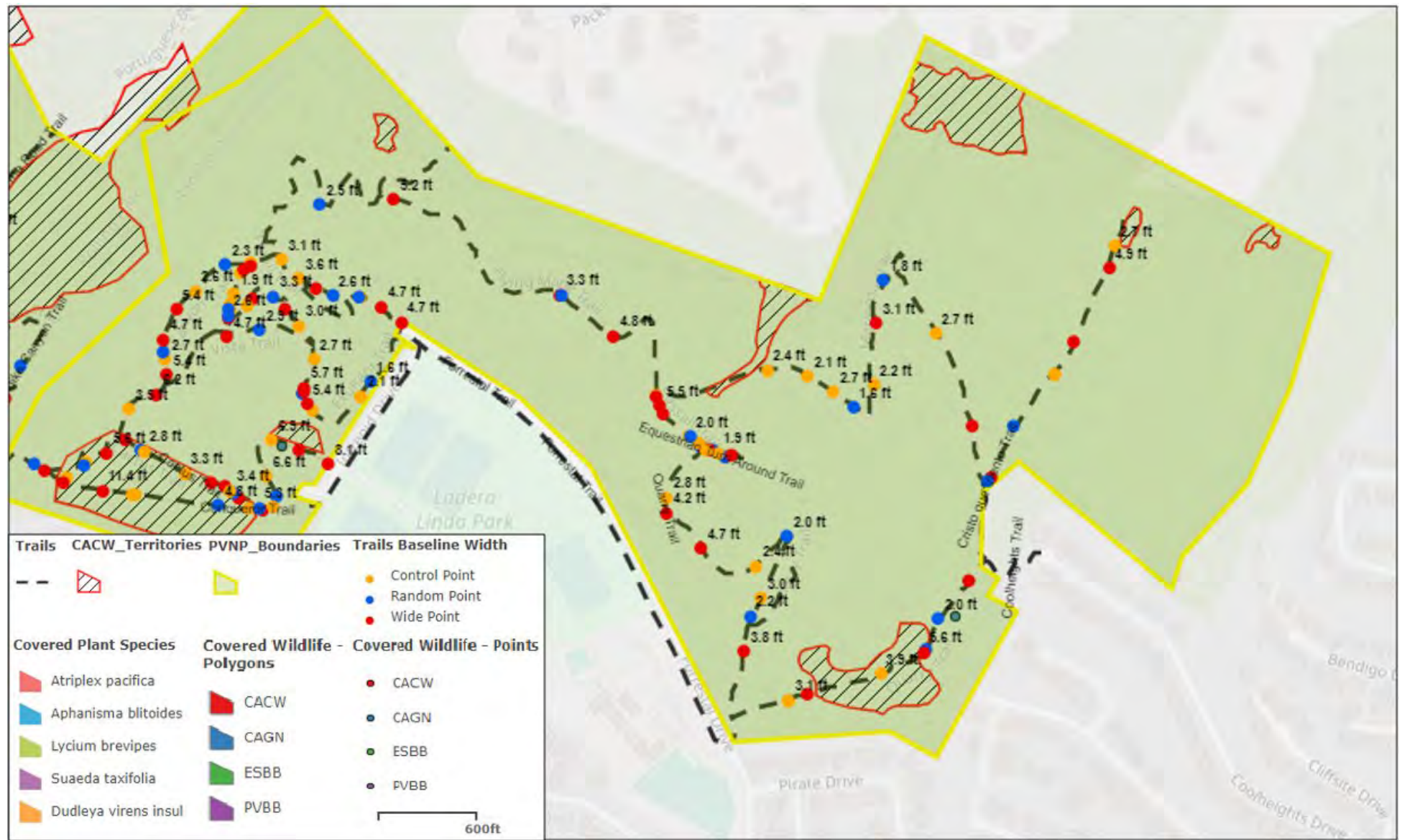
Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Alta Vicente Trail (West)	8.01 ft.	7.58 ft.	7.91 ft.	9.5 ft.	15.06 ft.	15.35 ft.	6.6 ft.	8.2 ft.	2652 ft.
Alta Vicente Trail (East)	3.52 ft.	3.77 ft.	3.46 ft.	2.21 ft.	2.34 ft.	5.66 ft.	1.5 ft.	1.8 ft.	1046 ft.
South Spur Trail	8.54 ft.	7.42 ft.	7.58 ft.	7.42 ft.	8.53 ft.	8.33 ft.	6.3 ft.	7.6 ft.	229 ft.
North Spur Trail	7.93 ft.	7.95 ft.	6.61 ft.	11.06 ft.	10.44 ft.	8.52 ft.	2.6 ft.	6.6 ft.	955 ft.
Nike Trail	2.3 ft.	2.6 ft.	1.9 ft.	2.8 ft.	2.8 ft.	3.1 ft.	1.9 ft.	2.3 ft.	381 ft.
Prickly Pear Trail	2.2 ft.	2.5 ft.	2.3 ft.	2.5 ft.	2.4 ft.	3.88 ft.	2.1 ft.	1.8 ft.	2192 ft.

Filiorum Reserve



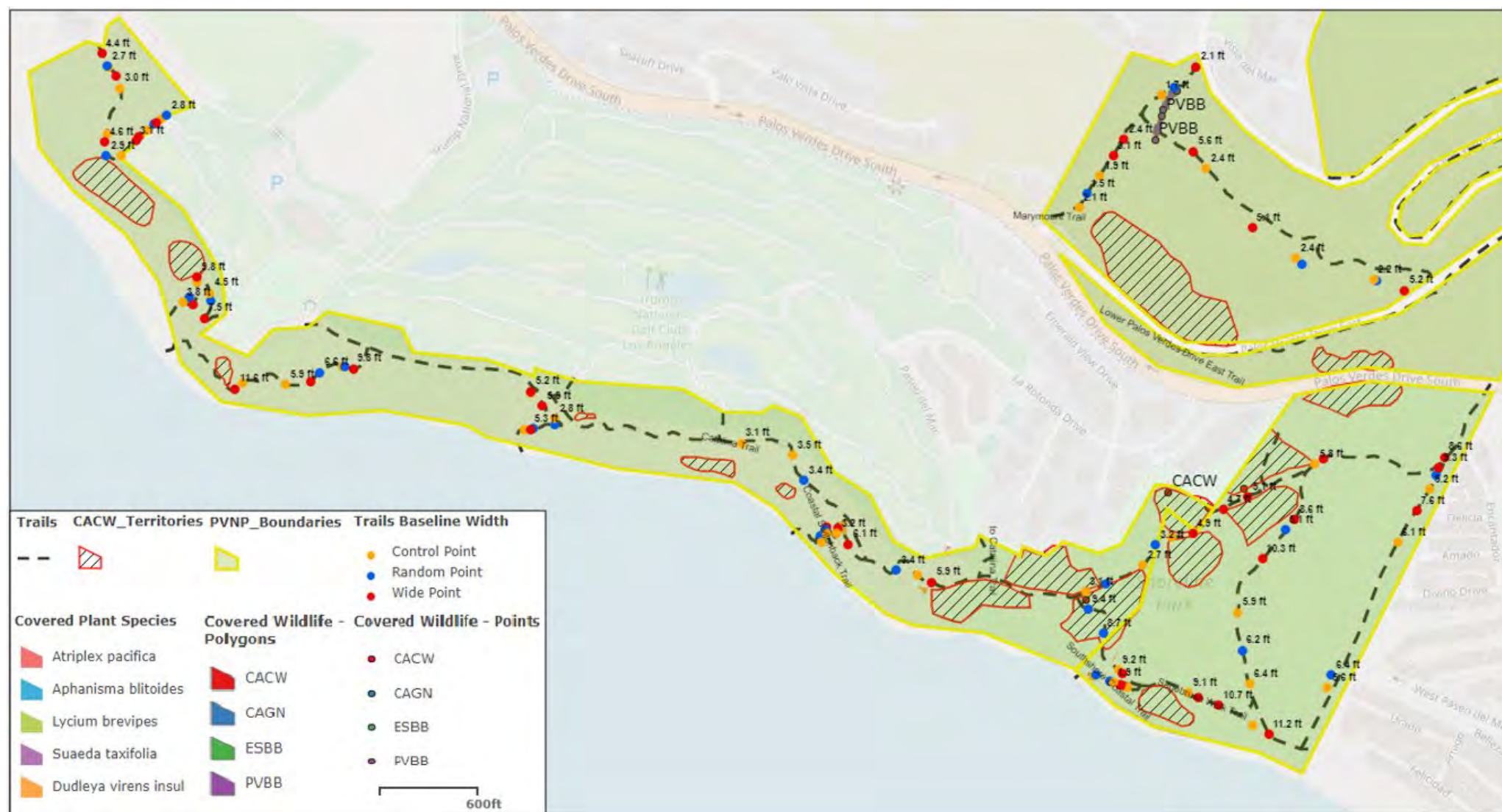
Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Eucalyptus Trail Trail measured manually	1.8 ft.	1.7 ft.	1.8 ft.	3.3 ft.	2.8 ft.	3.1 ft.	1.9 ft.	1.8 ft.	837 ft.
Ford Trail Trail measured manually	1.8 ft.	1.8 ft.	1.8 ft.	3.8 ft.	3.3 ft.	3.5 ft.	2.3 ft.	1.7 ft.	1641. ft.
Gary's Gulch	4.2 ft.	3.9 ft.	3.9 ft.	6.9 ft.	9.3 ft.	5.7 ft.	3.6 ft.	2.6 ft.	2622 ft.
Jack's Hat Trail	2.4 ft.	2.7 ft.	2.9 ft.	5.2 ft.	5.5 ft.	4.8 ft.	4.2 ft.	2.8 ft.	980 ft.
Kelvin Canyon Trail	3.6 ft.	3.9 ft.	3.7 ft.	7.6 ft.	7.7 ft.	5.7 ft.	3.6 ft.	2.6 ft.	2557 ft.
Pony Trail	2.8 ft.	2.7 ft.	2.6 ft.	3.6 ft.	4.4 ft.	4.8 ft.	1.8 ft.	2.6 ft.	4182 ft.
Rattle Snake Trail	3.2 ft.	4.0 ft.	2.9 ft.	9.1 ft.	6.5 ft.	10.0 ft.	2.5 ft.	2.3 ft.	2053 ft.
Zote's Cut Across Trail	4.3 ft.	4.3 ft.	4.1 ft.	8.6 ft.	5.9 ft.	N/A	3.6 ft.	3.5 ft.	2828 ft.

Forrestal Reserve



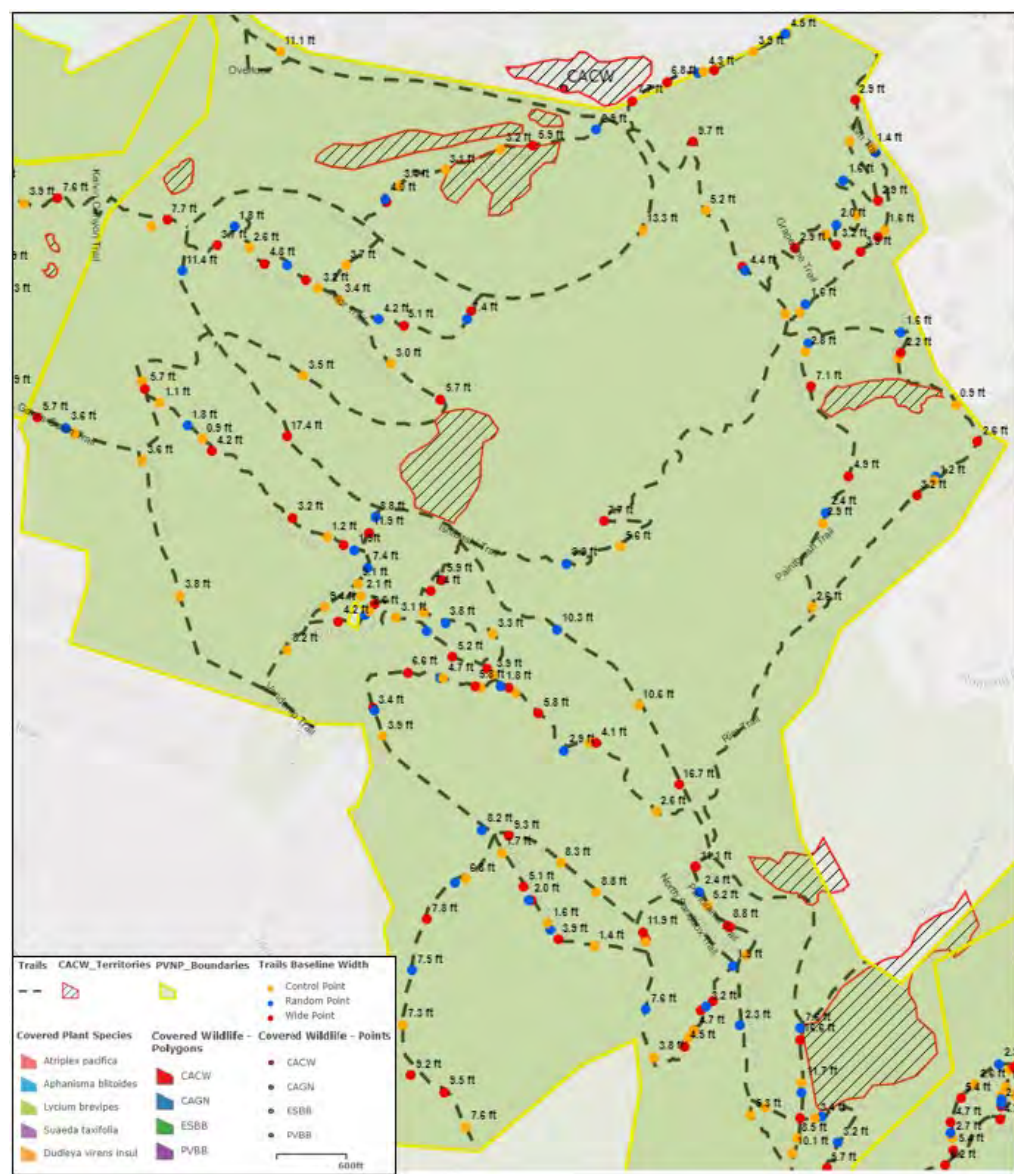
Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Basalt Trail	4.2 ft.	4.1 ft.	3.4 ft.	5.5 ft.	6 ft.	4.1 ft.	2.0 ft.	2.2 ft.	298.1 ft.
Cactus Trail	3.3 ft.	3.4 ft.	2.8 ft.	5.1 ft.	6.0 ft.	4.6 ft.	2.6 ft.	3.1 ft.	567.3 ft.
Canyon Trail	2.7 ft.	2.6 ft.	2.4 ft.	5.4 ft.	4.7 ft.	5.4 ft.	2.0 ft.	2.3 ft.	663.8 ft.
Conqueror Trail	8.1 ft.	7.6 ft.	8.3 ft.	11.2 ft.	13.0 ft.	11.4 ft.	8.3 ft.	4.8 ft.	968.1 ft.
Cristo Que Viento Trail	3.1 ft.	3.5 ft.	2.7 ft.	9.3 ft.	5.6 ft.	4.9 ft.	2.1 ft.	1.8 ft.	1320.2 ft.
Dauntless Trail	3.5 ft.	3.9 ft.	3.3 ft.	5.6 ft.	4.9 ft.	6.2 ft.	2.2 ft.	3.2 ft.	858.2 ft.
Exultant Trail	2.7 ft.	2.1 ft.	2.9 ft.	5.4 ft.	5.7 ft.	5.6 ft.	1.6 ft.	1.8 ft.	821.1 ft.
Flying Mane Trail	2.7 ft.	2.7 ft.	2.4 ft.	6.0 ft.	5.2 ft.	4.8 ft.	2.5 ft.	3.3 ft.	2653.2 ft.
Fossil Trail	3.4 ft.	3.6 ft.	3.1 ft.	4.4 ft.	4.7 ft.	4.7 ft.	2.1 ft.	2.6 ft.	560.3 ft.
Mariposa Trail	2.2 ft.	2.1 ft.	1.5 ft.	5.4 ft.	3.1 ft.	3.8 ft.	1.6 ft.	1.8 ft.	2521.5 ft.
Purple Sage Trail	6.9 ft.	6.6 ft.	6.4 ft.	8.1 ft.	9.0 ft.	7.4 ft.	5.3 ft.	4.3 ft.	628.6 ft.
Pirate Trail	3.1 ft.	3.9 ft.	4.1 ft.	4.2 ft.	5.6 ft.	4.6 ft.	2.0 ft.	3.2 ft.	1481.3 ft.
Quarry Trail	3.0 ft.	2.4 ft.	2.8 ft.	4.7 ft.	4.2 ft.	3.8 ft.	2.0 ft.	2.2 ft.	1759.2 ft.
Red Tail Trail Some of trail measured manually	2.9 ft.	2.0 ft.	1.9 ft.	5.3 ft.	3.3 ft.	3.6 ft.	1.9 ft.	2.6 ft.	268.5 ft.
Vista Trail	3.8 ft.	3.0 ft.	3.5 ft.	9.8 ft.	6.2 ft.	4.7 ft.	2.9 ft.	3.3 ft.	1217.8 ft.
Equestrian Turn Around	2.3 ft.	1.9 ft.	2.6 ft.	3.9 ft.	2.9 ft.	3.2 ft.	3.1 ft.	2.9 ft.	111.8 ft.

