COMPREHENSIVE MANAGEMENT AND MONITORING REPORT 2010-2012

for the

RANCHO PALOS VERDES DRAFT NATURAL COMMUNITIES CONSERVATION PLAN AND HABITAT CONSERVATION PLAN

Prepared for:

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SECTION 1 OVERVIEW AND SUMMARY OF ACTIVITIES

1.1 INTRODUCTION

This Management and Monitoring Report (Report) for the Rancho Palos Verdes Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP) is the third 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 (URS 2004) 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 Initial Management and Monitoring Report (Dudek 2007) was authored in 2006/2007 as a baseline report in anticipation of the completion of the NCCP/HCP. As of the writing of this Report, the NCCP/HCP is still in draft format with completion forecasted for 2013-2014. Because this agreement will be signed in the near future, this comprehensive report was provided to satisfy the requirements of the both the Management Agreement with the City and the reporting requirements of the NCCP/HCP.

The comprehensive monitoring report is be 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 three year 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). Discussion

and management recommendations are provided in Section 6. The Annual Report for 2012 is in Section 7.

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 1,382-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 ten Reserve areas, including Agua Amarga, Vicente Bluffs, Alta Vicente, Three Sisters, Abalone Cove, Portuguese Bend, Forrestal, San Ramon, Vista del Norte, and Filiorum (Figure 2). 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 PBNP 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.

On August 27, 2009, a fire burned approximately 165 acres of the Portuguese Bend Reserve, affecting both native and non-native vegetation and known nesting sites of the threatened coastal California gnatcatcher (*Polioptila californica californica*) and the special status cactus wren (*Campylorhynchus brunneicapillus*). In 2012, two fires occurred in the Preserve: 12.7 acres at Three Sisters Reserve, and 0.2 acre at Portuguese Bend Reserve. To address the impacts of the fires, PVPLC created a Fire Recovery Plan for each of these.

Figure 1. Palos Verdes Peninsula Nature Preserve.

1.3 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 the restoration of 5 acres per year for a total of 15 acres over the first 3-year period. The Habitat Restoration Plan 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 following provides a brief description of the Habitat Restoration Plan for Alta Vicente Reserve.

The Habitat Restoration Plan for Alta Vicente Reserve provides guidelines for the establishment of coastal sage scrub (CSS), coastal cactus scrub (CCS), and butterfly habitat on a total of 15 acres during 3 consecutive years at the Alta Vicente Reserve. However, since the 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 will be completed at Alta Vicente. Habitat restoration at Alta Vicente Reserve consists of two 5-acre phases, with one phase initiated each year. The first 5 acres of restoration (Phase 1) began with site preparation during the fall of 2007. Phase 1 plants were installed and hydroseeded during the winter of 2009/2010. Site preparation for Phase 2 began in fall 2008, and planting and seeding implemented in winter 2010/2011.

At Portuguese Bend Reserve, restoration of ten acres began with weed control in Fall 2010, followed by plant installation in Fall 2012.

Additional Restoration

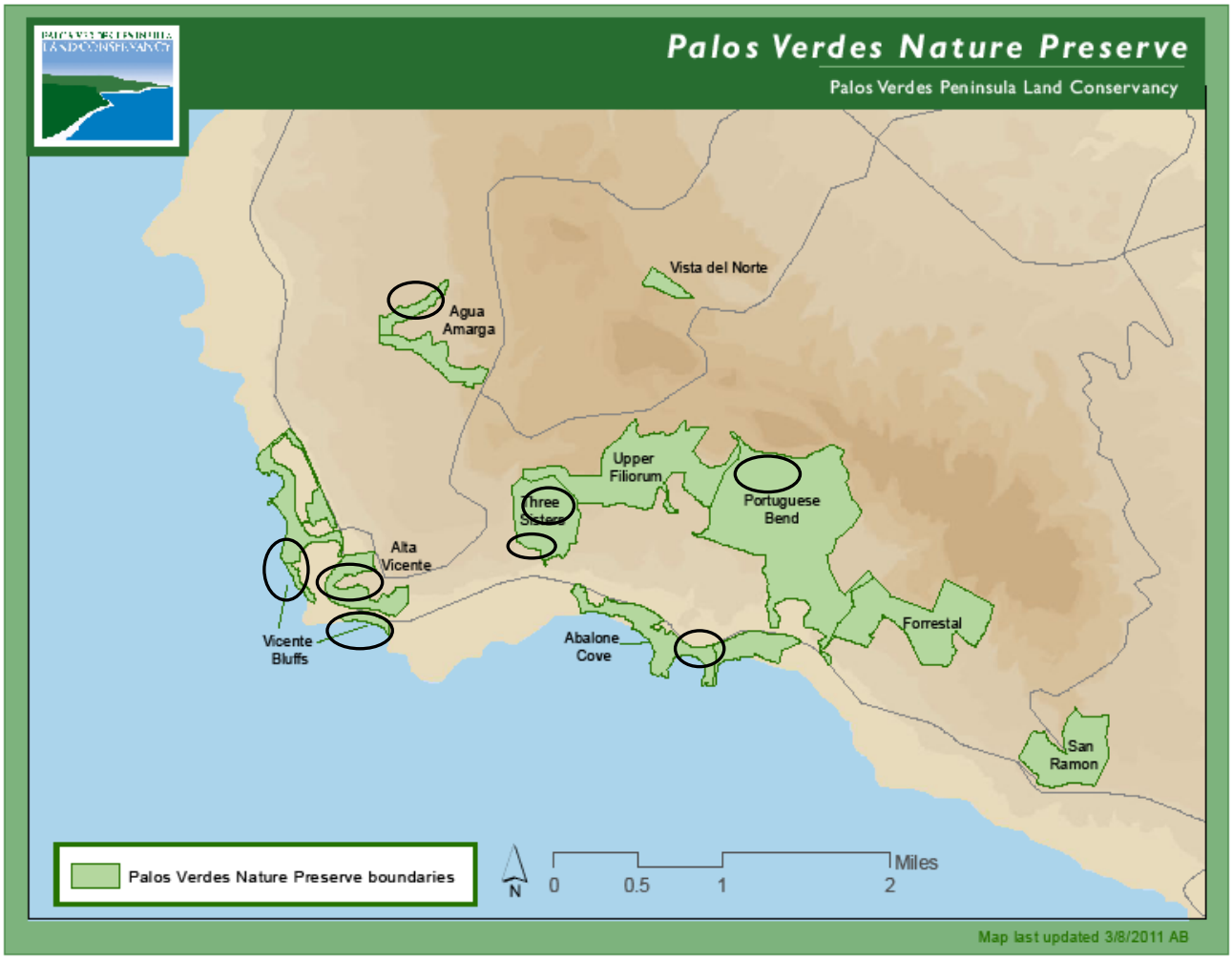
PVPLC attempts to seek additional funding when possible, to perform restoration on more than the minimum 5 acres required in the NCCP. Several opportunities of this nature occurred during the reporting period. Detailed information can be found in the 2012 annual report (Section 7). Additional restoration that occurred during this reporting period (2010-2012):

- 21 acres of coastal sage scrub and perennial grassland restoration in the Three Sisters Reserve as part of mitigation for the Southwest Airfield at Los Angeles International Airport.
- Three acres of coastal sage scrub and coastal bluff at Abalone Cove Reserve (National Fish and Wildlife Foundation grant)
- 0.25 acre of riparian scrub restoration at Lunada Canyon (Los Angeles County Sanitation District mitigation funds).

- 3 acres of riparian and coastal sage scrub restoration at McCarrell's Canyon, Three Sisters Reserve (Coastal Conservancy grant)
- 3 acres of coastal bluff scrub and El Segundo blue butterfly habitat at Vicente Bluffs Reserve
- 3 acres of cactus scrub at Portuguese Bend Reserve (Department of Fish and Wildlife Local Assistance Grant)
- 9.5 acres of coastal sage scrub and perennial grassland restoration (City of El Segundo mitigation funds)

Figure 2 provides a site map for each restoration project from 2010 through 2012, including the restoration at Alta Vicente Reserve and Portuguese Bend Reserve that are to fulfill the requirements of the NCCP Habitat Restoration Plan, once the success criteria are met.

Figure 2. Locations of 2010-2012 Restoration Activities.



Targeted Exotic Removal Program for Plants

In 2010, PVPLC treated 7 populations of *Euphorbia terracina* (Geraldton spurge, Euphorbia) in addition to treating the Euphorbia at the 95-acre San Ramon Reserve.

In 2011, PVPLC treated 20 populations of Euphorbia in addition to treating approximately 5 acres of Euphorbia at the San Ramon Reserve. Euphorbia grows rapidly in disturbed areas, is a prolific seeder and is rapidly expanding its distribution in southern California. In addition, PVPLC removed two populations of *Arundo donax* (Lunada and Abalone Cove Reserves).

In 2012, PVPLC treated 15 populations of *Euphorbia terracina*, and approximately 0.5 acre of Euphorbia at the San Ramon Reserve. PVPLC treated a population of *Ricinus communis* (castor bean) along the Rim Trail in Portuguese Bend, by cutting the plant and applying herbicide to the stump. This population has been spreading downward throughout the canyon, which is otherwise healthy. This will prevent its continued spread through Portuguese Bend. PVPLC removed 4 populations of *Acacia cyclops* (acacia) at Vicente Bluffs (Pelican Cove, northern Vicente Bluffs (bluff top and lower bluffs), and a restored site within Ocean Front Estates. PVPLC treated with herbicide (drill and kill) a population of 12 acacia at Three Sisters Reserve, in the area burned by the 2012 fire. The snags were retained to provide wildlife habitat.

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 virens* 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 PVPLC conducted covered plant species monitoring during 2010 and 2011. Numbers for the annual species *Atriplex* and *Aphanisma* were lower due to variation in rainfall but also from methodological variation. The number of stands in which *Atriplex pacifica* was observed was reduced to one out of the three survey stands. A new approach to better quantify the number of *Crossosoma californicum* individuals resulted in a total count of 776 plants, more than during the prior three surveys. The remaining three species' populations (*Dudleya, Lycium, Suaeda*) did not change from that observed during the initial 2006 survey. Threats to all species include invasive non-native species, cliff erosion, long-term drought, and trampling.

PVPLC is collecting seed of these covered plants for propagation and out-planting at restoration sites. In 2013, as part of a restoration funded by two grants (National Fish and Wildlife

Foundation and Santa Monica Bay Restoration Commission/Coastal Conservancy grant), invasive plants will be removed and covered species (*Atriplex, Aphanisma, Dudleya, Lycium*) will be installed along the coastal bluffs at Abalone Cove.

PVPLC recommendations are to:

- Create GIS maps with accurately measured areas for each photo point
- Continue seed collection for plant propagation and out-planting
- Remove threatening invasive species in priority areas
- Continue to seek restoration funding directed toward enhancing populations of these six species.

Covered Wildlife Species

El Segundo Blue Butterfly

Surveys for the El Segundo blue butterfly (ESB) were conducted in 2010 and 2012. Within the Palos Verdes Nature Preserve, ESB inhabit the steep ocean bluffs around Point Vicente. The NCCP mandates triennial surveys for long-term population trending.

The 2012 survey was conducted as a follow-up to the 2010 triennial survey where only two ESB were observed. Surveys were conducted at 13 sites with host plants: Twelve sites surveyed in 2010 and one additional site where host plants were discovered. Weekly surveys were conducted from June 7 through July 28, with a hiatus between June 11 and 20. Only one ESB was observed in the survey areas--an individual flying from Terranea Resort to Pelican Cove across the parking lot. Loss of host plants is most likely the reason for the paucity of observed ESB. A number of factors could affect the host plant, and thereby the butterfly, including slope failure, competition from invasive plants, and sea water inundation. In 2011, PVPLC increased ESB habitat around Point Vicente that will substantially benefit the butterfly. The next survey will take place during the next triennial monitoring period in summer 2013.

California Gnatcatcher and Cactus Wren

Surveys for California gnatcatcher and cactus wren were conducted in 2012. In 2012 the protocol was modified from earlier protocols to complete two passes versus three.

The California gnatcatcher was present at 8 reserves. The species was absent at Filiorum and Vista del Norte, and may not be resident at Agua Amarga. Compared with previous surveys, the estimate of California gnatcatcher territories for 2012 (33) was lower than that of both 2006 (65) and 2009 (40). However, the CAGN population documented in 2012 is within the range of the annual counts of 26–56 CAGN breeding pairs reported by Atwood et al. (1996).

Lower numbers in 2012 may be cause for some concern in the reserves where gnatcatchers are now very rare or absent after being more numerous on prior years' surveys (Agua Amarga, Three Sisters, and San Ramon). It is however possible that surveys did not detect the birds. PVPLC recommends monitoring the CAGN populations in the Palos Verdes Nature Preserve every three years, according to current plans. If funding allows, directed searches in the Preserve over the next three years could help to better understand population changes in the Preserve.

Cactus wrens were present at 8 reserves. They have not been detected in any surveys at Vicente Bluffs or Vista del Norte. Compared with previous surveys, the estimates of numbers of cactus wren territories (38-48) were up from 2009 (18) and similar to counts made in 2006. The first surveys in Filiorum Reserve indicate that cactus wren numbers at that location are high (9). Cactus wren numbers have increased at Alta Vicente, Portuguese Bend, and Three Sisters, three sites where restoration has taken place. Cactus wrens at Portuguese Bend have rebounded from any impacts of the 2009 fire. Lower numbers at Abalone Cove, Forrestal, and San Ramon could be due to variation in detectability, or to lower habitat quality due to increases in invasive plants. PVPLC will continue to restore habitat for CACW in the preserves. The PVPLC will continue to participate in the Coastal Cactus Wren Working Group that has formed to develop a coordinated approach to conserving cactus wren populations.

Trails

The 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. See Section 8 for trail maps.

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

From 2010 to 2012, PVPLC staff and volunteers have closed off spur trails at Pelican Cove, the eastern portion of Alta Vicente, Forrestal (Flying Mane, Mariposa), and Portuguese Bend (Ishibashi, Peppertree, Rim, Peacock flats).

PVPLC and the City of RPV have collaborated to create 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.

Covered Plant Species

2010 – 2012

Prepared By

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PALOS VERDES PENINSULA

LAND CONSERVANCY

April 18, 2013






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 2010 and 2011. Results from the survey show variations in plant abundance for the annual species *Atriplex* and *Aphanisma*, resulting from variation in rainfall but also from methodological variation. The number of stands in which *Atriplex pacifica* was observed was reduced to one out of the three survey stands. A new approach to better quantify the number of *Crossosoma californicum* individuals used a printed ledger-sized image of the stand. This resulted in a total count of 776 plants, more than counted during the prior three surveys. The remaining three species' populations are unchanged from that observed during the initial 2006 synoptic survey. Threats to all species include invasive non-native species, cliff erosion, long-term drought, and trampling.

The Conservancy is actively collecting seed for plant propagation and out-planting at restoration sites. In 2013, as part of a restoration funded by two grants (National Fish and Wildlife Foundation and Santa Monica Bay Restoration Commission/Coastal Conservancy grant), invasive plants will be removed and additional plants installed.