Ocean Trails Reserve



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
East Boundary Trail	5.2 ft.	6.1 ft.	5.6 ft.	8.6 ft.	9.3 ft.	7.6 ft.	5.9 ft.	6.4 ft.	2129 ft.
Gnatcatcher Trail	2.9 ft.	2.7 ft.	3.1 ft.	5.1 ft.	4.9 ft.	4.7 ft.	3.2 ft.	2.8 ft.	1458 ft.
Sagebrush Walk Trail	9.1 ft.	9.2 ft.	10.1 ft.	10.7 ft.	12.6 ft.	11.2 ft.	8.7 ft.	9.4 ft.	1209 ft.
Shoreline Park Trail	6.4 ft.	5.9 ft.	5.8 ft.	10.3 ft.	8.6 ft.	7.1 ft.	6.2 ft.	5.1 ft.	1340 ft.
Southshore Coastal Trail Trail measured manually	2.1 ft.	1.9 ft.	2.1 ft.	2.8 ft.	3.1 ft.	2.9 ft.	1.7 ft.	2.1 ft.	231 ft.
Dudleya Trail Trail measured manually	2.9 ft.	2.8 ft.	3.1 ft.	5.2 ft.	5.9 ft.	5.3 ft.	2.7 ft.	2.2 ft.	583 ft.
Catalina Trail	3.3 ft.	3.5 ft.	3.1 ft.	5.9 ft.	8.9 ft.	12.9 ft.	3.4 ft.	3.4 ft.	4703 ft.
West Bluff Trail Trail measured manually	2.2 ft.	2.6 ft.	2.5 ft.	3.5 ft.	3.1 ft.	3.1 ft.	2.8 ft.	3.6 ft.	362 ft.
Sunset Trail	7.3 ft.	6.6 ft.	7.5 ft.	10.1 ft.	13.1 ft.	12.4 ft.	4.9 ft.	6.8 ft.	681 ft.
West Portal Trail	2.6 ft.	3.0 ft.	3.1 ft.	4.4 ft.	4.6 ft.	3.5 ft.	2.7 ft.	2.9 ft.	639 ft.
Coastal Switchback Trail Trail measured manually	3.2 ft.	3.0 ft.	3 ft.	6.1 ft.	5.3 ft.	5.5 ft.	3.2 ft.	2.2 ft.	920 ft.

Portuguese Bend Reserve



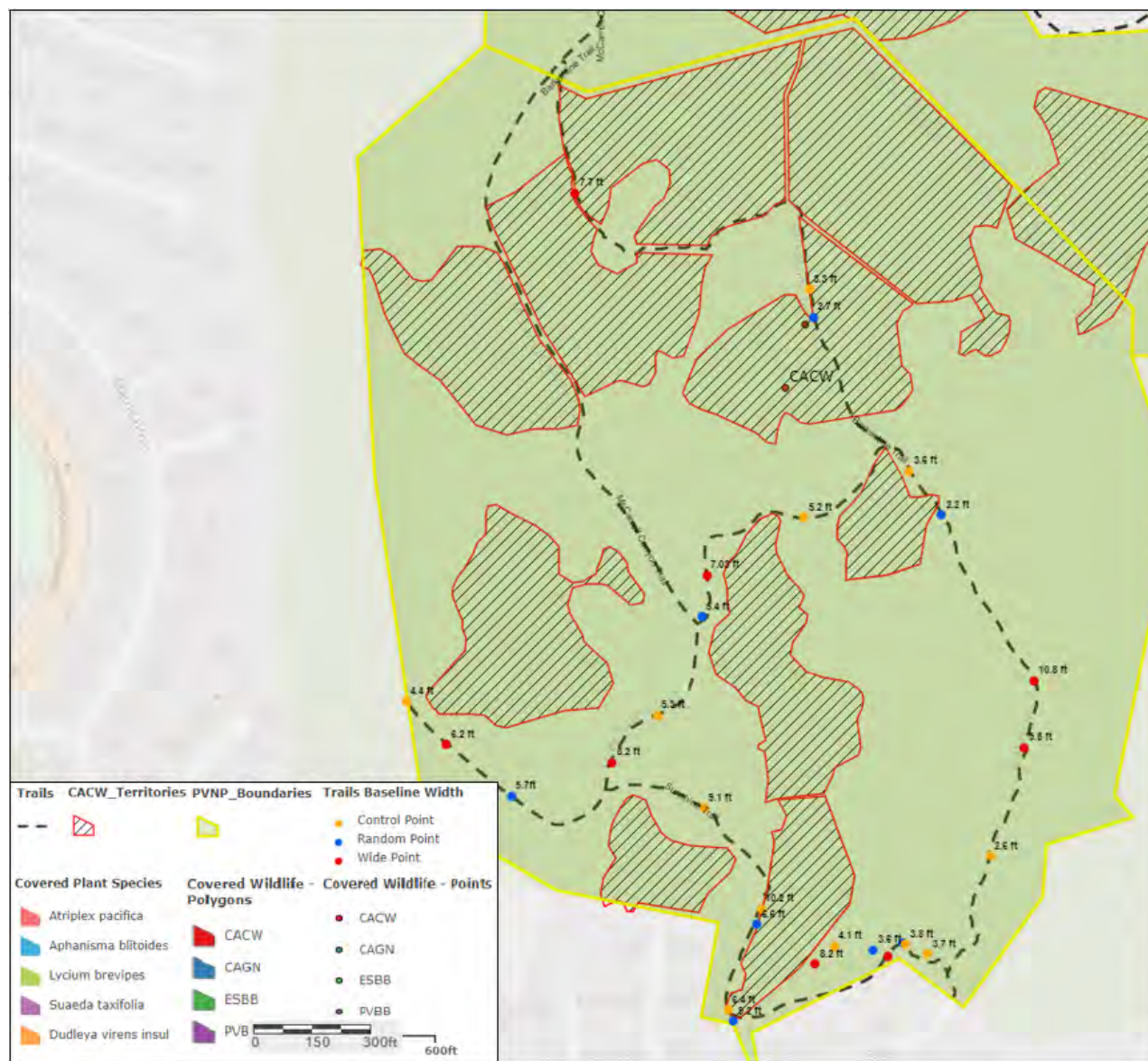
Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Ailor Trail	3.7 ft.	2.6 ft.	3.2 ft.	7.8 ft.	4.8 ft.	3.7 ft.	1.8 ft.	3.4 ft.	1025.3 ft.
Barn Owl Trail	11.7 ft.	8.5 ft.	10.1 ft.	16.6	15.5 ft.	12.3 ft.	7.6 ft.	8.8 ft.	665.7 ft.
Burma Rd Trail	11.1 ft.	13.3 ft.	10.6 ft.	31 ft.	16.7 ft.	17.4 ft.	10.3 ft.	11.4 ft.	10967.2 ft.
Eagle's Nest trail	3.0 ft.	3.5 ft.	3.4 ft.	5.7 ft.	5.1 ft.	7.5 ft.	7.4 ft.	4.2 ft.	2623.7 ft.
Fire Station Trail	4.6 ft.	4.3 ft.	3.9 ft.	7.8 ft.	6.8 ft.	7.7 ft.	4.5 ft.	4.2 ft.	1011.7 ft.
Garden Trail	2.6 ft.	2.1 ft.	3.1 ft.	3.5 ft.	4.2 ft.	5.2 ft.	2.0 ft.	1.8 ft.	898.6 ft.
Grapevine Trail	1.1 ft.	1.3 ft.	1.1 ft.	2.9 ft.	3.2 ft.	2.9 ft.	2.0 ft.	1.6 ft.	1747.4 ft.
Ishibashi Farm Trail	1.7 ft.	1.6 ft.	1.4 ft.	5.1 ft.	3.9 ft.	4.6 ft.	2.0 ft.	1.2 ft.	1002 ft.
Ishibashi Trail	5.2 ft.	5.7 ft.	5.6 ft.	10.1 ft.	9.7 ft.	7.7 ft.	3.2 ft.	4.4 ft.	4515.2 ft.
Klondike Canyon Trail	3.7 ft.	5.3 ft.	3.4 ft.	8.9 ft.	5.7 ft.	6.9 ft.	1.9 ft.	3.2 ft.	1234.4 ft.
Kubota Trail	1.1 ft.	0.9 ft.	1.2 ft.	3.6 ft.	3.2 ft.	4.2 ft.	1.8 ft.	1.9 ft.	1375.2 ft.
Landslide Scarp Trail	3.4 ft.	3.1 ft.	2.6 ft.	4.7 ft.	5.8 ft.	4.1 ft.	1.8 ft.	2.9 ft.	1332 ft.
Paintbrush Trail	2.8 ft.	2.9 ft.	2.6 ft.	7.1 ft.	4.9 ft.	N/A	1.7 ft.	2.4 ft.	1585.5 ft.
Panorama Trail	5.2 ft.	5.0 ft.	5.3 ft.	14.5 ft.	10.4 ft.	9.1 ft.	2.4 ft.	2.3 ft.	1736.8 ft.
Peacock Flats Trail	3.1 ft.	3.2 ft.	3.4 ft.	5.9 ft.	4.5 ft.	N/A	2.9 ft.	4.0 ft.	1335.1 ft.
Pepper Tree Trail	4.4 ft.	4.7 ft.	3.9 ft.	7.4 ft.	6.6 ft.	5.8 ft.	2.5 ft.	3.4 ft.	908.1 ft.
Pepper Tree Trail (drivable section)	8.3 ft.	9.2 ft.	8.8 ft.	11.7 ft.	9.3 ft.	11.9 ft.	8.2 ft.	7.6 ft.	3134.3 ft.
Rim Trail (North)	2.4 ft.	1.6 ft.	1.4 ft.	3.9 ft.	2.9 ft.	3.2 ft.	1.6 ft.	1.6 ft.	1247.2 ft.
Rim Trail (South)	1.2 ft.	0.9 ft.	1.1 ft.	2.2 ft.	2.6 ft.	3.2 ft.	1.6 ft.	1.5 ft.	2548.1 ft.
Sandbox Trail	4.7 ft.	3.8 ft.	4.5 ft.	11.1 ft.	8.8 ft.	7.6 ft.	1.9 ft.	3.2 ft.	841.9 ft.
Toyon Trail	4.6 ft.	3.3 ft.	3.9 ft.	7.4 ft.	5.9 ft.	5.5 ft.	3.3 ft.	3.8 ft.	1195.3 ft.
Vanderlip Trail Trail temporarily closed	3.7 ft.	3.6 ft.	3.8 ft.	4.7 ft.	5.7 ft.	4.5 ft.			1948.3 ft.
Water Tank Trail	9.1 ft.	8.2 ft.	9.4 ft.	11.9 ft.	N/A	N/A	7.4 ft.	8.8 ft.	1067.7 ft.



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Marymount Trail	2.1 ft.	1.9 ft.	1.7 ft.	2.4 ft.	2.1 ft.	3.1 ft.	1.5 ft.	1.4 ft.	1164 ft.
Switchback Trail	2.2 ft.	2.4 ft.	2.4 ft.	5.6 ft.	5.1 ft.	5.2 ft.	2.3 ft.	1.8 ft.	1806 ft.
Wanderer Trail	7.8 ft.	10.7 ft.	11.2 ft.	15.2 ft.	N/A	N/A	8.8 ft.	3.2 ft.	1156 ft.