Recommendations for program improvements include:

1. Revisit sites to confirm survey area demarcations
2. Create GIS maps with accurately measured areas for each photo point
3. Continue seed collection for plant propagation and out-planting
4. Install covered plant species in restoration efforts and/or broadcast seed during periods of favorable precipitation
5. Remove threatening invasive species in the following priority areas (See Figure 1 below):
    a. *Atriplex pacifica* – in the vicinity of Site Ap2
    b. *Aphanisma blitoides* – remove all non-native species except crystalline iceplant (*Mesembryanthemum crystallinum*) which may help promote this species
    c. *Dudleya virens* spp. *insularis* – At Sites Dv1 and Dv3

   d. *Suaeda taxifolia* – Upcoast from Vicente Bluffs in the vicinity of the El Segundo blue butterfly habitat at ESB Sites 2-5 (see Figure 6 in Sec 2.3)

6. Continue to seek restoration funding directed toward enhancing populations of these six species.

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1.0 INTRODUCTION

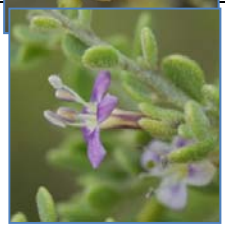
The Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP) for the Palos Verdes Nature Preserve (PVNP) provide a list of six plant species that are targeted for monitoring by the Palos Verdes Peninsula Land Conservancy (Conservancy) every three years. These species, known as covered species, have special status due to their rareness or limited distribution. Five of the six species, *Aphanisma blitoides* (aphanisma), *Atriplex pacifica* (south coast saltbush), *Crossosoma californicum* (Catalina crossosoma), *Dudleya virens* spp. *insularis* (bright green Dudleya), and *Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn), are listed by the California Native Plant Society (CNPS) as List 1B plants which are rare, threatened, or endangered in California and elsewhere. The sixth, *Suaeda taxifolia* (woolly sea-blight), is listed as CNPS List 4, 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 2010 through 2012. This report compares data with data from 2006 (Dudek 2007) and the 2007-09 triennial report (PVPLC 2011). All plant species are referred to by their genus only, unless when compared to a congener.

Table 1
List of NCCP Covered Species, Their CNPS Status, Recommended Survey Period, and Images of the Plants

NCCP Covered Species	Plant Images
Aphanisma blitoides, aphanisma CNPS List 1 B.2 Annual, survey in April – May	 
Atriplex pacifica, south coast salt bush CNPS List 1 B.2 Annual, survey in April - May	 
Crossosoma californicum, California crossosoma CNPS List 1 B.2 Survey in summer when leaves are red	 
Dudleya virens ssp. *insularis*, bright green liveforever CNPS List 1 B.2 Survey in April – June	 
Lycium brevipes var. *hassei*, Santa Catalina Island desert-thorn CNPS List 1 B. 2 Survey June	 
Suaeda taxifolia, wooly sea-blite CNPS List 4 Survey in summer	 

2.0 METHODS

Photo documentation for all six covered plant species was conducted during 2010 and 2012 following the methodology and photo points established in 2006 (Dudek 2007) (Figure 1). Data collection was refined by specifying survey areas accompanied by the collection of additional data to quantify percent cover. Surveys were conducted in 2010, during the recommended months (Table 1). A second survey was conducted for *Aphanisma* and *Atriplex* in 2011. The optimal time to survey *Crossosoma* is August, when the plant's leaves are a bright red color making it easy to spot in the distance.

All surveys were conducted by Stewardship Associate Ann Dalkey in July 2010. In March 2011, an additional survey for the annuals *Aphanisma* and *Atriplex* was conducted by Stewardship Manager Cris Sarabia and Ann Dalkey. Access to *Suaeda* Site St3 was blocked due to the presence of a large gully resulting from heavy storm events. Because the three original *Suaeda* sites were located in relative close proximity within the Ocean Trails section, a fourth site, St4, was established at the base of Pelican Cove (Figure 1). The additional site, located at a different reserve, provides a broader geographic area for monitoring the species.

For the annuals *Aphanisma* and *Atriplex*, stand structure was described as Annual and all plants were considered recruits. *Dudleya* clumps with contiguous bases were counted as one individual (Dudek 2007). Best estimates of the number of individuals in the *Lycium* stand were obtained from visual observations. The large *Crossosoma* stand in eastern Forrestal was counted from a ledger sized print of the stitched images. Counting the number of plants accurately in the field is impossible, so two photos were taken, carefully stitched together, printed in ledger format, and the plants counted.

An approach to standardize the area for estimating plant numbers at each photo point site was initiated in 2010 (See Appendix B for detailed protocol). For each occupied site, the original photographs and maps from Dudek (2007) were referenced against the on the ground conditions at each site. Then a specific area was delineated on a map for use in all subsequent efforts. The size of the areas were estimated and recorded. Once the areas are plotted in GIS, an accurate area can be determined to develop plant densities based up on the calculated areas and individual plant counts.

Rainfall data were obtained at various times from the National Weather Service (www.nws.noaa.gov/climate/index.php?wfo=lox) website for the Long Beach Airport station. The annual average rainfall value provided by the NWS for the Long Beach Airport is 12.94, based upon data measured from 1971 through 2000. All rainfall data are provided in "rain years" from the months of July 1 through June 30, to accurately reflect the rainfall influencing the plant species' subsequent growth. The rain years under consideration include 2009-10, 2010-11, and 2011-12.

Each species is coded and presented in figures and tables in the following manner:

- *Aphanisma blitoides*: Ab44, Ab46, Ab49, and Ab50
- *Atriplex pacifica*: Ap1, Ap2, Ap3
- *Crossosoma californicum*: Cc1, Cc2, Cc3
- *Dudleya virens* ssp *insularis*: Dvi1, Dvi2, Dvi3
- *Lycium brevipes* var *hassei*: Lbh1, Lbh2, Lbh3
- *Suaeda taxifolia*: St1, St2, St3, St4

3.0 RESULTS

Data from the surveys were collated into tables and are presented in Appendix A along with all photo point images.

3.1 RAINFALL

Abundant rainfall occurred during the first two years of the three-year monitoring period, therefore all species were surveyed during 2010. During the 2009-10 rain year, most rainfall occurred in significant storm events in January and February, resulting in a total of 15.7". These events created the erosional gully that precluded access to Site St3. In 2010-11, rainfall was evenly distributed from October through May resulting for a total of 18.8". Rainfall during 2011-12 was low, with only 7.6" arriving mainly during November through January.

All species were surveyed in July 2010, and all except the annual *Aphanisma* were observed (Appendix A, Table 3). This species was observed during a follow-up survey in March 2011.

Figure 1. Locations of photo points for covered plant species monitoring.

3.2 COVERED SPECIES

Aphanisma – The survey for Aphanisma occurred late in 2010 (July) due to staffing limitations. Evidence that the plant had bloomed earlier in spring was seen in withered plants remaining at three Abalone Cove sites: Ab44, Ab46, and Ab49. All sites were resurveyed in March 2011. At that time, approximately 300 specimens of *Aphanisma* was found at only at the Abalone Cove site Ab49. No specimens were observed at the site identified by Dudek (2007) as Ab50.

Atriplex – This plant was surveyed in July 2010 and again in March 2011. During the 2010 survey, *Atriplex* was observed at only one of the three survey sites (Ap3), and five individuals were found at a location further down the trail. In 2011, no plants were found at Site Ap3, which was overgrown by weeds. However, 17 plants were observed in at Site Ap2. No plants were observed at Site Ap1 during either survey.

Crossosoma – During the August 2010 survey, only two plants were observed at Site Cc1 where previously three had been reported. Five plants were observed at Site Cc2. The largest stand, Cc3, is located on the eastern border of Forrestal, numbering in the hundreds. Based on the print-out, the count was 776 individuals. During a June 2011 visit to Forrestal with small plant population researcher, Kaius Helenurm from University of South Dakota, three plants were observed at Site Cc1. The third plant was small, growing under a canopy of *Rhus integrifolia*.

Dudleya – *Dudleya* was present at all three survey sites. Site Dv1 is located on top of a steep hill, making the task of counting clumps difficult. A total of 30 clumps were counted at this site. A total of 170 and 40 clumps were counted at Sites Dv2 and Dv3, respectively.

Lycium – *Lycium* was present at all three of the survey sites. Sites Lbh1 and Lbh2 are located along the west edge of Portuguese Point forming dense stands separated by a small break in the stands. An estimate of 200 and 400 plants for Lbh1 and Lbh2, respectively, was made. Five plants were counted at the smaller stand, Lbh3. A few young plants were found within Site Lbh2, otherwise the stands were dominated by mature plants.

Suaeda – Of the three survey sites within the Ocean Trails area, both Sites St1 and St2 were visited, and 5 and 8 plants were found, respectively. The trail to Site St3 was blocked by a large gully resulting from the winter rains, which precluded access. At an alternate, fourth site, St4, established at Pelican Cove at the base of the bluff, adjacent to a site with active restoration, 45 plants were observed.

Table 2
Summary of Counts from All Surveys Conducted Since 2006. The Surveys Conducted in 2010 and 2011 Utilized the New Methodology Described Above.

Species	Estimated Count 2006	Estimated Count 2007	Estimated Count 2008	Estimated Counts 2010	Estimated Counts 2011
Aphanisma blitoides	0	0	≥371	≥250	300
Atriplex pacifica	136	0	376	5	17
Crossosoma californica	540	--	≥198	783	
Dudleya virens ssp. *insularis*[1]	3430	550	408	240	
Lycium brevipes var. *hassei*	750	300	--	605	
Suaeda taxifolia[2]	455	55	48	122	

[1] Not counted in 2008, but estimated as similar to 2007.
[2] Subsets counted in 2007 through 2010.

4.0 DISCUSSION

There is considerable annual variation in the numbers of all the covered species (Table 2).

The two annual species, *Aphanisma* and *Atriplex*, have very variable population sizes. Rainfall clearly impacts these two species. *Aphanisma* was not observed during the 2006 survey, nor the following year, but was observed in 2008, 2010, and 2011. *Atriplex* was not observed in 2007, following a winter of record low precipitation. However, it was observed in 2008 and 2011, when rainfall met the criteria of 75% of normal rainfall (12.94") or higher (Figure 2).

Invasive species have impacted the number of *Atriplex*, which was observed in significantly lower abundance in 2010 and 2011. Non-native grasses and plants have replaced the stands at Sites Ap1 and Ap3, the latter the site of greatest numbers of the species (see photos in Appendix A). At this time, the species is only found at Ap2. In response, the Conservancy has collected seed for propagation to enhance both the *Aphanisma* and *Atriplex* populations within the preserve.

Variation in the remaining four species' counts can be attributed to methodology. The survey areas delineated in 2010 have been standardized within a Conservancy Standard Operating Protocol and will be incorporated into the GIS database following confirmation

of the sites during the upcoming 2013-2015 period (See Appendix B). Henceforth, the survey sites will serve to estimate population trends in the Preserve.

The largest stand of *Crossosoma* occurs on the eastern slope at Forrestal. It is the largest known stand of the plant, surpassing those found at Santa Catalina and San Clemente Islands significantly, where typical stands are 5-7 plants (Kaius Helenurm, CNPS). It is impossible to count the hundreds of plants in the field, much less to delineate a subset of the slope that can be easily replicated. Therefore, the carefully stitched image created from two separate images, when printed in tabloid format, is most effective for counting the individual plants. Because *Crossosoma* leaves turn bright red in summer, this task is quite easy to perform.

We are confident that all specimens within the Forrestal Reserve were accurately counted, revealing a number higher than that provided by Dudek (2007). Furthermore, the Forrestal stand extends outside the Reserve, representing potentially hundreds more to add to the population.

The presence of the third Crossosoma individual at Site Cc1 could be due to the robust rainfall occurring during the 2009-10 and 2010-11 rain years. During the prior four years, rainfall was below average (Figure 2). It was the period during which the third specimen "disappeared", or perhaps went dormant. Or, possibly a new plant became established following the abundant rains. Most telling, this indicates that *Crossosoma* may be susceptible to long-term drought.

Lycium numbers were similar to those in 2006 (Dudek 2007). The main stand is dense, making it difficult to discern individuals, but from the images, we can see that the stand is consistently sized. Of critical importance, the distribution of this species is mostly limited to Portuguese Point within the Abalone Cove Reserve, though a couple of specimens are found outside the Palos Verdes Nature Preserve system. And, most specimens are mature. The Conservancy has on-going efforts to collect seed for growing the plant in the nursery and out-planting in the Preserve.

We are confident that we are capturing subsets of *Dudleya* and *Suaeda* that can be consistently measured for monitoring long-term population changes. Both of these species have wide-ranging distributions along the bluffs, though the overall population size of *Dudleya* is less abundant than *Suaeda*. The Conservancy is successfully growing and out-planting *Dudleya* for restoration projects along the bluffs.

All surveys have consistently identified erosion as a threat. Competition from native and non-native plants and trampling are also threats. These latter threats can be addressed through the Conservancy's on-going stewardship efforts and public education. However, erosion along steep cliffs, as recognized by Dudek (2007), is unavoidable, given the geology of the Palos Verdes Peninsula. Continued monitoring as the bluff faces retreat is important so that appropriate measures can be taken to ensure the continued presence of these species.

We have observed that *Aphanisma* occurs in areas of steep, bare slopes that are also occupied by crystalline iceplant (*Mesembryanthemum crystallinum*). As shown in Figure 3, several *Ahpanisma* seedlings are nestled amongst the iceplant. While normally considered a plant that out competes native species due to its ability to accumulate salt in the soil (Cal-IPC 2013), this plant may provide assistance to *Aphanisma*, possibly moisture. Salt should not be a problem for *Aphanisma*, for it occurs in saline wetlands, such as at Talbert Marsh and Upper Newport Bay in Orange County (Merkel & Associates 2004, Baldwin et al. 2012). The presence of crystalline iceplant may indicate suitable sites for out-planting *Aphanisma.*

4.1 WEATHER AND CLIMATE

Rainfall is highly variable, with wide swings from years with high precipitation to multiple years of below average rain (Figure 2). The surveys reported herein were conducted following abundant rainfall. The plants' response to the slightly below average precipitation in 2009-10 and 2010-11 is positive, however whether these plants will fare well under a possible climate change scenario with long periods of low rainfall is unknown.

While rainfall is episodic in southern California, it also varies locally, which can have implications for determining the value for 75% of average rainfall for covered plant monitoring purposes. Climate change poses a significant threat through reduced precipitation and more episodic rainstorms, sea-level rise, and increased wildfires (CalEPA 2012). Locally precipitation is expected to decrease by ten percent by late this century (CalEPA 2012).

Long-term drought has the potential to impact the survivorship of the more drought-sensitive species, such as *Crossosoma* and the annuals *Aphanisma* and *Atriplex.* Sea-level rise will accelerate cliff erosion (Global Change Project 2009), providing an additional threat to those species. Species such as *Dudleya*, *Lycium*, and *Suaeda*, with populations on steep ocean bluffs, may be subject to habitat loss and may need assistance in re-colonizing new bluff areas.

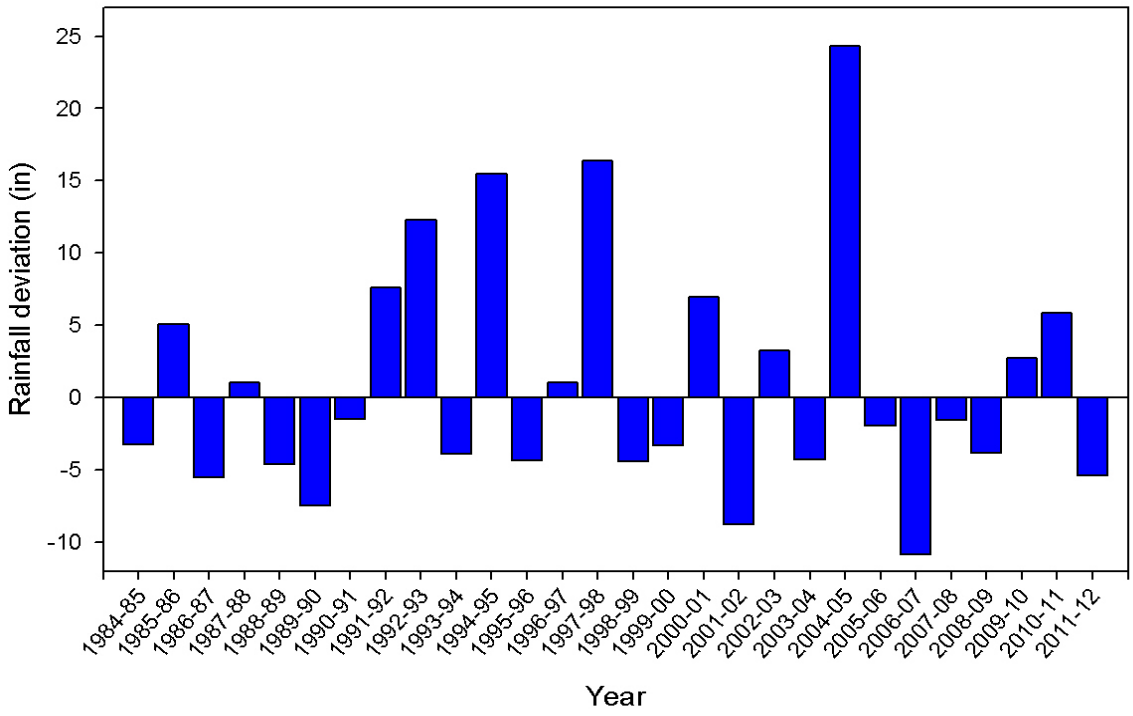
Figure 2. Seedling *Aphanisma* (reddish plants) growing adjacent to crystalline iceplant.

4.2 MANAGEMENT

While the Conservancy cannot directly mitigate climate change, it 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 amenable.

The Conservancy actively seeks grants for restoration, including projects along the coastal bluffs. A Santa Monica Bay Restoration Commission/Coastal Conservancy grant obtained in 2012 will fund the removal of invasive plants and the installation of bluff habitat plants at Abalone Cove in 2013.

Figure 3. Deviation in precipitation for the rain years 1984-85 through 2011-12 based upon the Long Beach Airport 1971-2000 average annual precipitation value of 12.94 inches. The number of years with below average rainfall is16, while the number of years with above average rainfall is 12.



5.0 RECOMMENDATIONS

The information gained from photo documentation can be improved with consistent monitoring methods. Additionally, PVPLC should continue expanding covered plant species populations through its stewardship. Specific recommendations include:

1. Revisit sites to confirm survey area demarcations
2. Create GIS maps with accurately measured areas for each photo point
3. Continue seed collection for plant propagation
4. Install covered plant species in restoration efforts and/or broadcast seed during periods of favorable precipitation
5. Remove threatening invasive non-native species with the following priority;
    a. *Atriplex pacifica* – in the vicinity of Site Ap2
    b. *Aphanisma blitoides* – remove all non-native species except crystalline iceplant (*Mesembryanthemum crystallinum*) which may help promote this species
    c. *Dudleya virens* spp. *insularis* – At Sites Dv1 and Dv3
    d. *Suaeda taxifolia* – Upcoast from Vicente Bluffs in the vicinity of the El Segundo blue butterfly habitat at ESB Sites 2-5 (see Figure 6 in Sec 2.3)
6. Continue to seek restoration funding for specifically enhancing populations of these six species.

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APPENDIX A

Documentation and Photo Point Images

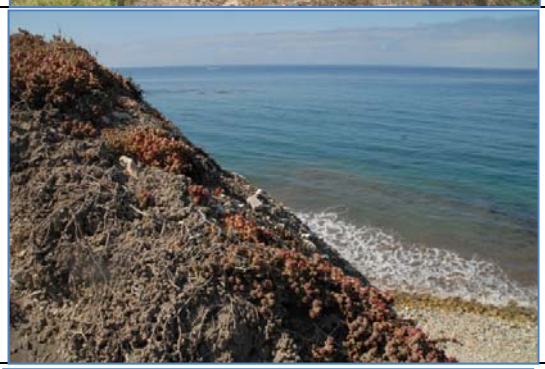
Appendix 1. Covered Plant Species Field Monitoring Results from 2010 and, Where Indicated, 2011.

Species Point	Phenology	Stand Structure	Recruits	Population Area/ Count	% Species Cover	% Other Natives	% Non-natives	% Bare	Threats	Comments
Ab44	Dead	Annual	Present	120 m^2 / n/a					Erosion, invasive spp	
Ab46	Dead	Annual	Present	8 m^2 / 50	5	0	50	75	Erosion, invasive spp	Only withered plants present
Ab49	Dead	Annual	Present	50 m^2 / ≥200	5	0	90	5	Erosion, invasive spp	Only withered plants present
Ab50	Absent									Site location uncertain
Ab44 2011	Absent									None observed in two visits
Ab46 2011	Absent									None observed in two visits
Ab49 2011	Flowering	Annual	Present	30 m^2 / 300	20	3	62	15	Erosion, invasive spp	
Ab50 2011	Absent									
Ap1	Absent									
Ap2	Absent									
Ap3	Fruiting	Annual	Present	40 m^2 / 5	1	39	40	20	Low numbers	Plants found further down trail than before
Ap1 2011	Absent									
Ap2	Non-	Annual	Present	10 m^2 / 17	4	0	15	71	Erosion,	Species occupies

2011	flowering								invasive spp	small area on bluff's edge
Ap3 2011	Absent									
Cc1	Dormant	Mature	No	3 m^2 / 2	10	85	0	5	Rhus	Leaves red
Cc2	Dormant	Mature	No	5 m^2 / 5	10	65	0	25	Erosion	Leaves red
Cc3	Dormant	Mature	Yes	9100 m^2 / 776	35	55	0	10	None	10-20 dead individuals
Dv1	Fruiting	Mature	No	336 m^2 / 30	5	50	15	30	Erosion, invasive spp	Site inadequately depicts plant numbers
Dv2	Fruiting	Mixed	Yes	500 m^2 / 170	20	10	20	50	Erosion	
Dv3	Fruiting	Mixed	Yes	180 m^2 / 40	5	15	10	70	Erosion, invasive spp	10 dead specimens
Lbh1	Non-flowering	Mature	No	224 m^2 / 200	90	5	5	0	None	Dense stand, possibly 2 dead individuals
Lbh2	Flowering	Mature	Yes	1888 m^2 / 400	90	5	5	0	None	
Lbh3	Flowering	Mature	No	150 m^2 / 5	100	0	0	0	Erosion	Fox prints on site
St1	Non-flowering	Mixed	Yes	230 m^2 / 8	5	0	90	5	Invasive spp	Dense *Salsola tragus*
St2	Non-flowering	Mixed	Yes	40 m^2 / 69	20	50	55	5	Invasive spp	*Mesembryanthemum*
St3										Site not occupied
St4	Flowering	Mixed	Yes	25 m^2 / 45					None	

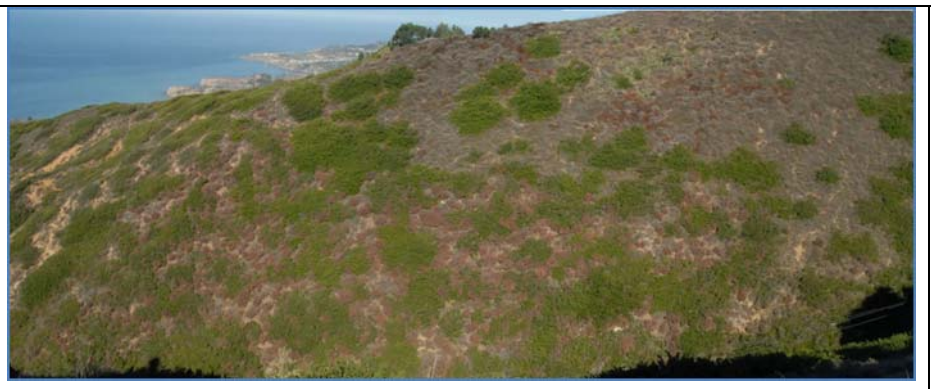
INTENTIONALLY LEFT BLANK

Figure A1. Photo points from 2010 and 2011 surveys.

Ab44 2010	
Ab46 2010	
Ab49 2010 CEI	
Ab3 2011	

Ap1 2010	
Ap1 2011	
Ap2 2010	
Ap2 2011	

Ap2 2011	
Ap3 2011	
Cc1 2010	
Cc2 2010	

Cc3 2010	
Dv1 2010	
Dv2 2010	
Dv3 2010	

Lb1 2010	
Lb2 2010	
Lb3 2010	
St1 2010	

St2 2010		
St4 2010		

Appendix B
Covered Plants:
Procedures for field methods, recording measurements, data entry, data QA/QC, and data assessment.

Method Overview

The Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP) for the Palos Verdes Nature Preserve (PVNP) provides a list of six plant species that are to be targeted for conservation through restoration activities conducted by the Palos Verdes Peninsula Land Conservancy (PVPLC). These species, known as covered species, have special status due to their rareness or limited distribution. Five of the six species, *Aphanisma blitoides* (aphanisma), *Atriplex pacifica* (south coast saltbush), *Crossosoma californicum* (Catalina crossosoma), *Dudleya virens* spp. *insularis* (bright green Dudleya), and *Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn), are listed by the California Native Plant Society (CNPS 2010) as List 1B plants which are rare, threatened, or endangered in California and elsewhere. The sixth, *Suaeda taxifolia* (woolly sea-blight), is listed as CNPS List 4, which is a plant of limited distribution.

Under the terms of the NCCP, covered species need to be monitored once every three years 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 are to be conducted during those years when rainfall exceeds 75% of the long-term average annual precipitation.

A reconnaissance survey was conducted in 2006 to document the baseline population sizes of these species for the NCCP (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. These photo point locations provide the location to photograph and assess the respective covered plant species every three years (Figure 1).

Covered plant species monitoring consists of taking a photograph at each photo point, then counting the number of individuals within a specified area at the photo point and documenting conditions of the plant and general habitat. The three year periods began after the 2006 baseline survey: 2007-2009, 2020-2012, 2013-2015, etc. The trigger amount of rainfall for conducting covered plant species monitoring is 9.70", based upon rainfall measured by the National Weather Service at the Long Beach Airport for the period 1971 – 2000, average rainfall is 12.94". If less than 9.70" of precipitation falls during the first two years of the monitoring period, then the monitoring must be conducted in the third year to document the effects of prolonged low rainfall.

Table 1. List of NCCP covered species, their CNPS status, recommended survey period, and images of the plants.		
Aphanisma blitoides, aphanisma CNPS List 1 B.2 Annual, survey in April – May		
Atriplex pacifica, south coast salt bush CNPS List 1 B.2 Annual, survey in April - May		
Crossosoma californicum, California crossosoma CNPS List 1 B.2 Survey in summer when leaves are red		
Dudleya virens ssp. *insularis*, bright green liveforever CNPS List 1 B.2 Survey in April - Jun		
Lycium brevipes var. *hassei*, Santa Catalina Island desert-thorn CNPS List 1 B. 2 Survey June		
Suaeda taxifolia, wooly sea-blite CNPS List 4 Survey in summer		

Figure 1. Locations of photo points for covered plant species monitoring.

Prepare for Covered Species Monitoring

Prepare for field work, performed by the lead for Covered Species Monitoring

1. Print-out datasheets and forms found at Stewardship/Monitoring/Monitoring Forms/FieldDataSheets.xlsx
    a. Six copies of the Covered Species form, one for each species (Figure 2).
    b. CNPS Percent Cover Diagrams.pdf
    c. Map showing locations of the photo points
    d. Printout of photo point images from the most recent Comprehensive Report
    e. Field procedures for covered species monitoring
2. Assemble the following equipment:
    a. GPS unit with proper transect shape file
    b. Clipboard
    c. Pens and/or pencils
    d. Scratch paper
    e. Camera
3. Obtain current rainfall amount for the July 1- June 30 rain year from Long Beach at the NWS' website: http://www.weather.gov/climate/index.php?wfo=lox

NCCP Covered Plant Species
Photo Point Monitoring

Species:_____ Date:_____

Rainfall to date[1]:_____ Comments:_____

Surveyors:_____

PP#	Photo Numbe	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

PP#	Photo Numbe	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

Figure 1. Example of Covered Plant Species Field Data sheet.

Field Methods

1. Safety first: It is best for two people to conduct the surveys together, especially for the difficult species *Crossosoma californicum*.
2. Visit sites in the mid-day (9:00 am – 3:00 pm) when shadows are minimal.
3. Fill-out all survey information, including species, date, rainfall to date, surveyors, and any pertinent comments.
4. Take photo
    a. Find previously occupied site by looking at Photo Point location on the map and the images printed from the prior report.
    b. Take photo carefully to include the area shown in the most recent photos.
5. Fill-out associated data
    a. Phenology – record the dominant state (>50%) of
        i. Flowering
        ii. Non-flowering
        iii. Fruiting
        iv. Dormant
        v. Dead
    b. Stand Structure – Record maturity of the stand:
        i. Mixed (young and old plants are present)
        ii. Mature (only old plants are present)
        iii. Young (only young plants are present)
    c. Recruits – Yes or No: are recruits present?
    d. Threats
        i. Invasives – are invasives growing over the species
        ii. Erosion – is the stand in an unstable area
        iii. Other – provide a comment
    e. Percent Cover – asses the approximate cover of:
        i. Covered species
        ii. Other native plant species
        iii. Non-native plant species
        iv. Bare ground
    f. Observed changes from previous survey are made comparing viewed conditions to those depicted in images printed from the prior report.
6. Make population estimate
    a. Determine area to be counted by comparing photo point maps, images printed from prior report, and conditions on hand
        i. Follow area estimates established in 2010 as noted in the 2010-12 Cumulative Report.
    b. Count individuals within the area
    c. Obtain size of area from Table 1.
7. Special considerations
    a. *Crossosoma californicum* – Site 3 (Cc3) is accessed from the utility easement on [street addresses to be added] Ganado Drive (accessed from Crest Drive). The

original photo point was taken north from the easement and is accessed by following a faint trail half-way down the slope, then traversing north to a pine tree stand.
    i. Alternatively, take two photos from the easement to create a panorama image. This image will need to be photo-shopped together, then printed in ledger format for counting the number of plants present. The bright red *Crossosoma* are readily distinguished from *Eriogonum fasciculatum*, which are more rust-red.
b. *Dudleya virens* ssp *insularis* – Count clumps of plants where pups are merged with adult.