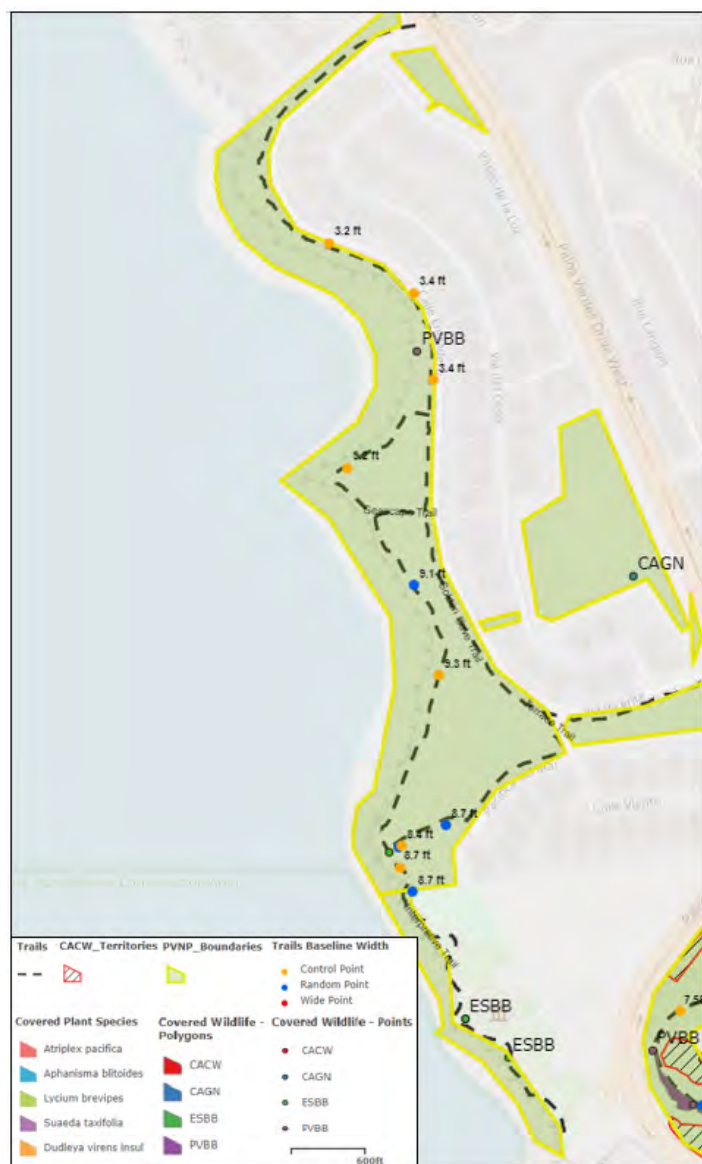
***Trail locations at this reserve need to be updated in the map to accurately reflect field alignment.**

Three Sisters Reserve



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Barkentine Trail	3.6 ft.	3.3 ft.	2.6 ft.	10.8 ft.	9.8 ft.	7.7 ft.	2.2 ft.	2.7 ft.	3406 ft.
McBride Trail	5.9 ft.	6.3 ft.	5.8 ft.	N/A	N/A	N/A	4.6 ft.	10.5 ft.	2659 ft.
McCarrell Canyon Trail	6.6 ft.	7.4 ft.	6.8 ft.	8.3 ft.	10.4 ft.	9.2 ft.	4.3 ft.	5.3 ft.	2084 ft.
Sunshine Trail (Drivable)	9.1 ft.	10.2 ft.	6.4 ft.	N/A	N/A	N/A	9.2 ft.	6.6 ft.	894 ft.
Sunshine Trail	4.1 ft.	3.8 ft.	3.7 ft.	8.2 ft.	5.2 ft.	5.7 ft.	2.3 ft.	3.6 ft.	795 ft.
Three Sister Trail	5.3 ft.	5.2 ft.	4.4 ft.	7.03 ft.	8.2 ft.	6.2 ft.	5.4 ft.	5.7ft	2807 ft.

Vicente Bluffs Reserve



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Golden Cove Trail Trail Temporarily Closed	3.2 ft.	3.4 ft.	3.4 ft.	N/A	N/A	N/A	3.4 ft.	3.4 ft.	1432 ft.
Seascape Trail	8.9 ft.	9.3 ft.	9.2 ft.	N/A	N/A	N/A	9.1 ft.	8.7 ft.	2871 ft.
Terrace Trail	8.5 ft.	8.4 ft.	8.7 ft.	N/A	N/A	N/A	8.7 ft.	8.9 ft.	403 ft.
Toveemor Trail	4.7 ft.	4.2 ft.	4.6 ft.	N/A	N/A	N/A	5.1 ft.	6 ft.	707 ft.

***No wide points exist on this reserve since the engineered decomposed granite trails have consistent widths throughout and reinforced with backing board and fence delineation. Toveemor Trail is delineated with a post and cable fence along the entire length.**

Vista Del Norte Reserve



Trail	Control Point 1	Control Point 2	Control Point 3	Wide Point 1	Wide Point 2	Wide Point 3	Random Point 1	Random Point 2	Length of Entire Trail (ft.)
Indian Peak Trail	2.6 ft.	2.2 ft.	1.4 ft.	3.1 ft.	3.3 ft.	2.7 ft.	2.7 ft.	2.3 ft.	1325 ft.
Vista Del Norte Trail	1.4 ft.	1.6 ft.	1.4 ft.	2.4 ft.	2.1 ft.	1.9 ft.	2.1 ft.	2.2 ft.	1389 ft.

*** Trail locations at this reserve need to be updated in the map to accurately reflect field alignment.**

5 DISCUSSION/RECOMMENDATIONS

Based on the results of the trail baseline survey, Land Conservancy staff has developed general recommendations for appropriate trail widths and prioritization of spur trail closures with the goal to protect sensitive trailside resources.

Baseline Trail Methodology Recommendations

The trail baseline monitoring program was developed to assess and document current trail widths to assist in the monitoring and management of recreational trails as required in the NCCP. The accuracy of measuring trail widths using GIS and 2017 LARIAC aerial imagery was accurate to within 1-2 feet of total trail measurements when verified in the field. This 1-2 feet margin of error can be due to various reasons such as pixels distorting imagery, time of year when imagery was taken and seasonal growth of surrounding vegetation, and changes occurring on the land between time of imagery capture and field verification since LAIRAC is currently updated every three years.

NCCP section 9.2.2.2 details criteria to guide in determining whether substantial widening of an existing trail has occurred over the baseline survey at the monitoring GPS point locations or in areas that exhibit substantial widening outside of the GPS locations:

For Non-Vehicular Trails:

- a. Over 2 feet wide: Substantial change is defined as widening more than an average of 2 feet (total both sides) beyond the baseline width over 10% of the total trail length.
- b. Equal to or less than 2 feet wide: Substantial change is defined as widening more than an average of 1 foot (total both sides) beyond the baseline width over 10% of the total trail length.

For Vehicular Access Trails:

- c. Over 8 feet wide: Substantial change is defined as widening more than an average of 2 feet (total both sides) beyond the baseline width over 10% of the total trail length.
- d. Equal to or less than 8 feet wide: substantial change is defined as widening more than an average of 1 foot (total both sides) beyond the baseline width over 10% of the total trail length.

Due to the guidelines set in the NCCP, the 1-2 foot margin of error could reflect discrepancies in the data's accuracy and trigger the criteria determining that a trail has been widened. Therefore, it is recommended that future trail width measurements be done in field using this projects baseline GIS data. TheGIS data is accessible to field monitors through the ESRI GIS collector app, making it easy to find the control, wide and random points in the field and collect accurate widths manually. Volunteer phones should be combined with a GPS high-accuracy receiver for best results.

The future 2026 trail width report should also assess the most current available aerial imagery to determine if it provides more accuracy than the 2017 LARIAC imagery used for this 2021 baseline survey. If imagery has a margin of error less than 1 foot, it should be considered as an option for trail width measurements using the same methodology described in this report.

Trail Width Recommendations

The majority of the trails on the Palos Verdes Nature Preserve are unimproved and historically existed before the preserve was formed as social trails or farm roads. When the major land acquisition efforts began around 2005, the Public Use Master Plan was drafted with strong community input. During the PUMP process, the advisory group intentionally did not set trail width standards nor did they determine multi-use designation (ie. hiking, biking, equestrian) based on the trail widths at that time. There is no historical data to show that trail widths have grown wider since the authorized recreational designations were adopted. This report will serve as the baseline data for trail widths in the preserve and will help to guide future management recommendations going forward.

It is recommended that trail widths be kept as close as possible to the overall average current trail widths. An average of the 3 control points is the general recommended trail width for that specific trail (with understanding that trails are not uniform in width throughout due to topographic reasons and other influences). Given that current recreational trail use designations (multiuse, hiking only, or combination thereof) have been in place for about 15 years, it is presumed that trail widths should not grow wider in future unless there are other underlying conditions that drive trail widening. Such underlying conditions that may cause widening include extreme trail slope, rocky and erosive geology, and minimal trailside habitat (ie. bare ground or nonnative grassland) to control the obvious edge of the trail bed.

It is recommended that all wide sections of trail be narrowed to the recommended trail width within 2 feet or less (total both sides) so that the overall trail width is constant. This can be done with temporary post and cable, post and rope or strategic log placement so that vegetation can fill current wide areas. This will ensure that those trails minimize impacts to the surrounding vegetation and habitat and increase the amount of areas for native vegetation. The placement of logs has been shown to be an effective strategy in trail delineation and width control. This process should be implemented and completed before the 2026 trail width monitoring, resources permitting. In locations where these mitigation measures may not be feasible due to some of the underlying conditions as described above, trail reroutes may be explored and old trail alignments revegetated in order reduce overall habitat impact. However, trail reroutes are not appropriate if they would newly impact sensitive habitat and therefore other management actions should be explored (ie, changing use designation, closing the trail, etc.)

There are approximately 19 vehicular trails on the preserve with various widths and turn-a-round points. The NCCP requires a formal Preserve Access Protocol (PAP) whereby the PVPLC, the City and the Wildlife Agencies will determine the appropriate widths for these vehicular trails and if they meet the needs to facilitate access for all authorized vehicles. Recommendations for vehicular access trail widths are not included in the tables below. Vehicular trail widths determination should follow measures included in Section 5.5 of the NCCP, to avoid and minimize, the maximum extent possible, environmental damage, including direct and indirect impacts to habitat and Covered Species.

Trail migration and shifting has occurred over time in some locations such as Vista del Norte Reserve and San Ramon Reserve. The reason for trail migration is due to the minimal surrounding vegetation. Trail delineation is recommended to minimize future trail migration. This can be done with post and cable fencing, post and rope or log placement from non-native trees cut on site. These methods can also be used to begin the process of narrowing trails to the recommended width.

With the completion of this baseline survey, PVPLC, the City and the Wildlife Agencies will have data to determine appropriate widths for all approved trails as identified in the PUMP and Preserve Trails Plan. The final width determination will take into consideration the current trail widths as documented by the baselines surveys, trail topography, nearby sensitive species and their habitats, trail prism, public use (taking into consideration the PUMP), and other factors. Once the final widths have been determined and agreed upon, they will be memorialized in the PUMP and will be referenced for comparison during subsequent 5-year trail width monitoring events. The determined trail widths will be monitored and maintained as a conditions for trail coverage as a Covered Activity under the NCCP and compatible with conservation goals.

Abalone Cove Reserve

Trail	Recommended Trail Width (< 2 ft.)
Abalone Cove Trail	4.9ft
Beach School Trail (Vehicular Trail)	N/A
Bow and Arrow Trail (Vehicular Trail)	TBD
Cave Trail –Trail Closed	N/A
Chapel View Trail (Vehicular Trail)	TBD
Cliffside Trail	2.7 ft.
Inspiration Point Trail	3.2 ft.
Olmsted Trail (Vehicular Trail)	13.9 ft.
Portuguese Point Loop Trail (Vehicular Trail)	TBD
Sacred Cove Trail	3 ft.
Sea Dahlia Trail –Trail Closed	N/A
Smuggler's Trail	2.3 ft.
Via de Campo Trail (Vehicular Trail)	TBD

*Beach School trail is paved and width cannot be adjusted.

Agua Amarga Reserve

Trail	Recommended Trail Width (< 2 ft.)
Lunada Canyon Trail	1.9 ft.

Alta Vicente

Trail	Recommended Trail Width (< 2 ft.)
Alta Vicente Trail (West) (Vehicular Trail)	TBD
Alta Vicente Trail (East)	3.9 ft.
South Spur Trail	7.8 ft.
North Spur Trail	7.5 ft.
Nike Trail	2.3 ft.
Prickly Pear Trail	2.3 ft.

Filiorum

Trail	Recommended Trail Width (< 2 ft.)
Eucalyptus Trail	1.8 ft.
Ford Trail	1.8 ft.
Gary's Gulch	4 ft.
Jack's Hat Trail	2.7 ft.
Kelvin Canyon Trail	3.7 ft.
Pony Trail	2.7 ft.
Rattle Snake Trail	3.4 ft.
Zote's Cut Across Trail	4.2 ft.

Forrestal Reserve

Trail	Recommended Trail Width (< 2 ft.)
Basalt Trail	3.9 ft.
Cactus Trail	3.2 ft.
Canyon Trail	2.6 ft.

Conqueror Trail(Vehicular Trail)	TBD
Cristo Que Viento Trail	3.1 ft.
Dauntless Trail	3.6 ft.
Exultant Trail	2.6 ft.
Flying Mane Trail	2.6 ft.
Fossil Trail	3.4 ft.
Mariposa Trail	1.9 ft.
Purple Sage Trail(Vehicular Trail)	TBD
Pirate Trail	3.7 ft.
Quarry Trail	2.7 ft.
Red Tail Trail	2.3 ft.
Vista Trail	3.4 ft.
Equestrian Turn Around	2.3 ft.