Data Assessment

1. First things first
    a. The survey lead assembles all datasheets and reviews data sheets for completeness.
    b. The survey lead checks the photographs and insures that they were properly placed onto the server into the respective folder: Stewardship/Palos Verdes Nature Preserve/Monitoring/Covered Plant Species Monitoring/Year/Photo Points
        i. At this time, the lead may take the option to rename the photos to indicate their location. Do this prior to deleting the images from the camera to prevent loss of images in the renaming process. Use the following format:
            1. Species abbreviation, Photo point number year (yyyy), photo number
            2. Example: Ap3_2010_420.jpg
            3. Include any additional photos

2. Enter data into the database
    a. Input data into form NCCP Covered Species Photo Point Monitoring
        i. When all data are entered, click Return to Main Form to return to the Switchboard form.
    b. When all data are inputted, print-out the QA NCCP Covered Species Photo Point report
    c. Write Data Entered, your initials, and date at the top of the data sheet
    d. The sheets are placed them into a clearly marked folder then into the "Data for Inputting" slot by the Intern desk
    e. At this point, persons that will input data the database and those performing the QA/QC steps should be identified.

3. Quality Assurance
    a. Compare the printed QA report with the information on the datasheet.
    b. Correct any entries with a red pen
    c. Once the transect is corrected on paper, then enter the database and perform the corrections to the data.

   i. It is best to check off each correction as they are made
   ii. It is important to work carefully as you are working in an application that is very unforgiving. Any changes are permanent and not retrievable.
d. Write Data QAd, your initials, and date at the top of the data sheet.
e. File data sheets in a folder marked PVNP Covered Plant Monitoring *Year*.

Data Extraction

All data are archived in the Monitoring database, in an Access application. It is easy to run queries if you are familiar with using Access. Do not try to extract the data if you are inexperienced with Access and find someone to help. Access is an unforgiving application which can lead to accidental permanent loss of data.

1. To extract data from the database for transferring to another application, follow these steps
   a. Open the Monitoring database and navigate to the query section. Currently there are no pre-made queries for extracting the data.

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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

Final Report

Abalone Cove, Palos Verdes Peninsula (photo. by Daniel S. Cooper)

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January 3, 2013

Introduction and Summary

We report on a single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Polioptila 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 Concern[1]) on the Palos Verdes peninsula in 2012. Our study area extended across 10 reserves covering a combined 1,225 acres managed by the Palos Verdes Peninsula Land Conservancy (Figures 1a and 1b). Our survey may be compared with previous surveys for these two birds conducted at most of the same sites in 2006 and 2009 (Dudek 2007, Hamilton 2009), as well as with more limited surveys conducted at Portuguese Bend reserve in 2010 and 2011 (CEM 2011).

In 2012, both California gnatcatcher and cactus wren were each present at 8 reserves, though not at the same ones. The California gnatcatcher was absent at Filiorum and was likely not resident at Agua Amarga and the Cactus wren was not detected at Vicente Bluffs. Vista del Norte had neither target species. Compared with previous surveys, the estimate of California gnatcatcher territories for 2012 (33) was lower than that of both 2006 (65) and 2009 (40), while numbers of cactus wren territories (38-48) were up from 2009 (18) and similar to counts made in 2006.

Methods

We (Daniel S. Cooper, TE 100008-2, SC-10615) conducted targeted surveys for the California gnatcatcher and the cactus wren at 10 reserves at the southwestern tip of the Palos Verdes peninsula (Figures 1a, 1b) across 17 survey days between 02 March and 12 June 2012. More than one site was visited on some days for a total of 58 survey hours (Table 1). We used a two-visit protocol, with one early-season visit during March and early April ("Round 1") and one late-season visit during May and early June ("Round 2"), spending between two and four days at each, depending on the size of the reserve and the amount of habitat present[2].

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 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

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[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 reserve-wide surveys had used a 3-visit protocol; a reduction in effort for 2009 and 2012 was made per the NCCP guidelines for RPV.

Wildlife Service/Department of Fish and Game ("7.3.2 Animal Species Monitoring"). A "zigzag" walking route was used to cover each preserve, following as closely to the most recent (2009) survey as possible (Appendix A).

All surveys were carried out by Daniel S. Cooper (TE 100008-2; SC-10615). Cooper has extensive experience with California gnatcatcher surveys throughout Los Angeles and Ventura County, and conducted similar target bird surveys at the Portuguese Bend reserve in spring 2010 and 2011 for the Palos Verdes Peninsula Land Conservancy. The survey routes used in 2012 were intended to follow those used by previous surveyors (Dudek 2007, Hamilton 2009), with the addition of a new site added in 2012, Filiorum reserve, located between Three Sisters and Portuguese Bend. No more than 80 acres of coastal sage scrub was surveyed on any single day, following USFWS (1997) guidelines; several reserves contained only scattered patches of coastal sage scrub, or had inaccessible areas that could not be reached during the survey.

In addition to recording aural detections of both species, visual scans (using Leica 8x42 Ultravid 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 transferred from field maps onto Google Earth maps and converted to digital files (.kmz). These are presented in Appendix B.

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 unmated female (only one instance in 2012, a female California gnatcatcher at Agua Amarga) or a lone juvenile of either species away from adults were not considered "territories". In one case (Abalone Cove), we observed fresh cactus wren nests in four areas (one of which had at least two fresh nests), but aside from hearing a possible (distant) call note, did not detect adult cactus wrens here on either of the two survey dates. Since four of the five nests were somewhat clustered, all

within 100 meters of each other, these were counted as a single territory, though we acknowledge more pairs might have been present and detected on additional visits outside the established protocol. 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). However, in one case, a cactus wren recorded just south of the border of the Portuguese Bend reserve was later moving far to the northeast (toward known/mapped territories) during our brief observation period and so was not counted as maintaining own territory where first seen (nearly all sightings involved birds making short flights only).

Comparisons among years have limited validity due to differences in methodology and timing. The two-visit schedule and the survey timing (March – early June) were similar to Hamilton (2009), while Dudek (2007) used three visits, most done later in the summer (June through August). It is also unclear how intensive the cactus wrens surveys were in 2006; while the "2006 Initial Management and Monitoring Report" (Dudek 2007) described conducting "focused surveys" for Cactus Wren, the original survey report to USFWS (Dudek 2006) describes the same effort as a "focused presence/absence survey" for California gnatcatcher alone, and states only that "point locations of all observed San Diego cactus wrens…were mapped during the survey", presumably without a concerted effort to determine territory boundaries or the existence of paired versus single birds. As pointed out by Hamilton (2009), this may have led to an over-estimate of the number of unmated adults, or, at least complicates year-to-year comparisons. Hamilton also spent more time at each site, as he was also mapping habitat in addition to surveying birds. Finally, there exists inherent variability in estimates that rely on a small number of visits, so claims of species increasing or decreasing at a given site based on two or three visits must be made with caution[3]. However, changes in territory numbers and locations contribute to a baseline of observations that may be used to inform management decisions in future years.

[3] Atwood et al. (1998a) recommended a minimum of six visits during early spring and time of fledging to accurately determine territory size for the gnatcatcher, based on surveys on the Palos Verdes Peninsula.

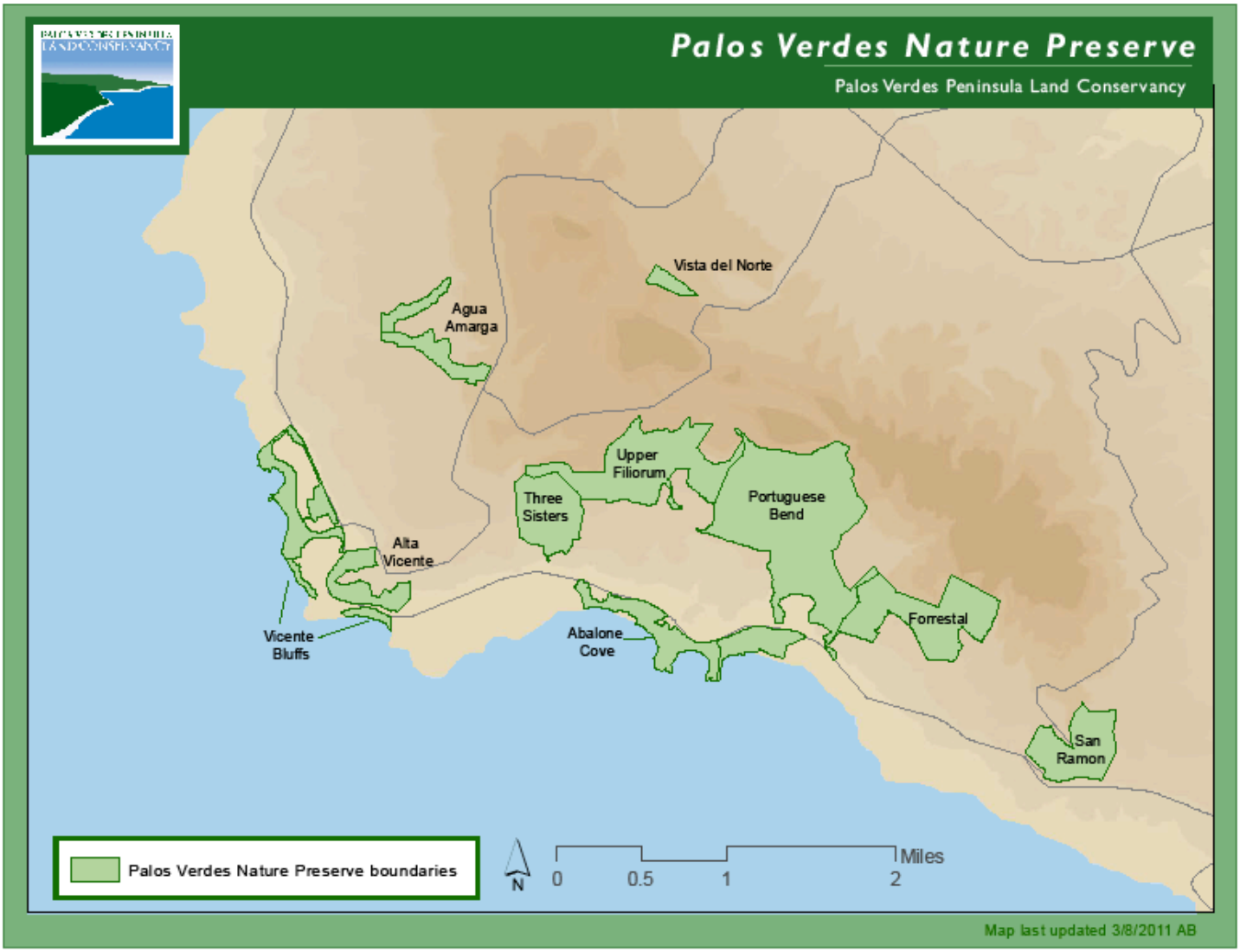


Figure 1a. Reserves in the Palos Verdes Nature Preserve in Rancho Palos Verdes (indicated in top of legend) surveyed during this study in 2012. Figure courtesy PVPLC.

Figure 1b. Aerial view of reserves surveyed during this study. Clockwise, from upper left: L = Agua Amarga (formerly "Lunada Cyn."); N = Vista del Norte, U = Filiorum; C = Portuguese Bend (formerly "Canyons"); F = Forrestal; R = San Ramon; A = Abalone Cove (east and west); T = Three Sisters; B = Vicente Bluffs (upper and lower); V = Alta Vicente. Figure from Hamilton 2009, courtesy of PVPLC.

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

Reserve	**Acres**	**Days surveyed**	**Time afield (all visits combined)**
Abalone Cove	64	3	7:10
Agua Amarga	59	2	5:05
Alta Vicente	55	2	4:35
Forrestal	155	4	8:40
Portuguese Bend	399	4	12:00
San Ramon	95	3	4:10
Three Sisters/Filiorum (combined)	300	4	10:35
Vicente Bluffs	84	2	4:40
Vista del Norte	14	2	1:05
TOTAL	**1,225**	**26**	**58 hours**

Table 2. Summary and description of survey effort in 2012 (wind <5 mph on each visit unless noted). Number of birds listed is the maximum number of adults encountered. Note that surveys on 19 Mar. and 08 June included two (adjacent) reserves.

Date	**Survey round**	**Time**	**Temp. start (F)**	**Temp. end (F)**	**Sky**	**Subarea, if applicable**	**# CAGN**	**# CACW**
Abalone Cove (A)								
4 March	1	08:00-10:00	68	68	Clear	East	5	0
22 March	1	09:20-11:50	55	58	Ptly Cldy	West	2	0
29 May	2	09:20-12:30	68	70	Clear	N/A	5	1
Agua Amarga (L)								
09 April	1	08:40-12:15	61	63	Clear	N/A	1	6
05 June	2	09:15-10:45	64	65	Clear	N/A	0	3
Alta Vicente (V)								
29 March	1	08:05-10:50	56	62	Clear	N/A	8	11
05 June	2	07:15-09:05	60	64	Clear	N/A	6	18
Forrestal (F)								
05 March	1	08:25-11:10	66	64	Ptly cldy	West	11	0
17 May	2	09:00-10:45	63	66	Ptly cldy	West	4	2
14 March	1	08:50-10:52	52	61	Ptly cldy	East	4	0
23 May	2	09:15-11:35	68	73	Ptly cldy	East	3	0
Portuguese Bend (C)								
2 March	1	08:00-11:50	53	68	Clear	South	5	5
18 May	2	07:25-11:00	59	68	Ptly cldy	South	6	1
12 March	1	10:00-12:40	52	61	Ptly cldy	North	0	0
22 May	2	07:30-09:25	63	68	Fog	North	0	1
San Ramon (R)								
04 March	1	10:10-11:00	72	79	Clear	Middle	2	0

03 April	1	09:00-10:25	64	67	Clear	Upper/Lower	0	2[4]
14 May	2	06:55-08:50	57	64	Clear	N/A	2	2
Three Sisters (T)								
19 March	1	08:20-11:30	50	55	Clear	N/A	4	7
08 June	2	07:55-10:10	63	65	Ptly cldy	Northeast	0	3
12 June	2	06:00-08:00	61	63	Overcast	(Remainder)	1	7
Filiorum (U)								
19 March	1	08:20-11:30	50	55	Clear	Northwest	0	5
02 April	1	08:48-11:55	65	72	Clear	N/A	0	6[5]
08 June	2	07:55-10:10	63	65	Ptly cldy	N/A	0	6
Vicente Bluffs (B)								
13 March	1	09:50-12:48	57	61	Ptly cldy	N/A	10	0
14 May	2	09:20-11:00	64	72	Clear	N/A	5	0
Vista del Norte (N)								
03 April	1	11:00-11:40	65	65	Clear	N/A	0	0
22 May	2	07:05-07:30	62	62	Clear	N/A	0	0

[4] Does not include single cactus wren detected south of reserve (Ocean Trails).

[5] Includes single bird seen just off southern boundary of property in cactus scrub (where nest also present).