Ocean Trails Reserve

Trail	Recommended Trail Width (< 2 ft.)
East Boundary Trail	5.6 ft.
Gnatcatcher Trail	2.9 ft.
Sagebrush Walk Trail	9.5 ft.
Shoreline Park Trail	6 ft.
Southshore Coastal Trail	2 ft.
Dudleya Trail	2.9 ft.
Catalina Trail	3.3 ft.
West Bluff Trail	2.4 ft.
Sunset Trail	7.1 ft.
West Portal Trail	2.9 ft.
Coastal Switchback Trail	3.1 ft.

Portuguese Bend Reserve

Trail	Recommended Trail Width (< 2 ft.)
Ailor Trail	3.2 ft.
Barn Owl Trail (Vehicular Trail)	TBD
Burma Rd Trail (Vehicular Trail)	TBD
Eagle's Nest trail (Vehicular Trail)	TBD
Fire Station Trail	4.3 ft.
Garden Trail	2.6 ft.
Grapevine Trail	1.2 ft.
Ishibashi Farm Trail (Vehicular Trail)	TBD
Ishibashi Trail	5.5 ft.
Klondike Canyon Trail (Vehicular Trail)	TBD
Kubota Trail	1.1 ft.
Landslide Scarp Trail	3 ft.
Paintbrush Trail	2.8 ft.
Panorama Trail	5.2 ft.
Peacock Flats Trail	3.2 ft.
Pepper Tree Trail	4.3 ft.
Pepper Tree Trail (drivable section)	TBD
Rim Trail (North)	1.8 ft.
Rim Trail (South)	1.1 ft.
Sandbox Trail	4.3 ft.
Toyon Trail	3.9 ft.
Vanderlip Trail Trail temporarily closed	3.7 ft.
Water Tank Trail (Vehicular Trail)	TBD

San Ramon Reserve

Trail	Recommended Trail Width (< 2 ft.)
Marymount Trail	1.9 ft.
Switchback Trail	2.3 ft.

Wanderer Trail (Vehicular Trail)	TBD
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Three Sisters Reserve

Trail	Recommended Trail Width (< 2 ft.)
Barkentine Trail	3.2 ft.
McBride Trail (Vehicular Trail)	TBD
McCarrell Canyon Trail (Vehicular Trail)	TBD
Sunshine Trail (Drivable Section)	TBD
Sunshine Trail	3.9 ft.
Three Sister Trail (Vehicular Trail)	TBD

Vicente Bluffs Reserve

Trail	Recommended Trail Width (< 2 ft.)
Golden Cove Trail Trail Temporarily Closed	3.3 ft.
Seascape Trail	9.1 ft.
Terrace Trail	8.5 ft.
Toveemor Trail	4.5 ft.

Vista Del Norte

Trail	Recommended Trail Width (< 2 ft.)
Indian Peak Trail	2 ft.
Vista Del Norte Trail	1.5 ft.

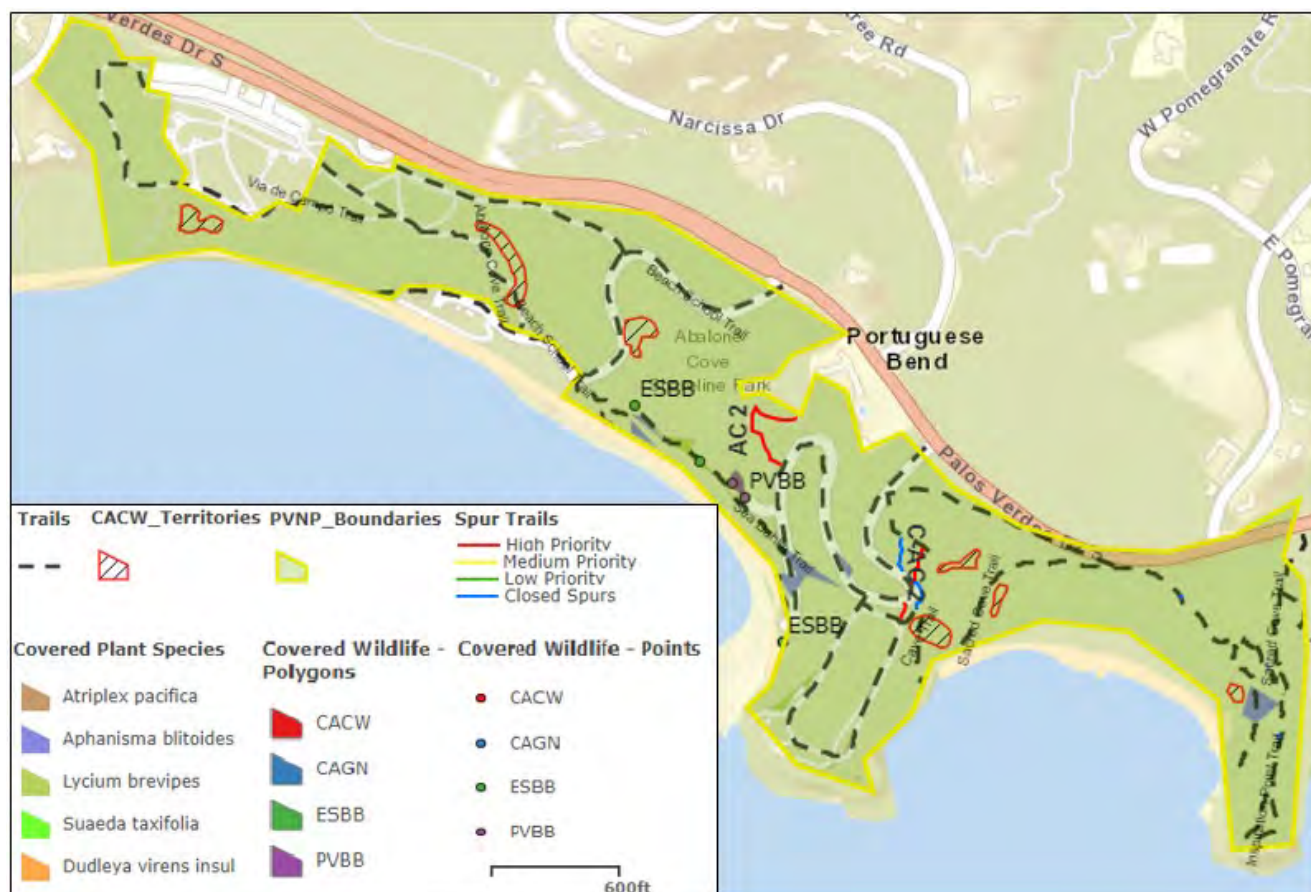
Spur Trail Closure Recommendations

Many unauthorized trails exist on the preserve. In this document, these unauthorized trails are referred to as spur trails. Spur trails are threats to flora and fauna and specifically in the preserve, NCCP covered species. Below are maps of spur trails documented from 2019-2021. The maps are coded to show prioritization with explanations of the potential impacts. Also shown are major spur trails that were closed during this time period. Approximately 100 minor spur trails have been closed in this same time period, but are not shown in these maps due to the overwhelming amount of data that would be displayed on a map.

Trail closure prioritization was primarily based on two factors: potential covered species impact and amount of spur trail use by public. The spur trail maps show the various covered species locations populations and territories. If a spur trail has the potential to cause an impact to a covered species or associated habitat, it is deemed high priority to close. PVPLC's Rapid Response program was created to address these potential impacts in a timely manner and are conducted by qualified and trained personnel who approach spur closers in a way that minimizes disturbance of species. Heavy public use of a spur trail elevates the impact to a priority level for closure so that impacts do not become irreversible.

The Rapid Response program endeavors to address spur trails before they become heavily used and impactful to the habitat. Spur trails are progressively escalated to higher urgency if cues of heavy public use are readily observed. A graduated approach to closing the spur trail is implemented with the goal to obstruct the trail using natural materials, and may involve stronger deterrents depending on the magnitude of use and propensity to be vandalized. An initial spur trail closure may involve soil disturbance and brush placement to hide the trail. If continued use is seen, closures may involve post and cable fencing with closure signage that includes a municipal code for enforcement as well as planting and/or seeding of appropriate local species. PVPLC's staff are also trained to recognize game trails and how to discern them from human-created spur trails.

Abalone Cove Reserve



The Abalone Cove Reserve is a 64 acre site with approximately 2.88 miles of trails. The 13 trails traverse a combination of coastal sage scrub, southern coastal bluff scrub and grassland. NCCP Covered species include the gnatcatcher, coastal cactus wren, Santa Catalina Island desert-thorn, woolly seabligh, aphanisma and south coast saltscale.

Identified Spur trails priority level:

- **High:** **AC1**-This spur leads from the Smugglers trail lookout as shortcut to Olmsted trail. Restoration work was completed in the area being transected which is gnatcatcher and coastal cactus wren habitat. PVPLC recommends continued planting of cactus, soil disturbance and regulatory signage placement.
- AC2**-This spur trail is a historical driveway from the adjacent Heritage Castle property. Recent restoration work has made this area suitable for gnatcatcher, coastal cactus wren, PVBB and ESB habitat. PVPLC recommends that the site continue to be maintained so the plantings fill in, post and cable addition to the Olmstead trail access point and regulatory signage installation.
- AC3**-This spur is a shortcut between Olmstead trail and Portuguese Point Loop trail. The area is gnatcatcher and coastal cactus wren habitat. PVPLC recommends post and cable installation, soil disturbance and regulatory signage installation.

- Medium: None
- Low: None
- Closed Spur trails – C-AC1, C-AC2, C-AC3, C-AC4, C-AC5

Agua Amarga Reserve



The Agua Amarga Reserve is a 59 acre site with 1 trail in the Lunada Canyon section measuring approximately 1/2 mile. The reserve consists of coastal sage scrub, coastal cactus scrub, grassland and disturbed vegetation. NCCP covered species include gnatcatcher and coastal cactus wren.

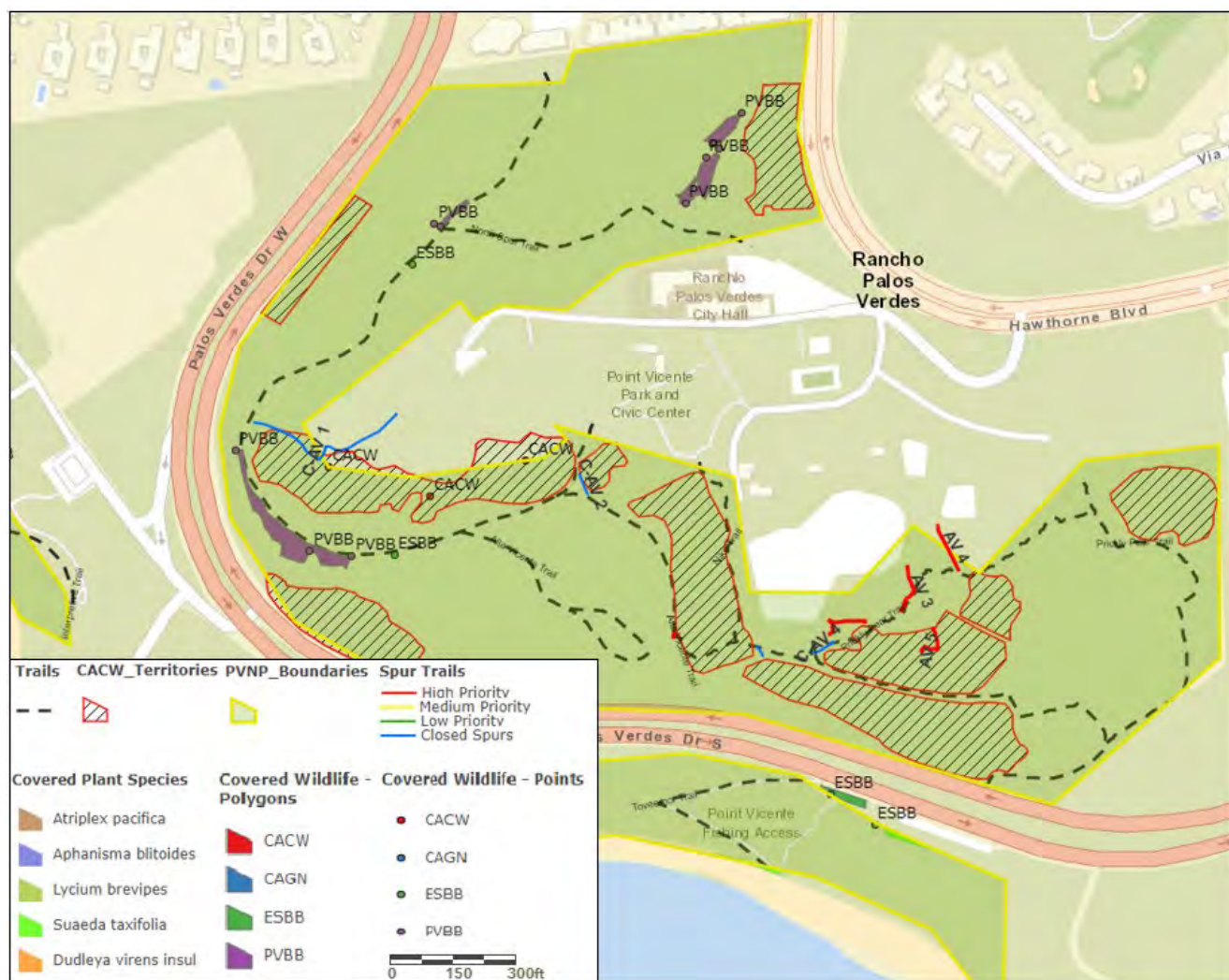
Identified Spur trails priority level:

- High: None
- Medium: None
- Low: **Agua I**-This spur trail is a historical access point from the local homes which allow fieldtrip access to the reserve from neighboring Vista Grande Elementary. Since field trips are

planned into the indefinite future as part of their science curriculum, PVPLC recommends placing a detachable post and cable closure on the preserve side of the spur and adding brush to hide the spur from unauthorized public use.

Closed Spur trails: **C-Agua I**

Alta Vicente Reserve



The Alta Vicente Reserve is a 51 acre site with approximately 1.67 miles of trails. The main habitat at Alta Vicente is coastal sage scrub, coastal cactus scrub, grassland and disturbed vegetation. NCCP covered species include gnatcatcher and coastal cactus wren.