Results

Maps showing all locations of California gnatcatcher and cactus wren observations, including nests, from the 2012 survey are provided in Appendix B, and are detailed in a table in Appendix C. To summarize differences between the 2006, 2009 and 2012 surveys, the number of California gnatcatcher territories estimated for the reserves dropped between 2009 and 2012 (from 40 to 33), to a point roughly half that which was estimated in 2006 (65) (Table 3). However, the number of cactus wren territories appears to have increased roughly two-fold from 2009, to a level more on par with counts in 2006, particularly when birds at Filiorum, which wasn't sampled in 2006 or 2009, are omitted from the total (total minus Filiorum listed in parentheses in Table 3).

The 2012 survey did not detect breeding California gnatcatchers at Agua Amarga (single female in 2012, vs. 3 territories in 2009 and 4 in 2006). The number of gnatcatcher territories declined in San Ramon; down from 7 in 2006 to 2 in 2009 to just one in 2012. Gnatcatcher territories declined at Three Sisters (8 in 2006, 4 in 2009, 2 in 2012), despite considerable recent habitat restoration. The severe decline of pairs at Vicente Bluffs, where 10 territories in 2009 were replaced by just 3 in 2012 is a somewhat special case, since the habitat here is almost entirely comprised of planted and irrigated restoration vegetation; the gnatcatcher estimate in 2006, prior to the full maturation of this habitat, was roughly the same as that in 2012 (4 pairs then, 3 pairs today). Countering these trends, increases in gnatcatchers from 2009 were noted only at Abalone Cove (up to 5 pairs in 2012 from 3 in 2009) and at Forrestal (up to 9 pairs in 2012, from 5 in 2009), and numbers remained roughly the same at Portuguese Bend (6 pairs in 2012 vs. 7 in 2009). Counts of gnatcatcher pairs were lower in 2012 than in 2006 at every site that supported the species in 2006.

For cactus wren, higher totals in 2012 were partially due to the addition of Filiorum to the list of sites surveyed, where as many as 9 territories were noted (including two likely territories just outside the boundaries that probably intersected the preserve border), making this new acquisition (by PVPLC) among the most productive for this species on the peninsula. Elsewhere, 2012 counts of cactus wren territories surged at Alta Vicente, where an estimated 13 territories were active (contrast this with 2009, when Alta Vicente had just 4 territories). Notably, cactus wrens were observed at Abalone Cove in 2012, where none were observed in 2009. Interestingly, birds here were only noted during round 2, when no fewer than six (fresh) nests were detected on 29 May. Numbers of cactus wren territories dropped only at Forrestal, a relatively minor site (2 territories in 2009 vs. 1 in 2012).

Just one brown-headed cowbird was noted during the 2012 survey, a male in the residential area adjacent to Forrestal reserve on 23 May.

Table 3. Estimates of territories of California gnatcatcher and cactus wren, by reserve. Note that Dudek (2007) conducted three visits during the survey, while Hamilton and Cooper made two.

	California Gnatcatcher			Cactus Wren		
	Dudek 2007	Hamilton 2009	Cooper 2012 (this study)	Dudek 2007	Hamilton 2009	Cooper 2012 (this study)
Abalone Cove	8	3	5	9 ad.	0	3
Agua Amarga	4	3	1	4 ad.	4	6
Alta Vicente	8	5	5	4 pr., 7 ad.	4	13
Forrestal	12	5	9	6 ad.	2	1
Portuguese Bend	14	7	6	4 ad.	2	3
San Ramon	7	3	1	10 ad.	1	2[6]
Three Sisters	8	4[7]	2	7 pr., 1 ad.	5	10
Filiorum	N/A	N/A	0	N/A	N/A	9[8]
Vicente Bluffs	4	10	4	0	0	0
Vista del Norte	0	0	0	0	0	0
TOTAL	**65**	**40**	**33**	**11 pr. + 41 adults**	**18**	**48 (38)[9]**

Discussion

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

Two of the three territories of California gnatcatchers Hamilton (2009) noted in the western portion of Abalone Cove were near birds detected in 2012: a pair along the road to the preschool on 22 Mar., and another in apparently landscaped/"restored" California sagebrush on the westernmost of the two main peninsulas on 29 May. A third pair found in 2009 to the northeast of the latter site was not detected in 2012 ("CAGN 'C'"; see Figure 14 in Hamilton 2009), though our survey found at least one pair on the eastern portion of the site near one detected in 2006 but where none was found in 2009. Otherwise, gnatcatcher observations in 2006 corresponded closely to those in 2012, with the notable exception of our not finding birds at the far western portion of the reserve adjacent to the main parking/picnic area (Figures 6h in Dudek 2007). Based on the aerial photos, this bluff area – located on steep

[6] At least one cactus wren territory was located southeast of San Ramon reserve, within city open space; this was mapped but not counted, since this area supports several pairs that will probably be censused separately in the future (unlike habitat adjacent to Filiorum, which was on private property).

[7] A fifth wren territory was just off the northeastern boundary of Three Sisters, land now part of Filiorum.

[8] Includes two probable territories off the southern boundary.

[9] Number in parenthesis excludes counts from Filiorum, which was not included in 2009 surveys.

slopes above the beach – has been heavily invaded with non-native shrubs and trees) and may no longer support suitable habitat for the gnatcatcher.

Abalone Cove territories of California gnatcatcher (white) and cactus wren (yellow).

Cactus wren was undetected entirely at Abalone Cove in 2009 as well as during Round 1 surveys in 2012, but in late May, multiple fresh nests were detected (6) as well as 1-2 singing birds (Figure 2b), suggesting that wrens either moved in from elsewhere late in the season, or had been extremely secretive in the months prior; either way, they are assuredly not extirpated from the site, as had been surmised by Hamilton (2009). Incidentally, one nest was only about 5 meters off the beach sand, a situation not noted at any other site during 2012. While no cactus wrens were observed in the eastern portion of the site in 2012, a vocal individual was observed briefly near the southern border of Portuguese Bend reserve on 18 May, where it presumably held a territory. Interestingly, cactus wren observations in 2006 closely matched those in 2012, with the same three areas used (Dudek 2007, Figures 6h and 6i).

Agua Amarga

As in 2009, all gnatcatcher/wren observations were made in the southern "arm" of the reserve, which supports the majority of the suitable habitat for both species. The only sighting of a California gnatcatcher in 2012 was of a lone female on 9 April near the southeastern edge of the reserve (located between two individuals/pairs mapped in 2009). Future surveys are necessary to determine if the species remains on the site. If no gnatcatchers are currently present, it may re-colonize in the future, as ample habitat remains. In 2006, gnatcatchers were mainly recorded in the southern arm of the reserve, but one was found in the northern arm, in coastal sage scrub that still exists (Dudek 2007, Figure 6c).

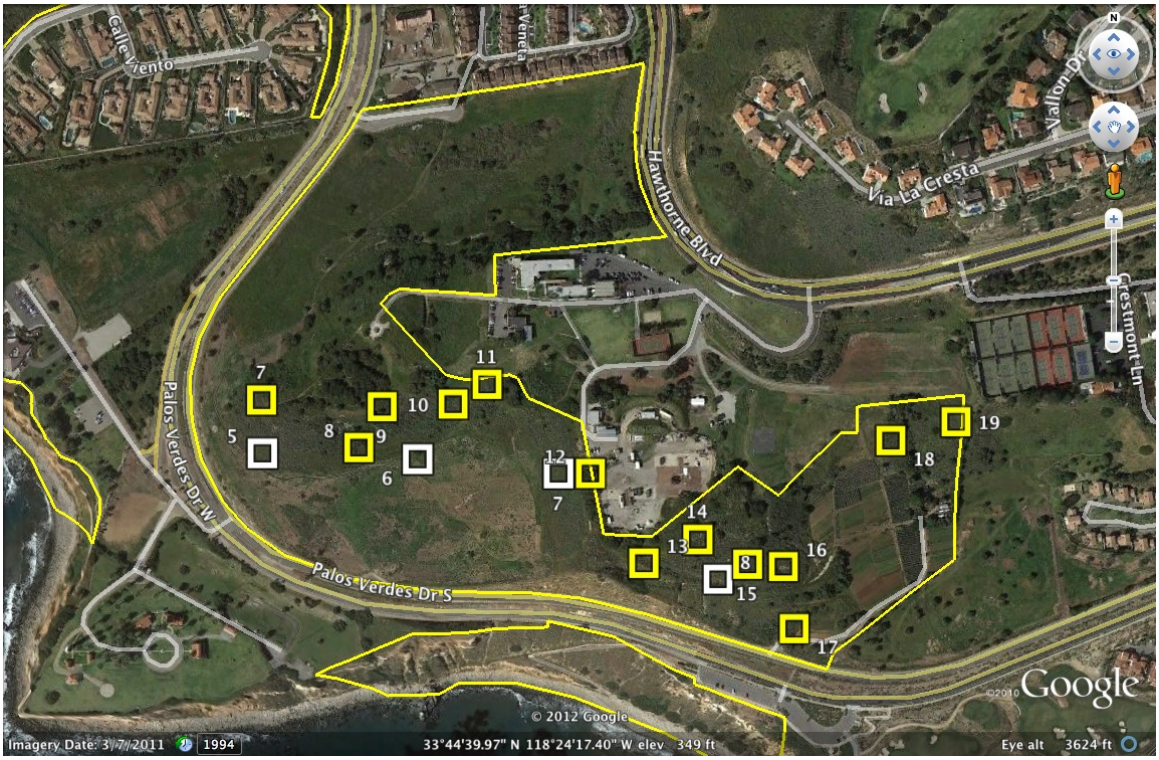
Singing cactus wrens were again noted along the north slope of the main canyon (as they were in 2006 and 2009), with the addition in 2012 of 1-2 singing birds along the southern lip of the canyon, apparently using non-native giant yucca (*Yucca elephantipes*) as singing perches.

Agua Amarga territories of cactus wren (yellow).

Alta Vicente

While numbers of California gnatcatcher, and locations of their detection, remained largely unchanged from 2009 to 2012 (4-5 territories in both years) and were observed using similar areas as in 2006 (Dudek 2007, Figure 6f), a notable find for this species in 2012 was an active nest with four nestlings on 05 June built well into the main restoration area on the lower part of the site (see Appendix B for map of location). A (separate) family group of adults accompanied by begging fledglings was seen on the same day at the edge of the same restoration area just to the west (Appendix B).

For cactus wren, at least 7 areas with fresh nests, as well as multiple pairs and singles beyond these nest locations, yielded an estimate of as many as 13 territories. At least two older nests placed in an isolated clump of cactus within the restoration area at the far southwestern corner of the site indicated even more potential habitat for additional territories. More surveys would be necessary to refine the estimate of pairs/territories here, but it is almost certainly much higher than the four territories found in 2009. In 2006, birds were using areas similar to those found in 2012 (see Figure 6f in Dudek 2007).



Alta Vicente territories of California gnatcatcher (white) and cactus wren (yellow).

Forrestal

We encountered single or paired California gnatcatchers in several areas of Forrestal, but many of these were found only on the first of the two visits. Assuming each of these represents a discrete territory, we estimated 9 territories, which was roughly intermediate between the 5 mapped in 2009 and the 12 in 2006. As a note, the pair far up the eastern canyon on 14 March was in atypical habitat (small patch of sagebrush within high, dense lemonadeberry *Rhus integrifolia* but was in nearly the same spot as a bird/birds found in 2006 (see Figures 6l and 6m in Dudek 2007).

The sole cactus wren territory found in 2012 at Forrestal was a pair actively nest-building during the Round 2 survey in mid-May (the species was missed entirely here in Round 1); it may have been the same pair found just west of here in 2009, which had no birds or nests in 2012. The territory at the southeastern end of the reserve found in 2006 and 2009 was not active in 2012 (no birds/nests), and no gnatcatchers were in this southern-most area either. Notably, loud leaf-blowers and/or tree-trimming operations were recorded in the adjacent neighborhood on both visits in 2012, making aural detections (of any species) difficult. It is possible the birds were less active during periods of loud noise, or we simply could not hear their calls above the ambient noise level.

Forrestal territories of California gnatcatcher (white) and cactus wren (yellow).

Portuguese Bend

The estimated five California gnatcatcher territories in 2012 were in roughly the same areas as those recorded 2009-2011, although birds were not found at the far southeastern corner ("Klondike Canyon" area) as they had been (Hamilton 2009, CEM 2011). Compared to the 2006 survey, birds have been essentially eliminated from the entire northern portion of Portuguese Bend, presumably following an August 2009 burn here.

Cactus wrens were again found in the southeastern corner of the reserve, but aside from some older nests, were absent from the lower Burma Rd. area where they had been found in 2006 and 2009 (and sporadically in 2010/11; see CEM 2011). However, the 2012 survey document an apparent re-colonization event, of a territory in the northwestern corner of the reserve ("CCW4"; see Figures 6j, 6k and 6l in Dudek 2007).

Portuguese Bend territories of California gnatcatcher (white) and cactus wren (yellow). A third territory of cactus wren to the north is visible on the map of Three Sisters/Filiorum.

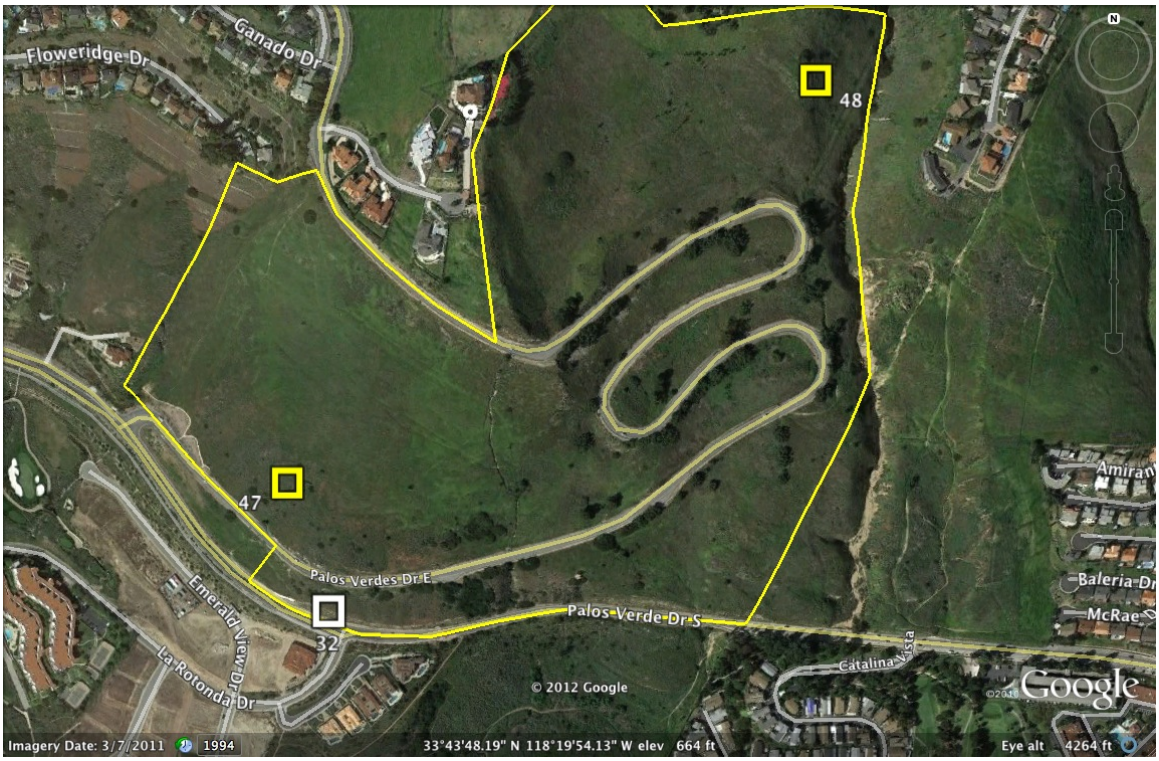
San Ramon

Just one pair of California gnatcatchers was observed in 2012, in the lowermost section of the reserve along Palos Verdes Dr. East, an area that held up to three pairs in 2009. Gnatcatchers were very widespread in the reserve in 2006, in central and northern areas that support very little coastal sage scrub today.