Identified Spur trails priority level:

- **High:** **AV1**-This spur leads to the edge of Alta Vicente preserve to a cliff lookout. The area was recently restored and is gnatcatcher habitat. PVPLC recommends disturbing the soil, planting cactus and placing regulatory signage.
- **AV2**-This spur leads from the City of Rancho Palos Verdes maintenance yard into the preserve. PVPLC is working with the city to address these spurs that cross through gnatcatcher, coastal cactus wren and Island Green Dudleya habitat. PVPLC recommends disturbing the soil, covering with brush, and placing regulatory signage at the three entry

points. City contractor education is also recommended since the trails lead from an area frequented by them.

AV3-Similar to AV2, this spur leads from the City of Rancho Palos Verdes maintenance yard into the preserve. PVPLC is working with the city to address these spurs that cross through gnatcatcher, coastal cactus wren and Island Green Dudleya habitat. PVPLC recommends disturbing the soil, covering with brush, and placing regulatory signage at the two entry points. City contractor education is also recommended since the trails lead from an area frequented by them.

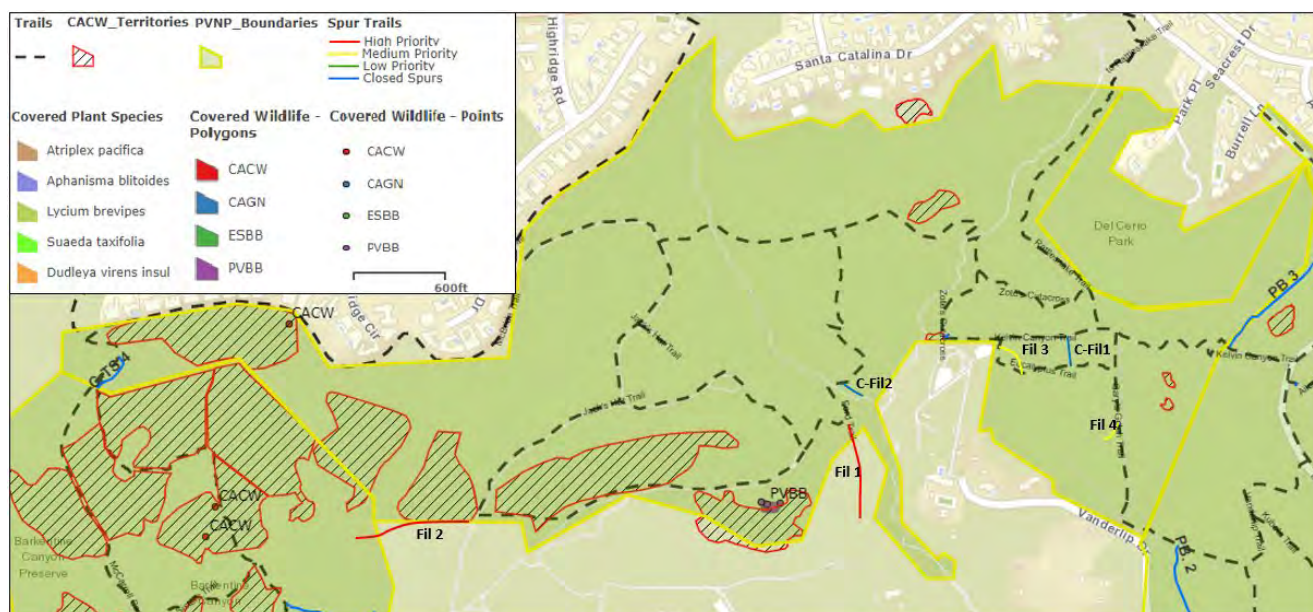
AV4-This spur leads to an old pillbox bunker on the side of the hill. The spur crosses through gnatcatcher, coastal cactus wren and Island Green Dudleya habitat. PVPLC recommends disturbing the soil, covering with brush, and placing regulatory signage at the entry point.

AV5- This spur leads from the City of Rancho Palos Verdes maintenance yard into the preserve. PVPLC is working with the city to address these spurs that cross through gnatcatcher, coastal cactus wren and Island Green Dudleya habitat. PVPLC recommends disturbing the soil, covering with brush, and placing regulatory signage at the entry points. City contractor education is also recommended since the trails lead from an area frequented by them.

- Medium: None
- Low: None

Closed Spur trails: **C-AV1, C-AV2, C-AV3, C-AV4**

Filiorum Reserve



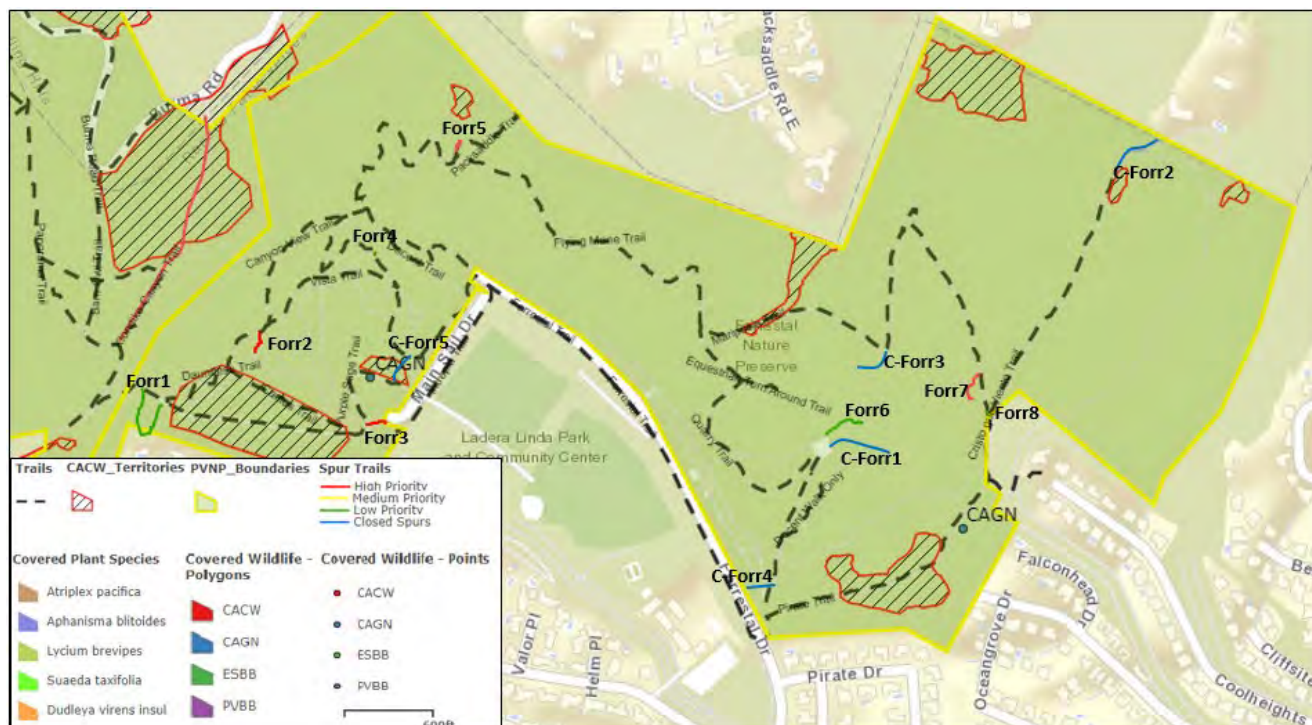
The Filiorum Reserve is a 191-acre property which lies in the center of the 900 contiguous acres of the Palos Verdes Nature Preserve. 3.76 miles traverse the various habitats which consists of coastal sage scrub, southern cactus scrub, grassland, exotic woodland and disturbed vegetation. NCCP covered species consists of core populations of gnatcatcher and coastal cactus wren.

Identified Spur trails priority level:

- **High:** **Fil1**-This spur is an old access point from the Portuguese Bend Community. The area surrounding the trail is gnatcatcher, coastal cactus wren and PVBB habitat. The connecting area below the reserve has recently been developed and minimal use is now seen. A regulatory sign is currently in place. PVPLC recommends soil disturbance and brush placement to allow the spur trail to be revegetated.
Fil2-This spur trail crosses through private property and connects to Three Sisters Reserve. The area is gnatcatcher and coastal cactus wren habitat. Currently, there is post and cable closures, brush closures and regulatory signage. While there is still evidence of use of this spur, it is minimal. It is recommended that the post and cable closures and regulatory signage be kept up and replaced when vandalized. Brush closures and soil disturbance should continue so that the trail can continue to fill in.
- **Medium:** None
- **Low:** **Fil3**-This spur trail is a shortcut between Eucalyptus Trail. It bisects a mainly exotic woodland area. PVPLC recommends covering the spur with brush, installing regulatory signage and delineation of the official trail.
Fil4-This spur trail used to connect to an old spur that wrapped around to Gary's Gulch trail. It is now just a remnant of the old trail that leads into gnatcatcher habitat. PVPLC recommends covering the spur with brush and delineation of the official trail.

Closed Spur trails: **C-Fil1, CFil2**

Forrestal Reserve



The Forrestal Reserve is a 154.9 acre reserve located adjacent to the Ladera Linda Community Center. The 21 trails total an approximate 3.93 miles that crisscross through coastal sage scrub, southern cactus scrub, southern coastal bluff scrub, grassland and disturbed vegetation. NCCP covered species at Forrestal include gnatcatcher, coastal cactus wren, and Catalina Crossosoma.

Identified Spur trails priority level:

- High: Forr2**-This spur cuts through a gnatcatcher habitat area and potential Palos Verdes blue butterfly habitat. Post and cable is currently at the site. PVPLC recommends that the spur trail be closed with additional post and cable, regulatory signage and soil disturbance, with seeding of coastal sage scrub and PVBB host plant.

Forr3-This spur is a shortcut between Purple Sage trail and cuts through gnatcatcher habitat. PVPLC recommends that the spur trail be closed with brush, regulatory signage and soil disturbance, with seeding of coastal sage scrub.
- Medium: Forr5**- This spur was once an official trail (Packsaddle Trail) that lead to private properties. The trail continues to be used lightly and currently has signage and brush blocking the trailhead. It crosses through gnatcatcher and potential coastal cactus wren habitats. PVPLC recommends continued brush closures with regulatory signage and soil disturbance.

Forr7- This spur leads from Mariposa trail down into the quarry where it can connect to other spurs. The spur crosses through gnatcatcher habitat. PVPLC recommends that the spur be closed with post and cable and regulatory signage in addition to soil disturbance.

- **Low:** **Forr1**-This spur trail is a loop around a steep area of Conqueror trail. It leads into a fuel modification zone which is cleared every year. PVPLC recommends that the spur trail be closed with post and cable, brush and regulatory signage.
Forr4-This small spur lead from the Vista trail lookout to the cliff edge. It adds to cliff erosion and impacts southern coastal bluff scrub. PVPLC recommends that this spur be covered with brush and disturbed.
Forr6-This spur leads from the quarry into coastal sage scrub. PVPLC recommends that this spur be covered with brush and disturbed.
Forr8-This small spur is a shortcut between Cristo que Viento Trail and Mariposa Trail. PVPLC recommends that this spur be covered with brush and disturbed.

Closed Spur trails: **C-Forr1, C-Forr2, C-Forr3, C-Forr4, C-Forr5**

Malaga Reserve

Malaga Reserve is a 61.5 acre canyon and the most recent property to be acquired and added to the Preserve. Consisting of coastal sage scrub, grassland and disturbed vegetation habitats. NCCP covered species include the gnatcatcher. The Malaga Reserve trail system is being finalized and has yet to be confirmed. The next 5 year trail width monitoring baseline report in 2026 will include the trails at Malaga Reserve.

Ocean Trails Reserve

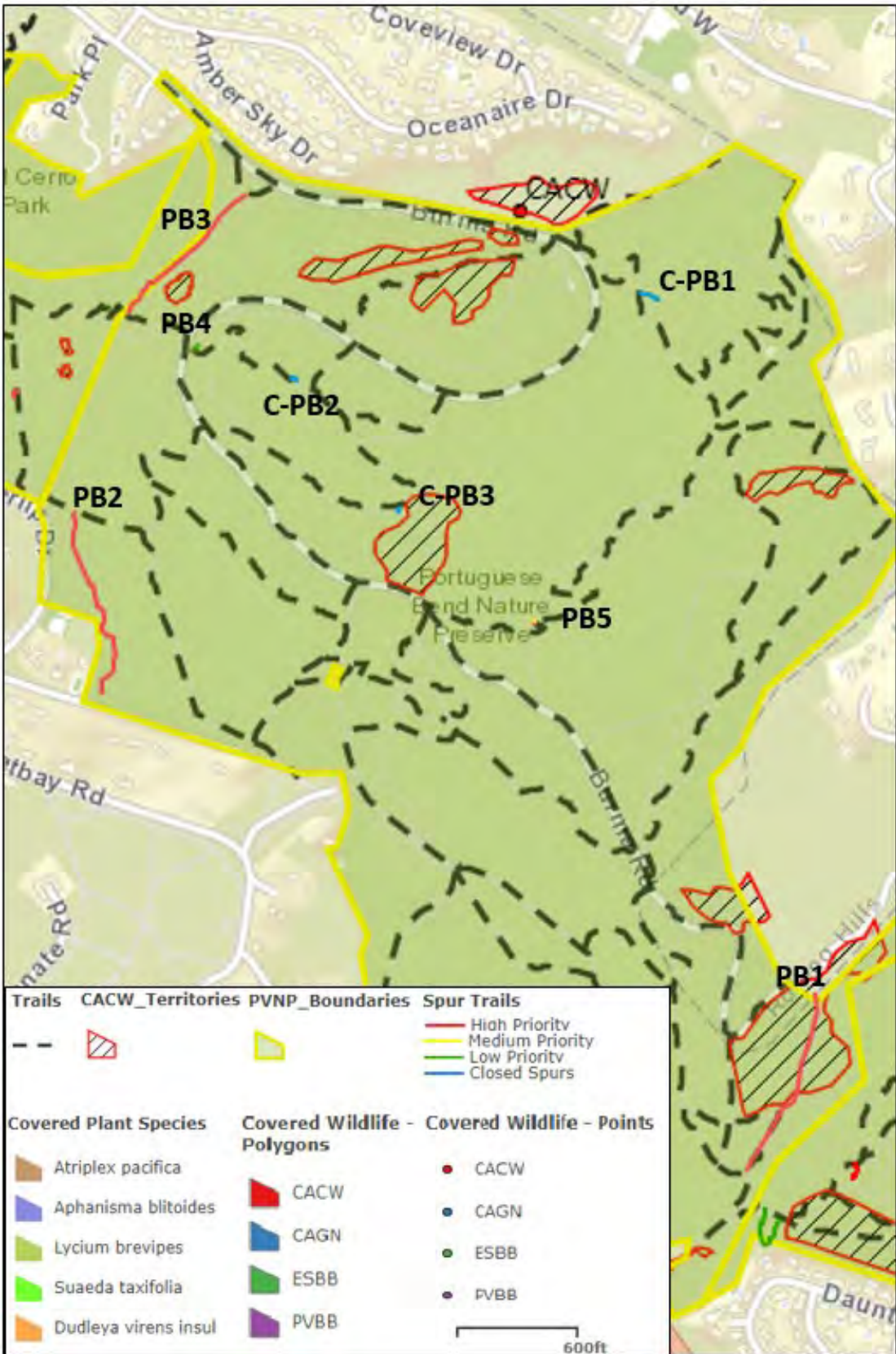


Ocean Trails Reserve is a 119 acre in the south-easternmost section of the Palos Verdes Nature Preserve. The approximate 3.43 miles of trails cross through coastal sage scrub, southern coastal bluff scrub, grassland and disturbed vegetation. Various NCCP covered species include gnatcatcher, coastal cactus wren, island green dudleya, wooly seablight, aphanisma and south coast saltscale.

Identified Spur trails priority level:

- **High:** **OT1**- This spur cuts from West Bluff Trail to the beach. It is a known paragliding staging area and gives illegal access to the beach. The spur trail meanders through Island Green dudleya patches, and gnatcatcher habitat and has become a priority for enforcement by city rangers. PVPLC recommends that a post fence be installed with regulatory signage at both ends. Cactus should also be planted along with coastal sage scrub seeding of path after disturbance.
- **Medium:** None
- **Low:** **OT2**- This spur is a shortcut between Sagebrush Walk trail and Shoreline Park trail. It is recommended that the trail be disturbed and seeded and a post and cable barrier be installed at either end with regulatory signage.
OT3- This spur leads up to an illegal lookout location and reconnects with Sagebrush Walk trail. It is recommended that the trail be disturbed and seeded and a post and cable barrier be installed at either end with regulatory signage.

Portuguese Bend Reserve



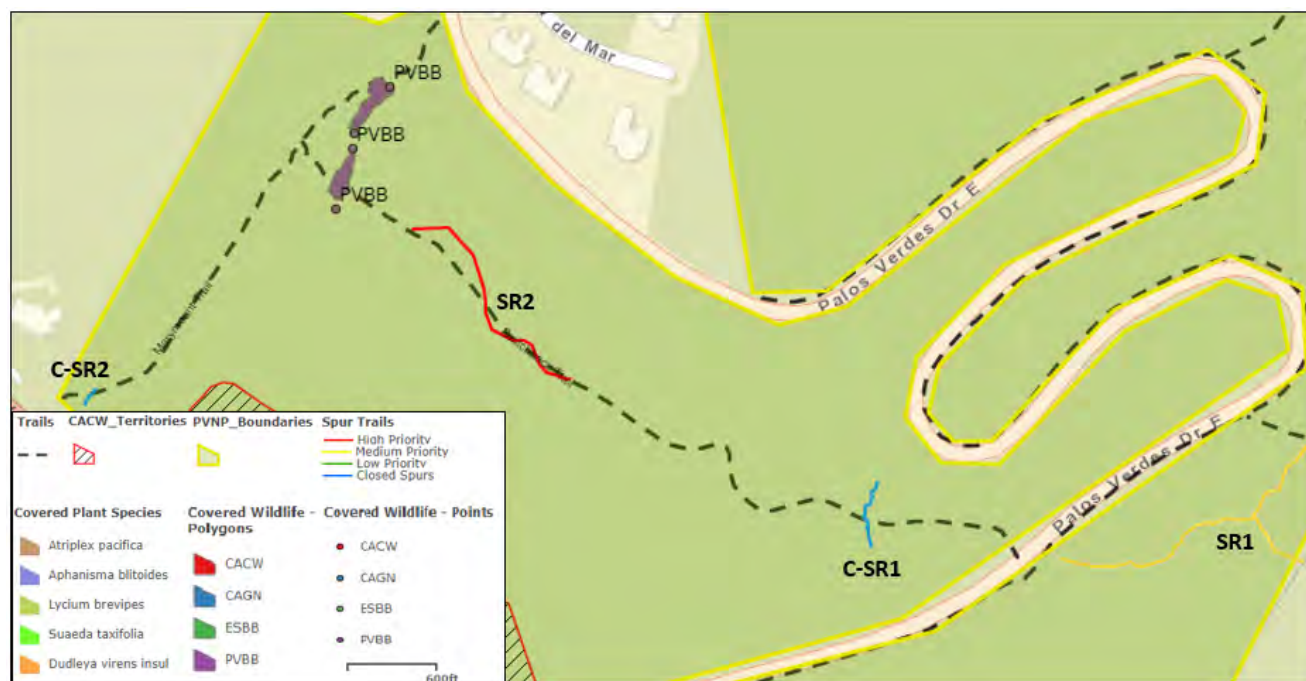
The Portuguese Bend Reserve is a 399 acre parcel that is the largest of the reserves. With 23 trails on rolling hills totaling 9.87 miles, the trails cross coastal sage scrub, southern cactus scrub, grassland, exotic woodland, and disturbed vegetation habitats. NCCP covered species include core populations of the gnatcatcher and coastal cactus wren.

Identified Spur trails priority level:

- High: **PB1**-This spur trail has been existent on the preserve since being acquired. PVPLC has never encountered anyone on the spur, but there is slight evidence of use. The trail is largely composed of daylighting bedrock which does not allow plants to fill in the open area. PVPLC recommends installing post and cable closures with regulatory signage and cactus plantings at both entry points. This area is prioritized since it has historical gnatcatcher and coastal cactus wren sightings.
PB2-This spur trail has been used as a shortcut from Gary's Gulch trail to Narcissa Drive for many years. Since it also serves as a fuel modification zone, it is cleared yearly which leaves it open for illegal trail use. It is recommended that Area Closed signage be installed and post and cable closures be installed at both entry points.
PB3-This spur trail is a short cut from the Burma Road lookout to Kelvin Canyon Trail. The spur was closed for many years but has now opened up again and it comes near a mature large cactus patch. PVPLC recommends installing post and cable closures and regulatory signage at both entry points. The compacted trail should also be disturbed, seeded and planted with cactus pads if feasible.
- Medium: **PB5**- This spur trail cuts across a switchback at Ishibashi trail. Cactus planting, brush placement and trail delineation are recommended.
- Low: **PB4**-This spur is a small shortcut between sections of Ailor trail. It is recommended that the spur gets hidden with brush and the official trail is delineated.

Closed Trails: **C-PB1, C-PB2, C-PB3**

San Ramon Reserve



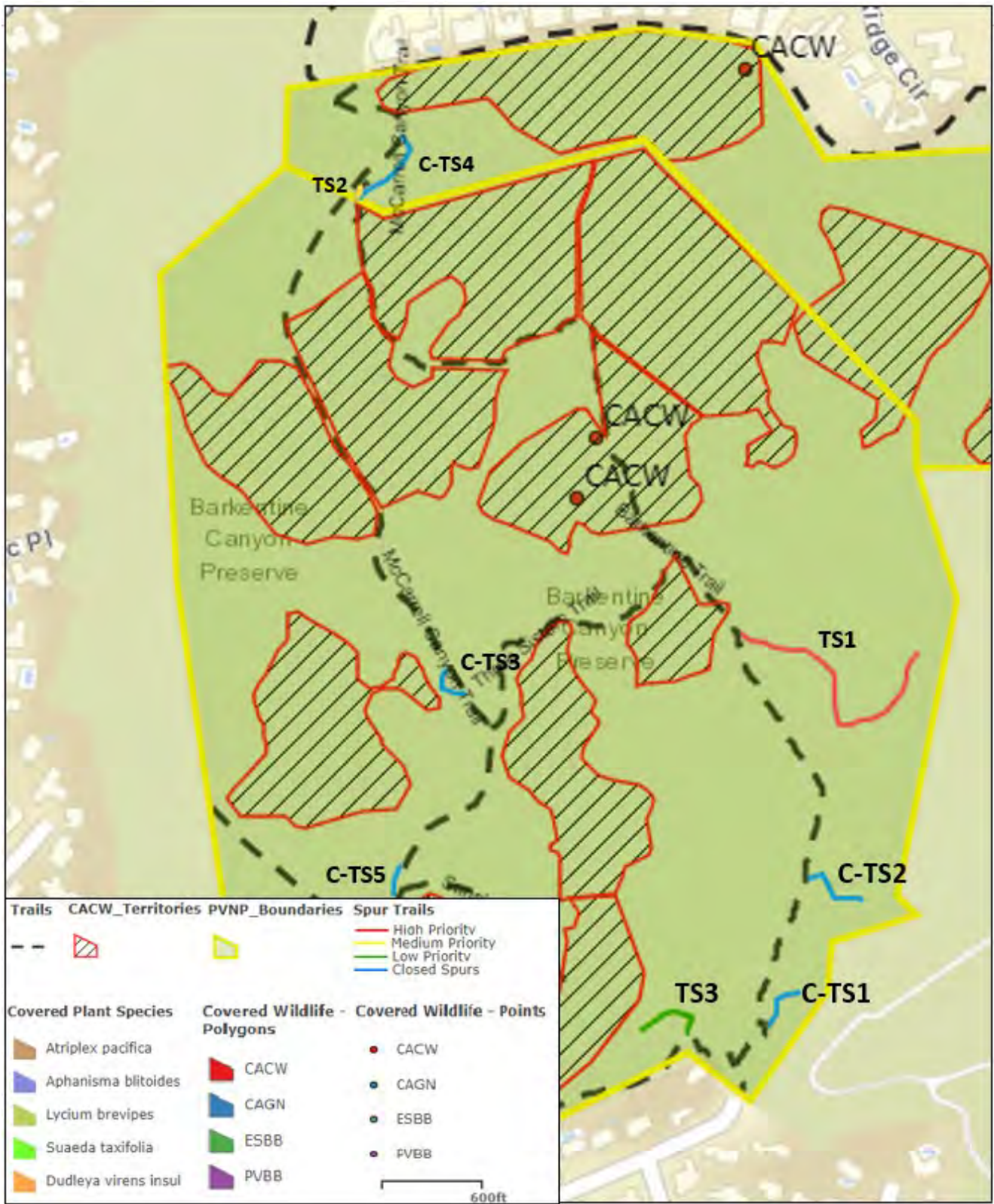
The San Ramon Reserve is comprised of 94 acres of coastal sage scrub, southern cactus scrub, grassland and disturbed vegetation with an approximate .82 miles of trails. NCCP covered species include gnatcatcher and coastal cactus wren.

Identified Spur trails priority level:

- **High: SR2-** This network of spurs is based on a network of illegal bike trails. The spurs follow along the official Switchback trail and connect to the SR1 on the other side of Palos Verdes Drive east. This area is historical PVBB, gnatcatcher and coastal cactus wren habitat. PVPLC recommends disturbing the spurs, laying brush over them and delineating the official trail. Regulatory signage should also be installed in strategic locations.
- **Medium: SR1-** This is part of the network of illegal bike trails that connect to the adjacent county-owned property to the east. This spur also crosses through a coastal sage scrub mitigation and a recent burn area. There is current regulatory signage at this location. PVPLC recommends post and cable closures, spur trail disturbance and strategic placement of regulatory signage.
- **Low: None**

Closed Spur trails: **C-SR1, C-SR2**

Three Sisters Reserve



The Three Sisters reserve is 99 acre parcel spread on a rolling hillside with approximately 1.76 miles that cross through coastal sage scrub, southern cactus scrub, grassland and disturbed vegetation. NCCP covered species coastal cactus wren and gnatcatcher exist on the site.

Identified Spur trails priority level:

- High: **TS1**- This spur trail has been in existence since the Three Sisters reserve was acquired. Vegetation grew back for a few years but is now being used again. It crosses through a grassland restoration site and potential coastal cactus wren and gnatcatcher habitat. Recommendations are to install signage and to disturb the trail path and hide it with natural litter.
- Medium: **TS2**-This spur is used as a shortcut between McCarrell Canyon Trail and Barkentine trail. Impacts to vegetation are minimal with trail widening as the main issue. It is recommended that the spur trail be disturbed and covered with natural litter. The official trails can be delineated with logs and rocks.
- Low: **TS3**-This spur trail is being used as a small shortcut along Sunshine trail. This area serves as a fuel modification zone and is disturbed vegetation consisting of weeds. It is recommended that the spur trail be disturbed and hidden with natural litter. The official trail can be delineated with logs and rocks.