The northern of the two cactus wren territories found in 2012 was in an area where one was also present in 2006 (but not in 2009). As with other sites, multiple nests at the southern territory (#47, below), were noted only during Round 2 surveys in late spring, when birds either moved onto the site or became suddenly active.

As a note, traffic noise was very loud in the southern portion of this reserve regardless of time of morning, and as with the southern edge of Forrestal, noise may have hindered

additional detections of both species (principally from Palos Verdes Dr. South), or may be actually reducing habitat quality here.



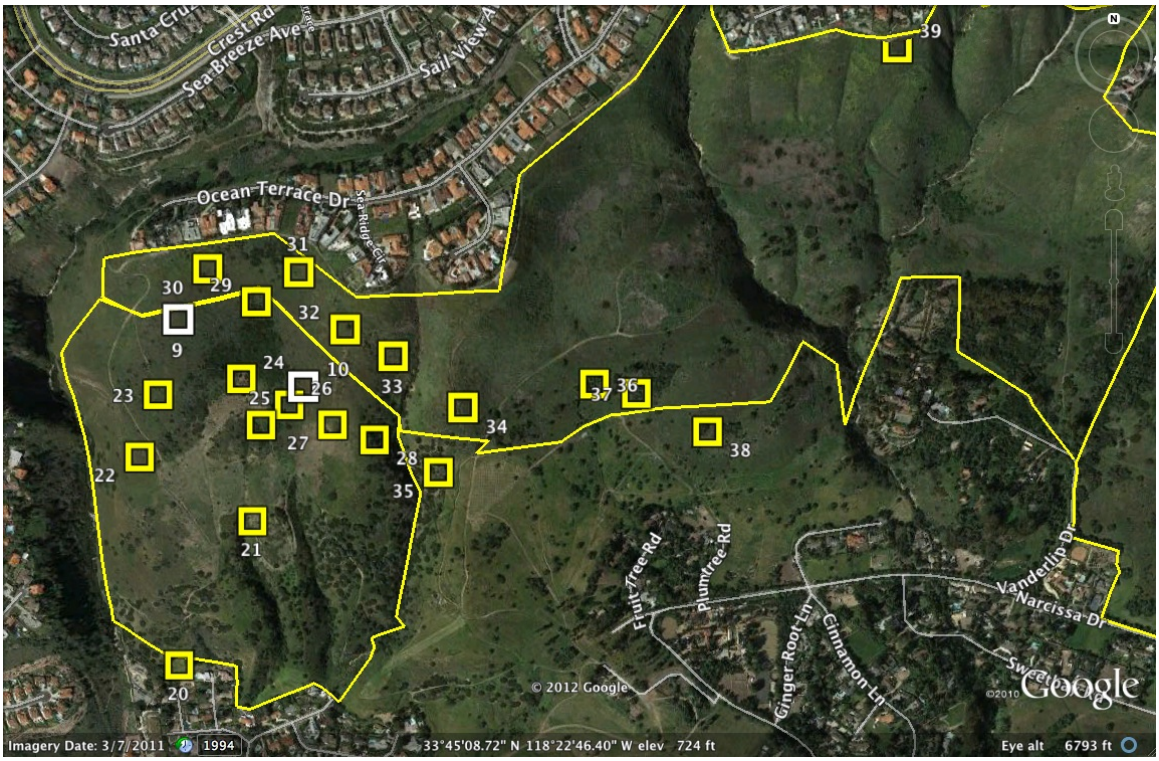
San Ramon territories of California gnatcatcher (white) and cactus wren (yellow).

Three Sisters

Based on our detection of just two California gnatcatcher territories, this species has apparently declined at Three Sisters. Both 2012 territories were in areas relatively close to territories previously documented in 2009 ("CAGN 'A'", "CAGN 'B'"; see Figure 21 in Hamilton 2009), in the northern portion of the reserve. However, the 2006 survey found the species much more widespread, with birds observed in five locations in the lower half of the reserve, including along the southern border near Barkentine Ave., where none was observed in either 2009 or 2012.

Cactus wren locations in 2006 were generally similar to those in 2012; however, the 2012 survey found cactus wrens in the southern half of the reserve, where they were not found in 2009.

The apparent decline of California gnatcatcher is hard to explain, particularly given the large amount of habitat restoration at the reserve. It is possible that large areas of restored vegetation are in a very early successional stage, and have several years to go before they reach the "waist-high" scrub favored by the gnatcatcher. Although a large number of acacia trees were removed from the western portion of the reserve, the continued maturation of large acacia shrubs on the southern half of the reserve may be reducing habitat quality for the species.



Filiorum

As this new site was added in 2012, numbers cannot be compared with those of prior years. The discovery of a sizable population of cactus wren here (7 territories; 9 if birds on adjacent private lands are included) is encouraging; however these birds were not widespread, but largely restricted to the western edge of the reserve. The absence of gnatcatcher here is difficult to explain, because the coastal sage scrub where the cactus wrens were found appears suitable for this species. Hamilton (2009) found a pair or family group at the extreme eastern boundary of Three Sisters near the border of Filiorum, where we found none in 2012.

Vicente Bluffs

One of the biggest surprises of the 2012 survey was the drastic drop in California gnatcatcher territories at this restored site, which had 9-10 territories in 2009 (Hamilton

2009, Fig. 15), and just four in 2012. Thus, the current estimate is exactly the same as that in 2006, which is six years after the restoration plantings were completed here (D. LeFer, via email). It is possible that the high number of gnatcatchers in 2009 occurred when the planted vegetation reached an ideal density and height for the gnatcatcher in 2009.

Cactus wren was unrecorded at Vicente Bluffs in all three surveys, 2006-2012.

Vicente Bluffs territories of California gnatcatcher (white) and cactus wren (yellow).

Additional notes

The apparent declines in gnatcatcher territories and increases in cactus wren territories should be interpreted with caution. These were based on as few as four visits, over four years, for many reserves, which is far too few to make claims of population trends. So, while these surveys are probably sufficient for presence/absence information – such as that neither species has colonized Vista del Norte reserve, or that California gnatcatcher may be nearing extirpation at Agua Amarga – numbers of both species vary naturally annually, and from decade to decade. Atwood et al. (1998b) noted population swings of c. 50% during annual surveys on the peninsula from 1993-1997, ranging from a high of 56 in 1994 to a low of 26 pairs the following year (1995); our 2012 estimate of 33 pairs fits within this range, as does Hamilton's in 2009 (40 pairs) which used similar methodology. Therefore, only through repeated surveys over multiple years will we be able to assess trends with any confidence. Many natural factors, such as winter temperatures and rainfall, may affect productivity, and as the peninsula is now an urban area, anthropogenic factors, including construction and landscaping noise and mere human presence at small, heavily used (by people) sites, may skew detections of individual birds.

The observed declines may be cause for some concern in the reserves where either gnatcatchers or wrens are now very rare or absent after being more numerous on prior years' surveys. For gnatcatcher, these would at least include Agua Amarga, Three Sisters, and San Ramon. For cactus wren, these would include Abalone Cove, Forrestal, and San Ramon. Of course, this begs the question, are the target species truly rare at these sites now, or did surveys just not detect them? Perhaps directed searches at places like San Ramon – at various times of year until the next three-year survey – could start to answer this question.

The possibility that cactus wrens could increase while gnatcatchers would decline may be due, at least in part, to the local habitat preferences of each. The gnatcatcher favors lush, high thickets of California sagebrush (*Artemisia californica*) or nearby quailbush (*Atriplex lentiformis*) (pers. obs.), while the cactus wren favors cactus patches free of weeds and vines, with large barren areas of soil needed for ground-foraging. Aside from factors that would affect both species (for example, a local increase in a predator such as the Cooper's Hawk *Accipiter cooperii*), climatic phenomena such as a particularly dry winter would result in "better" cactus wren habitat and "worse" California gnatcatcher habitat (and vice-versa).

However, at least for the cactus wren, given how many sites had wrens apparently absent during Round 1 surveys in early spring which then "attracted" nesting wrens by Round 2, the timing of surveys may be extremely important in declaring a species present or absent (or recolonized/extirpated). Hamilton surveyed only four sites during May (2009), and none past 19 May, a period in which we observed many new cactus wren nests being built. By contrast, most of the Dudek surveys in 2006 were in June and July, even extending into August. It is possible that for whatever reason, cactus wrens are more detectable in late spring and mid-summer.

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APPENDICES

Appendix A. Approximate walking routes taken by surveyor (Cooper) in 2012. Different colors represent routes taken on different survey days.

Figure A-1. Agua Amarga (left), Vista del Norte (right).

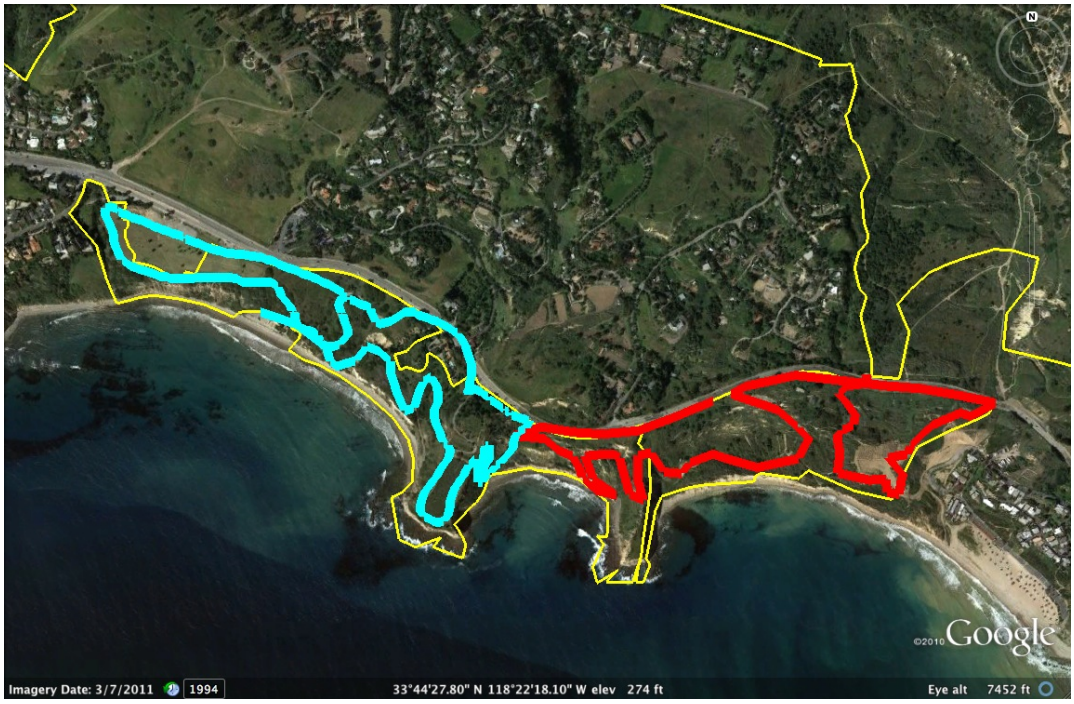

Figure A-2. Abalone Cove ("west" = blue; "east" = red).

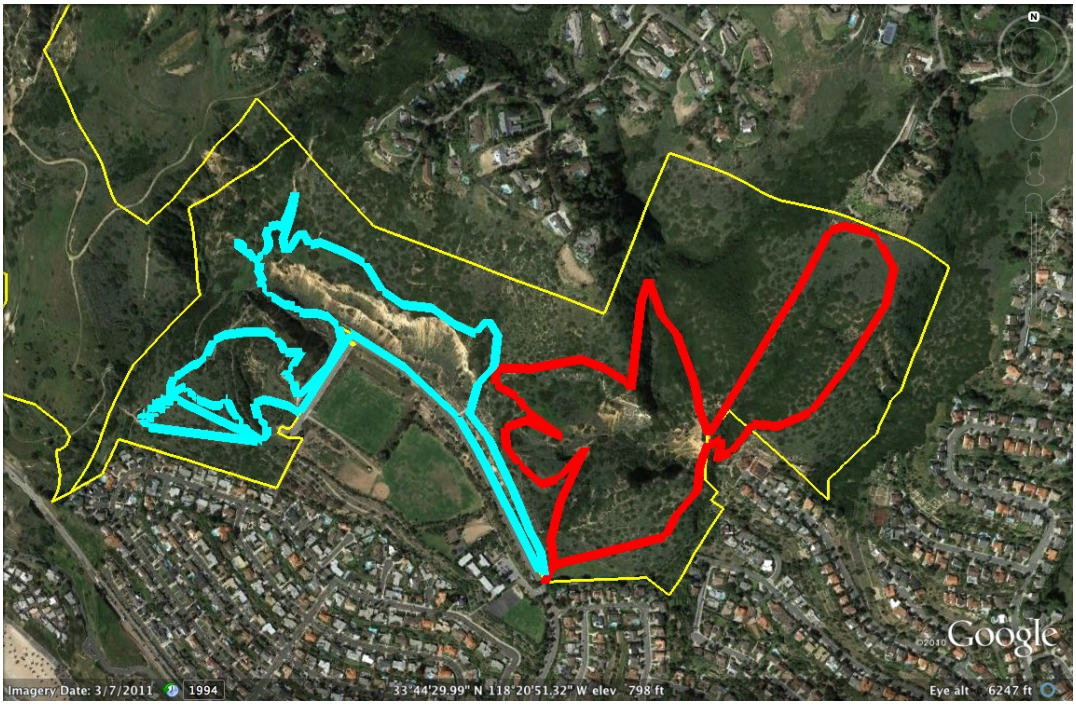

Figure A-3. Forrestal ("west" = blue; "east" = red).