Closed Spur trails: **C-TS1, C-TS2, C-TS3, C-TS4, C-TS5**

Vicente Bluffs Reserve

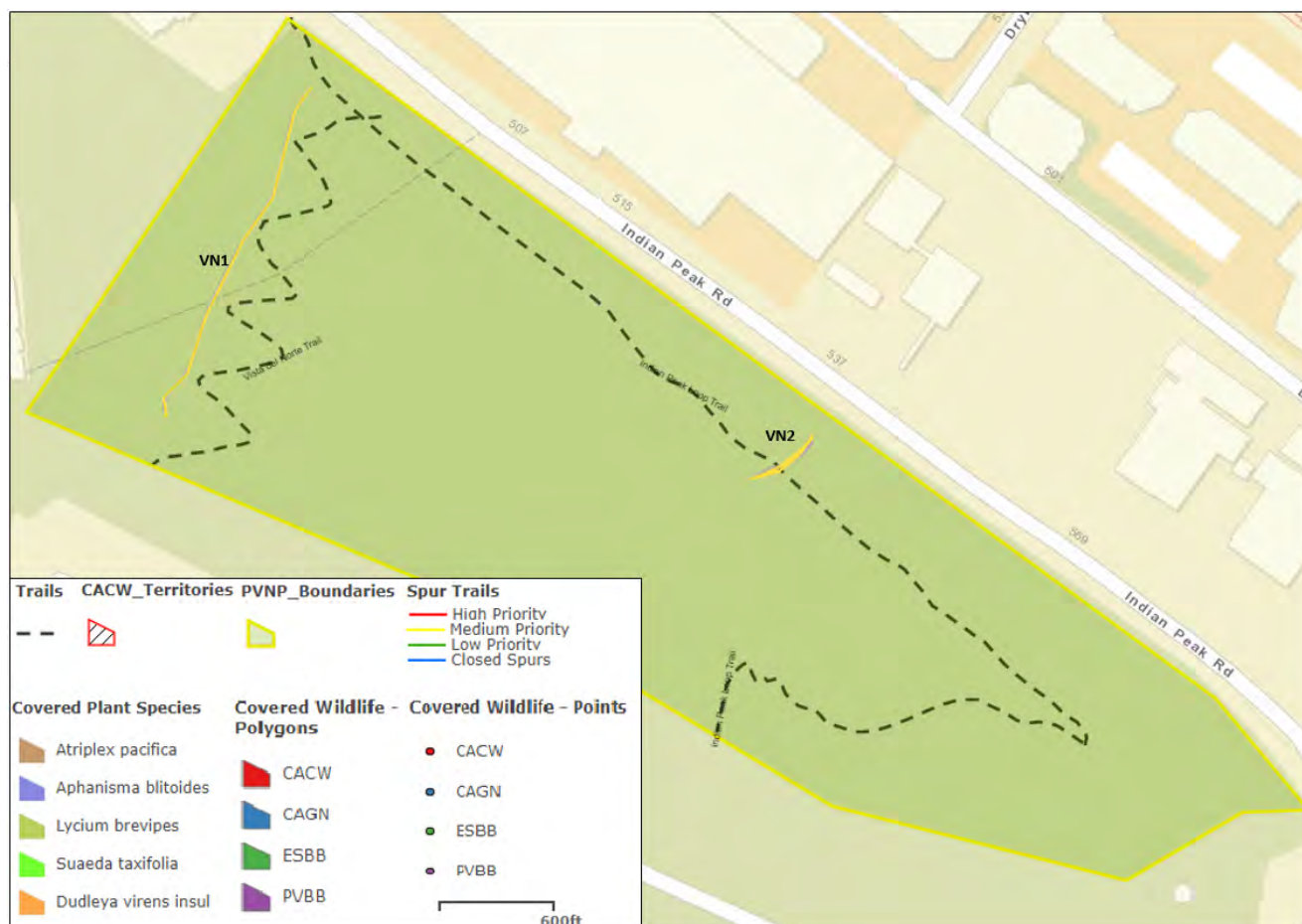


The Vicente Bluffs Reserve stretches around the bluffs of Lower Point Vicente (6 acres), the Fishing Access Property (9 acres) and the habitat areas of Oceanfront Estates (69 acres) for a total of 84 acres. An estimated 2.20 miles of trails skirt coastal sage scrub, southern coastal bluff scrub, southern cactus scrub, grassland and disturbed vegetation. Several known populations of NCCP covered species occur including the gnatcatcher, coastal cactus wren, dudleya virens, woolly seablight, and the El Segundo blue butterfly.

Identified Spur trails priority level:

- High: **VBI**-This spur is being used by the public attempting to access the beach below. The spur follows a loose trail along southern coastal bluff scrub. Island Green Dudleya, a covered species lines the trail and these populations are in danger of being damaged and killed. Signage and planting is recommended at the spur trail entrances.
VB2- This spur is being used by the public attempting to access the beach below. The spur follows a loose trail along southern coastal bluff scrub. Island Green Dudleya, a covered species lines the trail and these populations are in danger of being damaged and killed. Signage and planting is recommended at the spur trail entrances.
- Medium: None
- Low: None

Vista Del Norte Reserve



Vista Del Norte is 16.7 acre Reserve located near the intersection of Indian Peak Road and Crenshaw Blvd. The approximate .56 miles of trails traverse the limited CSS and disturbed habitat. The two trailheads are located at Indian Peak Road and at Crestridge Road via the Sol Y Mar Community. The site currently does not contain any known populations of NCCP covered species.

Identified Spur trails priority level:

- High: None
- Medium: **VN 1**-This spur trail takes a shortcut between the switchbacks of Vista del Norte Trail. Currently, 2 “Area Closed” signs are placed at the top and bottom of the spur trail. This area traverses a Fuel Modification Zone that is cleared every year. A holistic plan that takes the fuel modification zone into consideration needs to be addressed before a sustainable closure plan is developed.
VN 2 – This spur is speculated to be used by locals as a shortcut from the adjacent shopping center onto the Vista del Norte Trails. This area burned in 2014 and was hydroseeded as a recovery effort. As the seeded vegetation grows, the spur trail should disappear. The addition of brush to camouflage and block the trail should be added to this spur.
- Low: None

6 CONCLUSION

It is hoped that technology developments in the future with high-resolution aerial imagery will aid in the efficient monitoring of the Preserve trails. Until that time when the margin of error can be reduced, it is advised that field monitoring serve as the primary data gathering methodology in the next 5-year survey.

There are great challenges inherent in the circumstances by which trails were inherited from social use (not engineered) and were designated for uses without memorializing trail width standards when the Preserve Trails Plan and Preserve Use Master Plan (PUMP) were developed. Therefore, it is difficult at this juncture to advise what the trail widths should be, without public input and concurrence from the City and Wildlife Agencies. This report proposes using the average of the three control points for each trail to determine acceptable widths, but this may be open for discussion if other considerations and methodologies are preferred by the stakeholders.

Increasing trail use and public outdoor enjoyment is a widespread issue many land managers are working to understand and address. The City of Rancho Palos Verdes, in its endeavor to mitigate the impacts of growing numbers of people coming to the city to enjoy the Preserve, is exploring ways to diffuse the intensity of Preserve use in some areas such as upper Portuguese Bend Reserve and redirect public use to areas that are equipped with sufficient parking and amenities to accommodate increased use in locations such as City Hall and the adjacent Alta Vicente Reserve. The overall increasing use and changes to current use may impact trail widths and/or the proliferation of spur trails in new areas. It is recommended that public use is quantified and evaluated in the context of the 5-year trail width monitoring program to inform recommended remediation measures should such increased use result in trail widening beyond acceptable thresholds.

Further, as PVPLC monitors the cactus wren species annually, and the CA gnatcatcher and covered plant species every three years, it is important that biological information is given heavy consideration when making trails and public use management decisions. Should covered species and habitat decline over time, and trails suffer undue widening, then more drastic management decisions may be discussed in coordination with PVPLC, City staff and Wildlife Agencies.

SECTION 7

DISCUSSION AND MANAGEMENT RECOMMENDATIONS

SECTION 7 DISCUSSION AND MANAGEMENT RECOMMENDATIONS

7.1 INTRODUCTION

This section discusses management recommendations based on the results of the 2019-2021 covered species surveys, 20-acre Abalone Cove habitat restoration plan, TERPP report, and predator management report. Because the covered species surveys, habitat restoration plan, predator report, trail baseline width report and TERPP reports were authored as stand-alone documents and each clearly states management recommendations independently, this section will attempt to summarize all aspects of management of the Palos Verdes Nature Preserve (PVNP), including topics not covered in the above sections, such as trails and public use. Recommendations are based on analysis of successful techniques as well as areas that can be improved.

7.2 HABITAT RESTORATION

Habitat monitoring of restoration areas show that the effects of the drought are still being felt even with marginal increases in precipitation in 2019-2021. Most CSS restoration areas are meeting success criteria or on track to meet success criteria by the end of their monitoring period. Butterfly and Cactus Scrub habitat are both struggling to meet success criteria for a few reasons, with drought being the first and most important impact. Scrub is notoriously slow growing and without adequate precipitation the cactus patches will take even longer to reach success criteria. The Butterfly habitat at Alta Vicente has not met success criteria mostly due to drought but invasive species have also shown to be a problem.

It is recommended that areas throughout all this and all future phases continue to receive non-native plant control and supplemental irrigation when necessary, to maintain positive native plant growth and establishment. It is recommended that weed removal continue and be more frequently implemented at PVB host plant restoration sites than other perennial dominated habitat types. Any infill planting that needs to occur in these areas should be solely PVB and ESB host plant species. Along with potential infill planting of butterfly host plants, future thinning of shrubs may be necessary to keep these areas within Butterfly habitat success criteria percent cover. Additionally, PVPLC implemented the use of drip line irrigation systems to replace overhead sprinklers, which showed an increase in plant vitality and reduction in plant mortality, and will be the preferred method of irrigation in all future planting projects. This method will also help curtail the effects of prolonged drought.

7.3 MANAGEMENT RECOMMENDATIONS

Trails

The Preserve trails fall under the City's Public Use Master Plan (PUMP), which is an NCCP-covered activity, and must therefore follow certain avoidance and minimization measures and guidelines to protect covered species, including closing trails that were previously in use and no longer authorized. In 2019, Burma Road and Rattlesnake Trailheads saw an average of 20,800

visitors per month. The City's trail counter data shows that public use at these trailheads nearly doubled by December 2020 at 40,800, and then dropped down to about 20,000 in May and June 2021.

Visitors have been creating new unauthorized trails on the Preserve, and tampering with PVPLC's trail closures. With the addition of full-time Field Operations Specialist in 2014, whose main task is to close unauthorized trails and replace closures after vandalism, PVPLC staff and volunteers have closed off spur trails using cactus and physical barriers at Alta Vicente, Abalone Cove, Agua Amarga, Forrestal, Filiorum, Portuguese Bend, San Ramon, Three Sisters, Vicente Bluffs, and Vista Del Norte Reserves. PVPLC recommends the continued coordination with volunteers of the Rapid Response team to monitor closures and assist with the replacement of removed closures. Over the years, Cactus has matured and created permanent barriers, so using plant species where feasible is the best recommended approach.

PVPLC, with City of RPV coordination, created a Volunteer Trail Watch program to educate the public and improve trail etiquette, protect the natural resources of the Palos Verdes Nature Preserve, enhance the safety of, and promote an enjoyable experience for all Preserve visitors. Trail Watch volunteers observe activities on the Preserve, communicate the importance of following Preserve Rules to the public, and inform enforcement about times and locations of problematic activities. The VTW program collects data about visitor impacts, trail issues, and trends in violations of the rules to support enforcement.

Continued spur trail creation is a major concern especially during bird breeding season and when they occur in high quality habitat areas or near documented NCCP/HCP covered species. Trail closure prioritization was primarily based on two factors: potential covered species impact and amount of spur trail use by public. PVPLC recommends that future enforcement efforts target individuals who are causing vandalism to trail closures and signage as well as other rules violations, and utilize VTW reports of observations and trends to help focus enforcement efforts. Additionally, PVPLC recommends enhanced distribution of the "Sharing Trails Safely" brochure and website link to enhance efforts to protect natural resources and promote safety. PVPLC also recommends the City continue its coordination with PVPLC and include its recommendations when making recreation and trails decisions. Continued coordination, communication and planning in the VTW monthly meetings is essential so that target areas are addressed and impacts are minimized. It is also recommended that regulatory signage continue to be maintained and repaired of any vandalism. New locations for regulatory signage should also be identified where needed while old signs that are no longer needed be removed.

Covered Species

Covered Plant Species

During this triennial monitoring period, the Palos Verdes Peninsula Land Conservancy (Conservancy) conducted covered plant species monitoring during 2019. Previously poorly defined boundaries at the monitoring sites resulted in highly variable year to year counts of the species (PVPLC 2013). To reduce this variability, all sites were mapped using GPS to create maps to develop clearly defined boundaries for this and future surveys. Additional stands

resulting from the Conservancy's restoration projects and those found in the Preserve were mapped as a management tool to promote better knowledge of the special status plant species within the Preserve. Results from the survey include a slight increase in count of several of the species studied. Both annual species, *Aphanisma blitoides* and *Atriplex pacifica* were observed in slightly higher quantity than in 2017 and but much lower than previous years within reference sites. *Dudleya* was surveyed in April and was found to be present at all three reference sites. *Dudleya* population appears to be in decline with the total number of individuals across all reference sites 2017. *Lycium* was surveyed in April and May and was found to be stable in all three reference sites while *Suaeda* reference sites experience decreases in the number of individuals. It is thought that the 2017 surveys inadvertently included the non-native *Bassia hyssopifolia*, and that *Suaeda* populations did not actually increase dramatically from 2015 to 2017 and have thus stayed relatively stable. Threats to all species include encroachment by harmful invasive plants, cliff erosion, long-term drought, and trampling.

PVPLC recommendations are to:

- Utilize methodology described in this report
 - Including survey stands to determine where boundaries have changed, especially for the annuals *Aphanisma* and *Atriplex* and the perennial *Suaeda*
- Utilize the GIS maps for locating and counting stands
- Calculate areas for each stand to develop aerial extents for each species
- Calculate density for measuring variation within stands for long-term assessments
- Continue seed collection for plant propagation
- Install covered plant species in restoration efforts and/or broadcast seed during periods of favorable precipitation
- Remove encroaching invasive plants
- Continue to seek restoration funding for enhancing populations of these six species

Covered Wildlife Species

El Segundo Blue Butterfly

Surveys were performed for the El Segundo Blue butterfly (*Euphilotes battoides allyni*) during the 2019 flight season. Surveys were conducted within three reserves of the Palos Verdes Nature Preserve: Vicente Bluffs, Alta Vicente, and Abalone Cove. Six surveys were conducted between July 19 and August 17, 2019 at 10 survey sites within Vicente Bluffs (five survey sites), Alta Vicente (two survey sites), and Abalone Cove (three survey sites). 51 ESB butterflies were observed in 2019 in close association with sea-cliff buckwheat (*Eriogonum parvifolium*) the ESB host plant. The 51 butterflies were observed at three of the 10 survey sites with 98 percent of the butterflies observed at two survey sites at Vicente Bluffs.

PVPLC recommendations are to:

- Continued management and maintenance in ESB habitat
- Continue invasive species removal at all ESB sites

- Infill planting of ESB host plants in each ESB habitat site when necessary

Palos Verdes Blue Butterfly

Surveys were performed for the Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdensis*, PVB) during the 2021 flight season. In April of 2020, captive bred PVB were released into the Palos Verdes Nature Preserve by Dr. Jana Johnson of Moorpark College in collaboration with the PVB working group. This was the first time PVB were flying in Palos Verdes since they were determined to be extirpated from the Preserve in the 1980s. The two sites within the PVNP that PVB were released were three sites within the Alta Vicente Reserve and one site in the Filiorum Reserve (Fig. 1). No free flying PVB were discovered during the 2021 flight season in either release site within the PVNP.