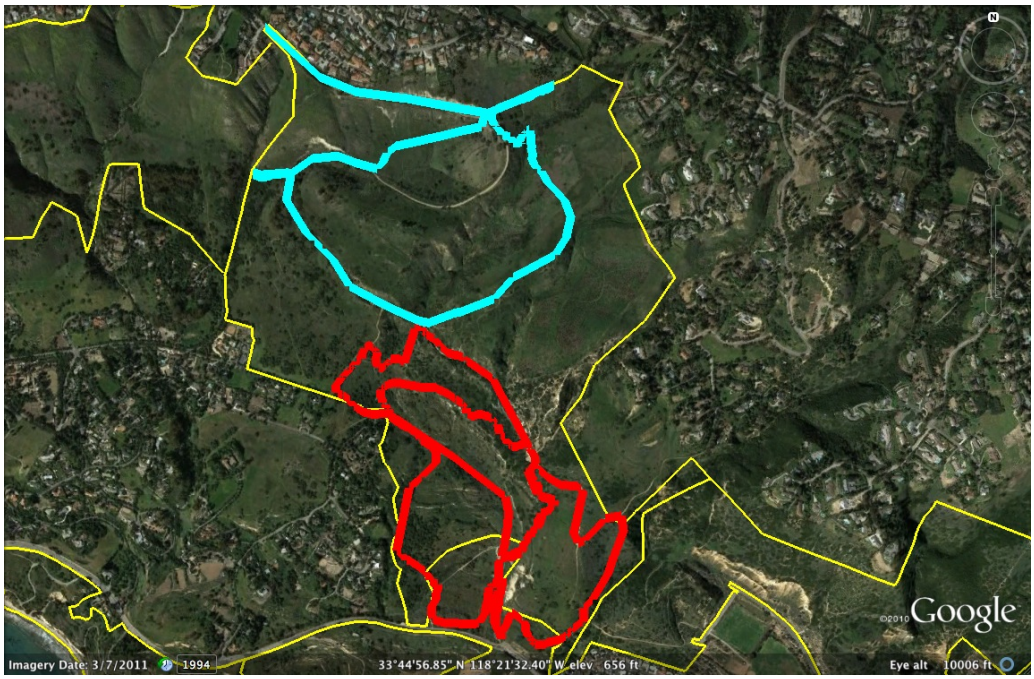

Figure A-4. Portuguese Bend ("north" = blue; "south" = red).

Figure A-5. San Ramon

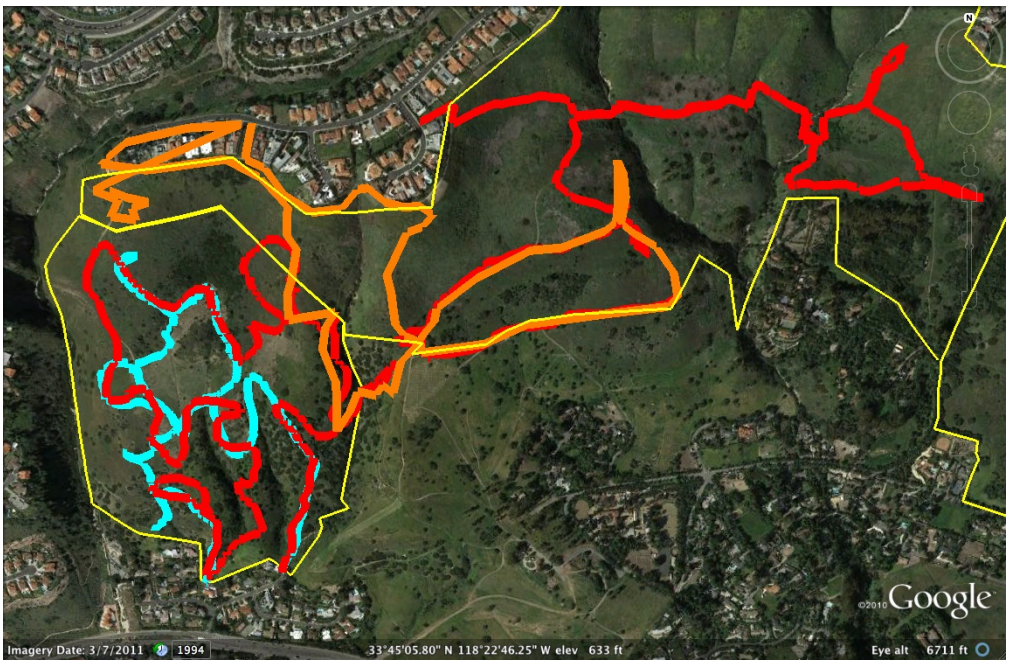

Figure A-6. Three Sisters (red/blue; at left) and Filiorum (orange/red; at right).

Figure A-7. Vicente Bluffs (upper) and Alta Vicente (lower).

Appendix B. Maps of all California gnatcatcher/cactus wren detections, 2012. Green pins represent gnatcatchers, pink pins represent cactus wrens. Round 1 surveys (March-April) indicated with a diamond icon; Round 2 surveys (May-June) indicated with a star icon. Please refer to Appendix C for additional details on each.

Figure B-1. California gnatcatcher and cactus wren observations, Abalone Cove.

Figure B-2. California gnatcatcher and cactus wren observations, Agua Amarga.

Figure B-3. California gnatcatcher and cactus wren observations, Alta Vicente.

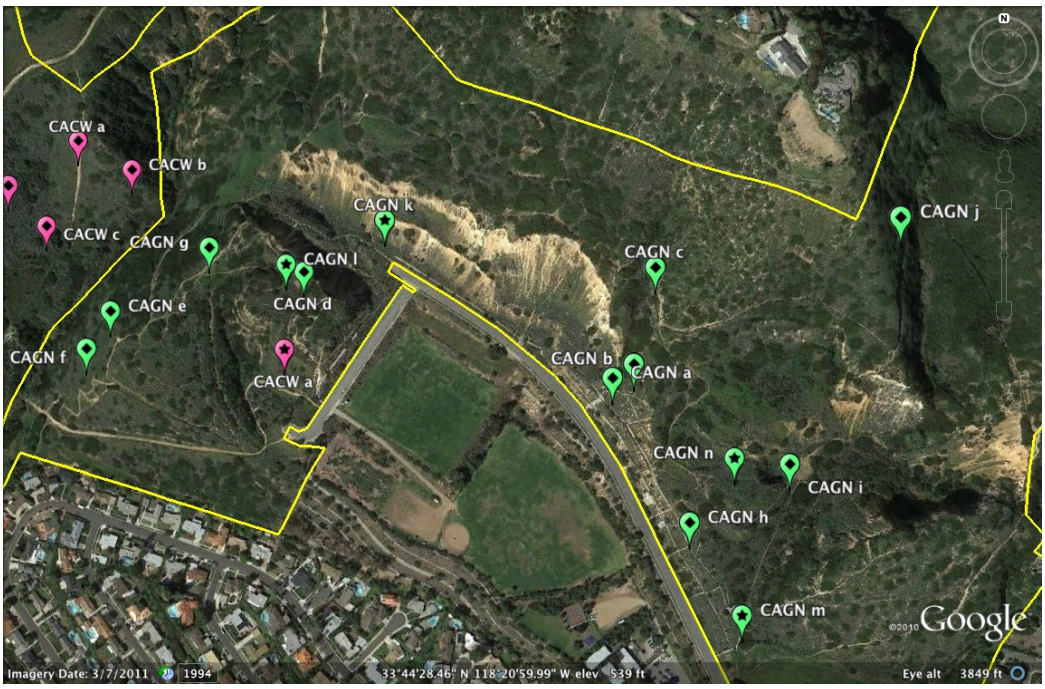

Figure B-4. California gnatcatcher and cactus wren observations, Forrestal.

Figure B-5. California gnatcatcher and cactus wren observations, lower Portuguese Bend (and upper Forrestal). See Figure B-7 for an additional cactus wren observation.

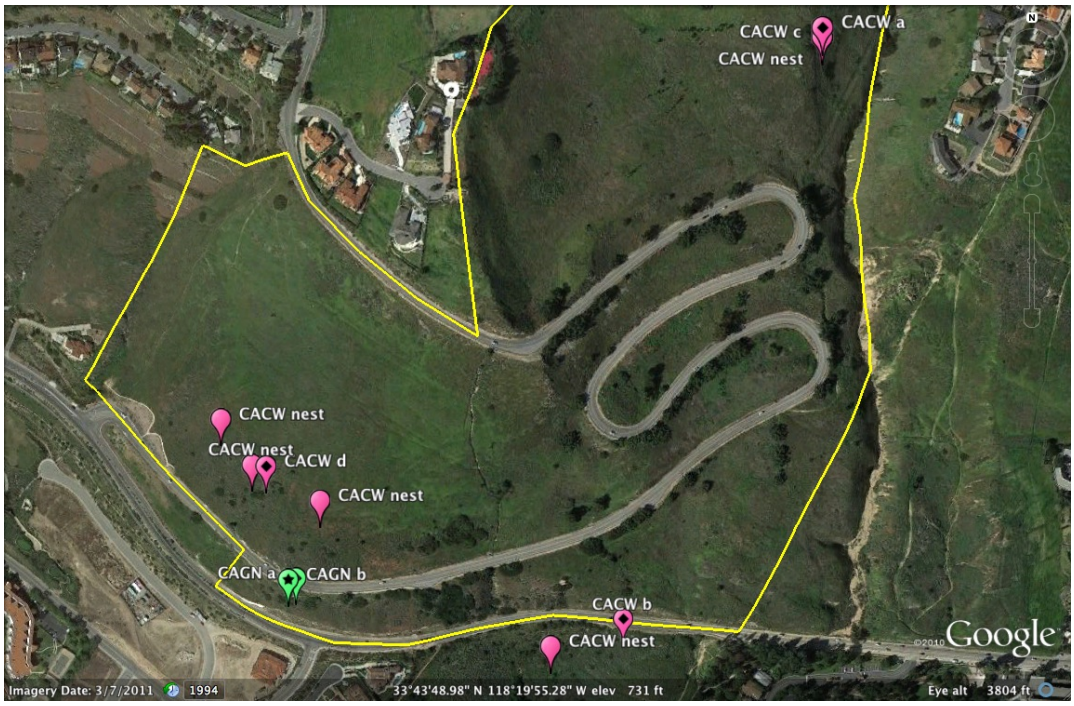

Figure B-6. California gnatcatcher and cactus wren observations, San Ramon.

Figure B-7. California gnatcatcher and cactus wren observations, upper Portuguese Bend/east Filiorum.

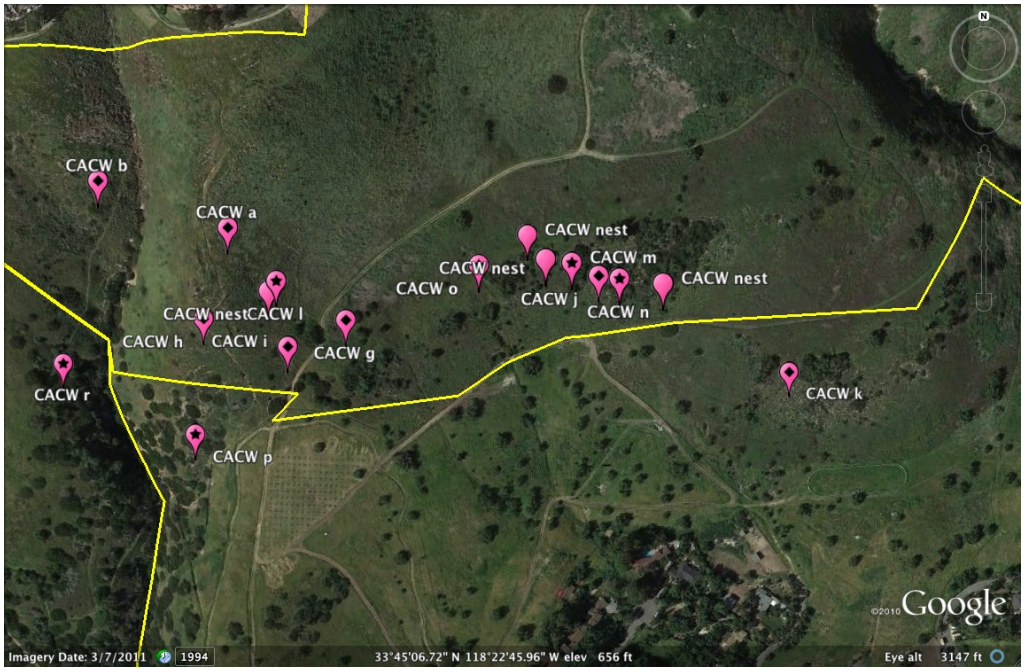

Figure B-8. California gnatcatcher and cactus wren observations, southern Filiorum.

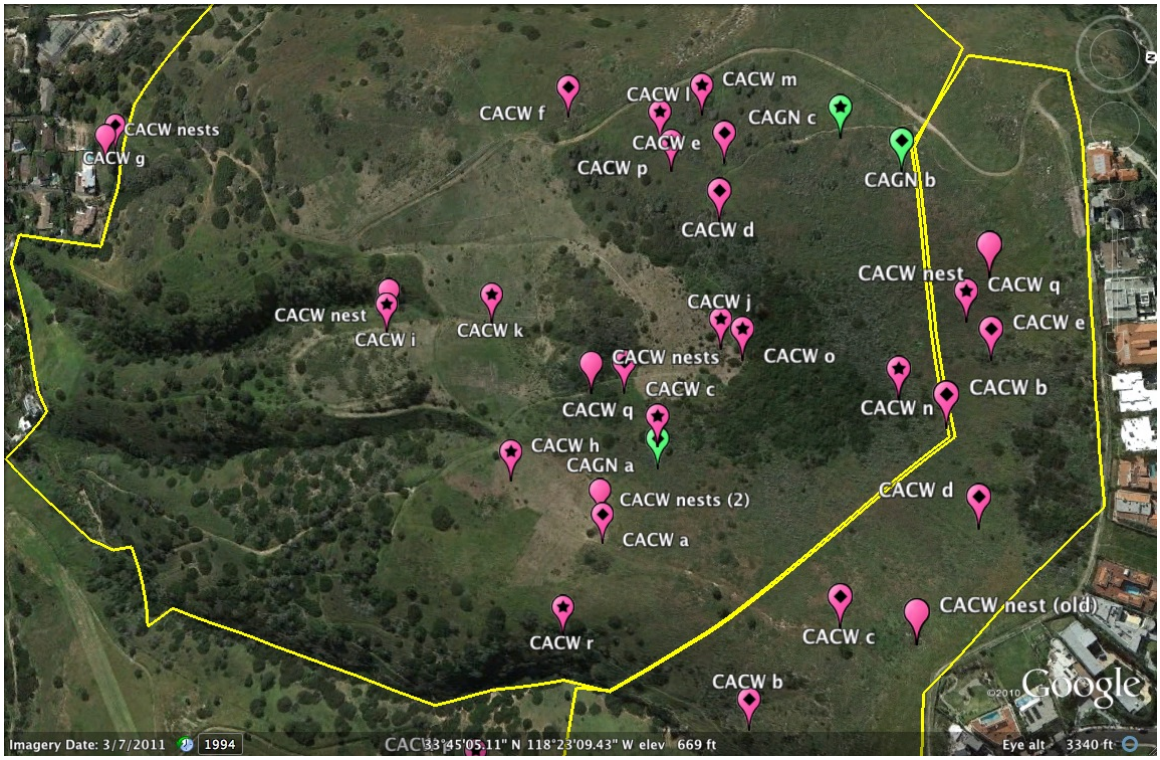

Figure B-9. California gnatcatcher and cactus wren observations, Three Sisters/Filiorum. Note east-west orientation.

Figure B-10. California gnatcatcher and cactus wren observations, Vicente Bluffs.