PVPLC recommendations are to:

- Continued management and maintenance in PVB habitat
- Continue invasive species removal at all PVB sites
- Infill planting of PVB host plants in each PVB habitat site when necessary
- Continued captive bred releases into appropriate locations in the preserve in collaboration with the PVB working group.

California Gnatcatcher and Cactus Wren

A single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Poliophtila californica californica* (Federally Threatened) and the cactus wren *Campylorhynchus brunneicapillus* (formerly a Candidate for federal listing; now treated as a California Bird Species of Special Concern I) was conducted across nine reserves within the PVNP.

For 2021, we estimate 24 territories of California gnatcatcher this year, and seven territories of cactus wren. Compared with previous surveys, the estimate of California gnatcatcher territories for 2021 is up from 2018, but still below their 2006-2015 average. Both California gnatcatcher and cactus wren were present together at three reserves early in the year, and at four reserves by late spring. The California gnatcatcher was absent (or presumed absent) at two reserves (same as 2018 vs. absent at only one in 2015), and the Cactus wren absent at six of the nine reserves. We attribute these slight increases to the combination of the slight reprieve from the prolonged drought (i.e., an unusually rainy winter in 2019-20), and an increase in removal of non-native shrubs like acacia (*Acacia* spp.). However, the threats of drought, predation, invasion by non-native shrubs and annual plant species is still a major problem and could possibly hinder the recovery of both species locally. We attribute these declines to the combination of prolonged drought, the continued growth of invasive shrubs, and an increase in local predators.

PVPLC recommendations are to:

- Continued removal of large *Acacia*, *Caesalpinia*, *Echium*, and other invasive non-native trees and shrubs at Three Sisters, Filiorum, and Alta Vicente and all previous CACW sites
- Installation of cactus wren nest boxes (e.g., similar to those deployed by Irvine Ranch Conservancy and other reserves in Orange County);

- Limiting human use of certain trails that run through prime cactus wren habitat, such as at Alta Vicente and Three Sisters, to reduce stress on the remaining pairs;
- Removal of tall (non-native) trees on the periphery of the preserve known or likely to support nesting Cooper's hawks (e.g., pines, *figus*); and
- (if necessary) Translocation of birds/eggs from nearby populations to supplement the breeding population on the peninsula.

Threats

Invasive Plants

Invasive species are a ubiquitous problem in wild lands, and pose a substantial threat to the integrity of native vegetation communities in the PVNP. Aggressive non-native plant control is a highly recommended priority for the long-term preservation of established and future recruitment of native vegetation stands in the PVNP. Management priorities are based on the highly invasive species as listed by the California Invasive Plant Council (Cal-IPC). Of particular concern are highly invasive species such as *Euphorbia terracina* (Geraldton carnation spurge), located in Portuguese Bend Reserve and San Ramon, *Ricinus communis* (castor bean) located in Agua Amarga and Abalone Cove, and *Acacia cyclops* (acacia) found throughout the PVNP. PVPLC conducted invasive weed surveys to produce a baseline map for invasive plants. These maps can be compared to results of future invasive plant surveys to determine whether a population is spreading. Along with the vegetation map produced in 2000, this map will allow PVNP staff to prioritize and target areas for TERPP and restoration. TERPP activities can be focused to:

1. Reduce invasive plant expansion into otherwise high quality habitat.
2. Control invasive plants in areas where clearing invasive plants will create higher quality habitat.
3. Detect and eradicate any new invasive species to the peninsula before they spread.

Wildfires

Because fire is a natural feature of the region, under normal circumstances natural re-growth of habitat is expected. However, extensive fires or repeated fires in the same location of the Preserve may adversely affect the Covered Species conserved by the Permit Area plan because habitat type conversion from existing habitat(s) to invasive or non-native weeds can occur.

PVPLC will monitor burned areas within the PVNP to determine if the habitat is recovering, and for negative impacts on Covered Species. Measures developed by consensus between the City and the Wildlife Agencies will be implemented if deemed necessary. These measures could include erosion control, noxious species control, reseeding, or other measures identified during the analysis.

As resources and funding are made available, PVPLC shall prioritize and remove plants identified on LA County's High Fire Risk, including but not limited to Acacia. The presence of

Acacia is prevalent throughout the Preserve and the City, impacting habitat and posing risks by potentially spreading fire within the Preserve and/or to nearby residential areas. PVPLC shall seek funding opportunities to remove Acacia from key areas outside of the fuel modification zones managed by the City.

Erosion, Compaction, Habitat Loss

Coastal bluff erosion was observed in all survey areas within the PVNP that occur on the coastline. In addition to coastal bluff erosion, canyon erosion was documented in Lower Altamira canyon where the population of *Coreopsis* occurs. Canyon erosion also occurs in several other canyons on the peninsula within the PVNP. Plant species that occur on the coastal bluffs (such as *Dudleya*, *Aphanisma*, *Suaeda* and *Lycium*), or on the side slopes of eroding canyons, are threatened by potential erosion. Additionally, wildlife species which rely on the habitat on the coastal bluffs and in eroding canyons, are threatened by the loss or degradation of their habitat. The majority of coastal bluff erosion threatening coastal bluff plant and wildlife species is naturally occurring and little can be done to prevent it from happening. The soils on the peninsula are highly erosive and the area is highly geologically active. However, some erosion problems that were noted within the PVNP (e.g., Pelican Point) were a consequence of unauthorized, unstable coastal bluff trails, which PVPLC has since closed and restored.

Some additional erosion problems on the coastal bluffs are related to disturbed vegetation and presence of invasive annual species. Restoration of degraded coastal bluffs would help to minimize soil erosion and improve native coastal bluff scrub habitat.

PVPLC will continue to maintain established trails, and close and revegetate unauthorized trails. The trail improvements and restoration project completed at Pelican Cove and Vicente Bluffs will continue to reduce cliff erosion at this site. PVPLC obtained funding for habitat restoration at Abalone Cove Reserve, including closing and replanting unauthorized trails, which have since began to revegetate and limit access. PVPLC will continue to monitor for erosion and develop erosion control plans when necessary.

PVPLC recommends that the City develop a protocol for utility company access and fuel modification that can be closely followed by staff to ensure that habitat impacts and erosion do not occur.

Predator Control

Feral Cats and Red Fox

Few feral animals have been observed in the PVNP over the last three years, except at Vicente Bluffs and Alta Vicente Reserves. Feral cat activity was due to a long-established feral cat feeding station near the Preserve. In collaboration with City of RPV staff, most of the feral cats were removed, and the cat feeding station was moved a greater distance from the Reserve. PVPLC will monitor to ensure that there is no longer evidence of cats in the Preserve.

PVPLC will continue to monitor throughout the Preserve, and if a significant impact is determined, will consult with agencies on follow-up actions. Options may include a feral animal removal program will be established. This program could consist of trapping and removal at regular intervals throughout the year. It would be based on the latest scientific data to ensure its success.

Brown-headed Cowbirds

The Predator Control Plan addresses monitoring and control of brown-headed cowbirds. The brown-headed cowbird is a nest parasite that lays its eggs in other bird species' nests, including the nests of California gnatcatcher. This behavior negatively affects native bird species, and can reduce reproductive success. Brown-headed cowbirds have not been observed during California gnatcatcher and cactus wren surveys in 2021, and there were no incidental observations on the Preserve. If brown-headed cowbirds become a threat, a cowbird trapping program may be implemented.

Climate Change

Climate change poses a significant threat through reduced precipitation and more episodic rain storms, sea-level rise, and increased wildfires in the southwestern US (Global Change Project 2009). Higher temperatures, changes in rainfall, and fire regime, would lead to changes in the distribution and composition of vegetation communities (CCCC 2006). In particular, an increased frequency of wildfires would result in a change in vegetation types from shrubs to grassland (CCCC 2006).

Climate change scenarios for California predict a decrease in shrub communities, including CSS, due to the increase in the frequency of wildfires (CCCC 2006). The predicted loss of shrub land is associated with increased frequency of wildfires, and not with changes in temperature or precipitation (CCCC 2006). CSS restoration in the PVNP is an important long-term goal based on this scenario. A diverse plant community, created with a diverse seed mix and plant palette, will facilitate regeneration after fire disturbance, and prevent habitat type conversion to a grassland community. In addition, an adaptive management model will allow for adjustments as techniques and outcomes are evaluated.

Long-term drought from reduced precipitation has the potential to impact the survivorship of the more drought-sensitive plant species, such as *Crossosoma* and the annuals *Aphanisma* and *Atriplex*, as shown in the NCCP/HCP Covered Plant Species report below. Sea-level rise will accelerate cliff erosion (Global Change Project 2009), leading to an additional threat to those species. Species such as *Dudleya*, *Eriogonum*, *Lycium*, and *Suaeda*, with remnant populations along the steep ocean bluffs, may be subject to habitat loss and may need assistance in recolonizing new bluff areas.

PVPLC will continue to monitor rare plant species populations and drought sensitive species for survivorship impacts. Where appropriate, propagation of these species will occur in PVPLC's native plant nursery and bulking up of seed will occur. Suitable locations for out planting will be

identified, such as restoration sites or other protected and managed areas, and documented for success.

Adaptive Management

An adaptive management framework will be used to modify restoration and management activities as success is assessed, new information becomes available, or changes occur in weather conditions. Adaptive management is a key element of implementing effective conservation programs which takes into account data from monitoring species and natural systems as well as new information from management and targeted studies to continually assess and adjust the effectiveness of conservation actions.

Adaptive management may include re-prioritizing monitoring efforts, as indicated by monitoring results and the resultant degree of management required for a given resource. For example, if a specific population proves stable over a period (e.g., 10–20 years), the frequency of monitoring may be reduced, particularly if a species' habitat and physical site characteristics remain unchanged. Conversely, another species may require more intensive monitoring because of declining trends. The remediation and adaptive management program will achieve the objectives of providing corrective actions where (1) resources are threatened by land uses in and adjacent to the Preserve, (2) current management activities are not adequate or effective, or (3) enforcement difficulties are identified.

The highest priority monitoring tasks will be those (1) that provide direct evidence of changes in key biological resources and (2) for which corrective or remedial management actions are possible.

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SECTION 8

2021 ANNUAL REPORT

PALOS VERDES PENINSULA
LAND CONSERVANCY



*Palos Verdes Peninsula
Land Conservancy*



January ~ December 2021

**PALOS VERDES
NATURE PRESERVE**

ANNUAL REPORT

**FOR THE
RANCHO PALOS VERDES
NATURAL COMMUNITY
CONSERVATION PLAN**



March 2022

2021 ANNUAL REPORT

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1.0 INTRODUCTION

The 2021 Palos Verdes Nature Preserve Annual Report for the Rancho Palos Verdes Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) fulfills annual submittal requirements by the Palos Verdes Peninsula Land Conservancy (PVPLC) for the Palos Verdes Nature Preserve (Preserve). Additionally this report details stewardship activities, research, funding, and community involvement in the Preserve during the period January 1 through December 31, 2021. This report also includes annual submittal requirements of the City of Rancho Palos Verdes including habitat tracking and updates on Covered Projects and Activities permitted under the NCCP/HCP.

PVPLC is the designated Habitat Manager for the Palos Verdes Nature Preserve for the City of Rancho Palos Verdes. The Preserve encompasses approximately 1,400 acres and is located on the southern side of the Palos Verdes Peninsula in the City of Rancho Palos Verdes, California. The Preserve was formed under the RPV NCCP/HCP (adopted by City Council in October 2018) to “maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City and region pursuant to the requirements of the NCCP/HCP Act and Section 10(a) of the ESA (URS 2004a).” As a primary component of the NCCP/HCP, a Preserve design was proposed to conserve regionally important habitat areas and provide habitat linkages in order to benefit sensitive plants and wildlife. PVPLC manages the habitat in the Preserve per the requirements of the NCCP/HCP as well as other Preserve management duties further detailed in a management agreement with the City.

The primary focus of management for the Preserve is to maintain or restore habitat for the covered plant and animal species listed in the NCCP/HCP. A Habitat Management Plan was adopted in 2007 that outlines the restoration of five acres per year for a total of 15 acres over a three-year period. This plan also outlined the methodology for removal of exotic plant species, a predator control plan, and the monitoring of covered plant and animal species. PVPLC seeks additional funding when possible, to perform restoration on more than the minimum five acres per year required in the NCCP/HCP as well as for invasive species removal. Several opportunities of this nature occurred during the reporting period that enabled PVPLC to implement additional restoration as detailed below. Additionally, PVPLC executes several trail projects and habitat protection and enhancement measures with the aid of staff, volunteers and additional funding sources.

PVPLC also facilitates scientific research through community science programs and academic research in the Preserve. Volunteers greatly support the implementation of management strategies for the Preserve by assisting in monitoring the properties, wildlife, and habitat as well

as help restore habitat and maintain trails. Collaborating with regional high schools and colleges allows for scientific research that expands our understanding of the Preserve.

Annual Submittals (Included in This Report)

1. Restoration Plans for the NCCP/HCP and Other Projects
2. NCCP/HCP Restoration Monitoring Report
3. Tracking of Habitat Impacts
4. Targeted Exotic Removal Program for Plants (TERPP) Report
5. Community Science and Education Programs
6. Trail Maintenance Activities and Project List
7. Volunteer Involvement and Support

Site Description

The Preserve is located on the southern side of the Palos Verdes Peninsula in the City of Rancho Palos Verdes, California (Figure 1). The approximately 1,400-acre Preserve has been divided into twelve subareas referred to as Reserves (Table 1).

The topography of the Preserve is diverse, ranging from relatively flat lowland areas above steep coastal bluffs in the south, to very steep slopes, ridgelines and gullies on the slopes to the north. Elevations range from approximately sea level along the coastal edges of Vicente Bluffs, Abalone Cove, and Ocean Trails to approximately 1,300 feet above mean sea level at the northern most parcel, vista del Norte. Adjacent land uses include single-family residences on most sides, open space associated with neutral lands on the Peninsula, the Pacific Ocean to the south and west, and the Los Verdes and Trump National golf courses near the western and eastern ends of the Preserve area.

Figure I. Map of the Palos Verdes Nature Preserve with associated Reserves locations