Appendix C. List of all California gnatcatcher ("CAGN" shaded) and coastal cactus wren (CACW) observations during 2012 survey, by reserve.
"Status": P = pair; S = single; F = Family group; J = juvenile; m/f = male/female

Subarea	Date	Species	Status	Time	Notes
Abalone Cove					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
East	04 Mar.	CAGN a	P	08:20	
East	04 Mar.	CAGN b	Sm	09:00	
East	04 Mar.	CAGN c	S	08:50	
East	29 May	CAGN d	P	10:12	
West	22 Mar.	CAGN e	P	11:18-11:35	
West	29 May	CAGN f	P	10:50	
West	29 May	CAGN g	Sm	11:20	
West	29 May	CACW a	S	11:10	Perched at top of bluff, flew down to nest.
Alta Vicente					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	29 Mar.	CAGN a	P	08:15	
	29 Mar.	CAGN b	P	09:12	Male moved downslope; female stayed on road, tame.
	29 Mar.	CAGN c	P	09:35	
	29 Mar.	CAGN d	P	09:40	
	05 June	CAGN e	F	07:30	Pair feeding 3 fledglings
	05 June	CAGN f	F	07:54	Pair attending nest; 4 nestlings
	05 June	CAGN g	P	08:00-08:10	
	29 Mar.	CACW a	S	08:15	
	29 Mar.	CACW b	S	08:15	
	29 Mar.	CACW c	S	08:30, 09:20	Quiet; "chuck" call only
	29 Mar.	CACW d	S	08:30	Heard from a distance
	29 Mar.	CACW e	S	08:30	Heard from a distance
	29 Mar.	CACW f	S	08:45	
	29 Mar.	CACW ff	S	09:10	Foraging
	29 Mar.	CACW g	P	09:21	Nest-building on fenceline
	29 Mar.	CACW h	S	09:40	
	29 Mar.	CACW i	S	10:19	
	29 Mar.	CACW hh	P	10:27	
	29 Mar.	CACW ii	P	10:27	
	05 June	CACW j	P	07:16	Flew just to east across trail
	05 June	CACW k	S	07:19	
	05 June	*CACW l*	*P*	*07:19*	*Flew east, with eggshell; same as CACW k?*
	05 June	CACW m	S	07:30	Flew with nesting material from nest to top of mesa
	05 June	CACW n	J?	07:40	"growling" call
	05 June	*CACW o*	*S*	*08:00*	*Same as CACW r?*
	05 June	CACW p	S	08:00	
	05 June	CACW q	S	08:00	Foraging in restoration area
	05 June	CACW r	S	08:10	
	05 June	CACW s	S	08:13	
	05 June	CACW t	P	08:22	
	05 June	*CACW u*	*S*	*08:22*	*= one of CACW t pair; carrying food to nest*
	05 June	CACW v	S	08:22	
	05 June	CACW w	S	08:40	

	05 June	CACW x	P	08:40	
Agua Amarga					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	09 Apr.	CAGN a	Sf	09:29	
	09 Apr.	CACW a	S	09:09	
	09 Apr.	CACW b	S	10:00	Flying west
	09 Apr.	CACW c	S	10:15	
	09 Apr.	CACW d	S	10:15	
	09 Apr.	CACW e	P	10:20	2 birds flying from east
	09 Apr.	CACW f	S	11:50	On *Yucca elephantipes*; 2nd CACW possibly heard to west. CACW possibly heard here on 05 June.
	05 June	CACW g	P	09:55	
	05 June	CACW h	S	09:55	
Forrestal					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
West	05 Mar.	CAGN a	P	08:35-08:50	
West	05 Mar.	CAGN b	S	08:55	
West	05 Mar.	CAGN c	P	09:05	2 more CAGN heard to west during observation, possibly a/b
West	05 Mar.	CAGN d	Sm	09:55	Territorial, flying from perch to perch but no female detected.
West	05 Mar.	CAGN e	P?	10:10	Territorial male calling; 2nd calling bird engaged in fight/chase
West	05 Mar.	CAGN f	Sf	10:15	
West	05 Mar.	CAGN g	P	10:40	
West	05 Mar.	CAGN h	Sm	11:00	Flew down to recording, then back up.
East	14 Mar.	CAGN i	P	09:00	
East	14 Mar.	CAGN j	P?	10:00	2 birds calling 30 m apart.
West	17 May	CAGN k	P	09:00	
West	17 May	CAGN l	F	09:20	
East	23 May	CAGN m	Sm	09:17, 11:00	Silent/tame
East	23 May	CAGN n	Sm	10:00	Scolding/tame
West	17 May	CACW a	P	09:50	Nest-building
Portuguese Bend					
South	2 Mar.	CAGN a	S	08:00	
South	2 Mar.	CAGN b	P	08:44	
South	2 Mar.	CAGN c	P	11:15	
South	4 Mar.	CAGN d	S	08:00	Found during Abalone Cove survey
South	18 May	CAGN e	Sm	08:00	Carrying food (white grub)
South	18 May	CAGN f	Sf	08:15	Flew to north 20 m; silent
South	18 May	CAGN g	Sm	08:20	Carrying food, flying across road.
South	18 May	CAGN h	Sm	08:42	Flew in from west; silent
South	18 May	CAGN i	Sm	09:00	Carrying food to west of trail
South	18 May	CAGN j	Sm	10:30	Territorial, calling
South	2 Mar.	CACW a	P	09:30	
South	2 Mar.	CACW b	S	09:30	
South	2 Mar.	CACW c	S	09:30	
South	2 Mar.	CACW d	S	09:30, 10:20	
South	18 May	CACW e	S	11:30	Flew from across road, continued east up canyon.
North	22 May	CACW f	P	08:45	
Vicente Bluffs					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	13 Mar.	CAGN a	P	10:00	

	13 Mar.	*CAGN b*	*P*	*10:10*	*Same as CAGN a?*
	13 Mar.	CAGN c	S?	10:12	Scold/pishing call
	13 Mar.	CAGN d	P	10:30	
	13 Mar.	CAGN e	P	11:13	
	13 Mar.	CAGN f	Sm	11:26	Flew in from north, returned
	14 May	CAGN g	Sm	09:30	Time approx.
	14 May	CAGN h	Sf	10:00	Time approx.
	14 May	CAGN i	Sm	10:00	Time approx.
	14 May	CAGN j	Sm	10:30	Time approx.; flew north with apparent fecal sac.
San Ramon					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	04 Mar.	CAGN a	P	10:15	
	14 May	CAGN b	P?	08:45	Time approx.; two birds.
	03 Apr.	CACW a	P	09:15	
	03 Apr.	CACW b	S	10:10	Just off southern boundary
	14 May	CACW c	S	07:10	Time approx.
Three Sisters					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	19 Mar.	CAGN a	P	09:45	
	19 Mar.	CAGN b	P	10:20	
	12 June	CAGN c	J, Sf	07:00	
	19 Mar.	CACW a	S	09:25	
	19 Mar.	CACW b	S	09:40	
	19 Mar.	CACW c	P	09:45-09:55	
	19 Mar.	CACW d	S	10:00	
	19 Mar.	CACW e	S	10:15	Time approx.
	19 Mar.	CACW f	S	10:35	
	19 Mar.	CACW g	S	11:10	
	08 June	CACW r	S	09:40	Heard from Filiorum
	12 June	CACW h	F	06:15	Also recorded 08 June
	12 June	CACW i	S	06:29	
	12 June	CACW j	S	06:35	
	12 June	CACW k	J	06:35	
	12 June	CACW l	J, S(f?)	06:54	
	12 June	CACW m	S	06:54	
	12 June	CACW n	S	07:00	
	12 June	CACW o	J (3)	07:15	
	12 June	CACW p	S	07:10, 07:16	
	12 June	CACW q	S	07:20	
Filiorum					
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**
	19 Mar.	CACW a	S	09:00-09:20	
	19 Mar.	CACW b	S	09:00-09:20	
	19 Mar.	CACW c	P	09:30	
	19 Mar.	CACW d	S	09:30	
	19 Mar.	CACW e	S	10:05	
	2 Apr.	CACW f	S	09:15	Time approx.
	2 Apr.	CACW g	S	10:27-10:35	
	2 Apr.	CACW h	S	10:35	
	2 Apr.	*CACW i*	*S*	*10:35*	*Same as CACW g?*
	2 Apr.	CACW j	S	10:48	
	2 Apr.	CACW k	S	10:55	Off southern boundary
	8 June	CACW l	S	08:18	Nest-building
	8 June	CACW m	F	08:30	

	8 June	CACW n	S	08:35	Nest-building
	8 June	CACW o	S	09:00	Flew northeast, carrying food
	8 June	CACW p	S	09:10	
	8 June	CACW q	S	09:56	

El Segundo Blue Butterfly (*Euphilotes battoides allyni*) Survey Results for 2011

by

Ann Dalkey

September 29, 2011

1.0 SUMMARY

Surveys for the El Segundo blue butterfly (ESB) were conducted within preserves managed by the Palos Verdes Peninsula Land Conservancy (PVPLC) under permit number TE-217663-0. The species is listed as Federally Endangered and is included in California's Wildlife Action Plan as State-Endemic Special Status Invertebrates. Within the Palos Verdes Nature Preserve, ESB inhabit the steep ocean bluffs around Point Vicente. Due to the ESB's endangered status, it is governed by the Palos Verdes Nature Preserve Natural Community Conservation Planning/Habitat Conservation Plan (NCCP) that mandates triennial surveys for long-term population trending.

The 2011 survey was conducted as a good faith follow-up from the 2010 triennial survey where only two ESB were observed. Surveys were conducted at 13 sites possessing host plants. Twelve of the sites were surveyed in 2010 and one additional site where host plants were discovered. Weekly surveys were conducted from June 7 through July 28, with a hiatus between June 11 and 20. Only one ESB was observed in the survey areas, an individual flying from Terranea Resort to Pelican Cove across the parking lot. Loss of host plant is most likely the reason for the paucity of observed ESB. A number of factors could affect the host plant, and thereby the butterfly, including slope failure, competition from non-native, invasive plants, and sea water inundation. PVPLC has recently increased habitat around Point Vicente and at the base of the bluffs to benefit the butterfly, thanks to Coastal Conservancy funding. The next survey will take place during the next triennial monitoring period in summer 2013.

2.0 INTRODUCTION

Surveys for the Federally-endangered El Segundo blue butterfly (*Euphilotes battoides allyni*, ESB) were conducted within preserves managed by the Palos Verdes Peninsula Land Conservancy (PVPLC). El Segundo blue butterflies inhabit ocean bluffs within the Palos Verdes Nature Preserve (PVNP), which is located entirely within the City of Rancho Palos Verdes (Figures 2 and 3).

2.1 EL SEGUNDO BLUE BUTTERFLY

The El Segundo blue butterfly is a member of the *Euphilotes battoides* complex that utilizes wild buckwheat species (*Eriogonum* spp.). The ESB is unique to this group in that it is dependent upon a single buckwheat species, dune buckwheat (*Eriogonum parvifolium*), for its entire life cycle (egg, larvae, pupae, and adult) (Mattoni 1990). Although the ESB possesses unique, but microscopic morphological characters, it is otherwise virtually identical to the Bernardino blue (*Euphilotes bernardino*) (Pratt 2006a). In the field, the butterfly is identified by its association with dune buckwheat.

Historically, the ESB inhabited dune habitat that ranged continuously along the coast from Santa Monica to Malaga Cove at the Palos Verdes Peninsula (Mattoni 1990). Intensive development started in the 1890's has significantly reduced the habitat, leaving less than 10% of the dunes that is highly fragmented (Mattoni 1993). With the loss of habitat, ESB populations declined and it was listed as endangered in 1976.

The recovery plan for ESB identified four recovery units: Ballona, Airport Dunes, El Segundo, and Torrance (U.S. Fish and Wildlife Service (USF&WS) 1998). In the recent El Segundo Blue Butterfly 5-year Review, the butterfly was found to be absent at the Ballona Unit and present at all other units (USF&WS 2008). The Review considered that by 2007 ESB populations had increased at their respective recovery units; Airport Dunes and Torrance, where the ESB colonized habitat at recent dune restoration projects at Dockweiler Beach, Redondo Beach, and Torrance Beach (2006, 2004, and 2003, respectively). More encouraging news was the discovery of ESB on the bluffs around Point Vicente on the Palos Verdes Peninsula, a site not included in the recovery plan (Osborne 2001 and Pratt 2006b). Despite occupying a different habitat, steep shale bluffs instead of loose dune sands, the butterflies at this latter site were found solely on dune buckwheat and are considered El Segundo blue butterflies until taxonomic uncertainties of this genus are clarified (USF&WS 2008). Due to the fragmented populations and continued habitat degradation threats, ESB retains the endangered status (USF&WS 2008).

While other locations and historically occupied areas have been well discussed, there has been little mention of the butterflies' presence on the Palos Verdes Peninsula. Known ESB populations have been observed at Pelican Cove near the vicinity of the newly developed Terranea Resort (Osborne 2001), and Vicente Bluffs in front of the Oceanfront Estates (Pratt 2006b). Both Pelican Cove and Vicente Bluffs are reserves in the Palos Verdes Nature Preserve, which are covered under a Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP/HCP) that requires triennial ESB monitoring, beginning in 2010.

The results of the 2010 ESB survey, conducted to satisfy PVPLC's NCCP/HCP triennial monitoring, revealed only two El Segundo blue butterfly individuals observed on the western side of Vicente Bluffs (Dalkey 2011). In contrast, seven individuals were observed in a single day in early July 2009 during the preliminary survey (Dalkey 2009). As a result, PVPLC decided that a "good faith" effort was needed to determine whether or not the observations from 2010 represented the current state of the ESB population at Vicente Bluffs.

2.2 METHODS

The ESB surveys described in this report were conducted to survey occupied habitat areas in accordance with the NCCP guidelines. The document requires that monitoring be conducted for six consecutive weeks during the peak flight period, for a total of six surveys. In addition to documenting numbers of adults detected, sex, behavior, weather, and condition of the larval

habitat, including host plant abundance and condition, an estimate of the number of host plants is required. Also, any new areas with occupied or potential habitat are discovered for the butterflies, are to be surveyed.

Due to the steep bluffs occupied by ESB, transect surveys as recommended by Mattoni et al. (2001) are precluded. Point observations were conducted at 12 sites established in 2010, plus an additional site discovered in 2011 (Figures 6 and 7, and Figure B-1 in Appendix B). The surveys were initiated June 7. Due to the host plant phenology showing the lack of flowers, the weekly surveys were postponed, then restarted on June 21 following warming weather and the presence of ESB at Terranea. The surveys were concluded July 28. Numbers of ESB butterflies, including female, male, or unknown sex, were recorded as well as other lycaenid species. Concurrently, the number of host plant present was recorded along with general assessments of the habitat.

Safety concerns mandated that additional persons be present during the surveys. PVPLC Stewardship Associate Adrienne Bosler, PVPLC Conservation Director Danielle Lefer, and PVPLC Interns Laura Botzong, Simone Boudreau, Harrison Kirner, Kelsey Lyberger, and Andrew Wang accompanied me at various times during the surveys, but did not actively participate in the surveys. The surf also posed a safety risk, rendering access to Site 6 unfeasible during periods of high tides for all but the first survey.

Figure 6. Map of Vicente Bluffs (VB1-6, 8-10, 13) and Pelican Cove survey sites within the Palos Verdes Nature Preserve (PC 7, 11, 12).

Figure 7. Map of Abalone Cove survey sites within the Palos Verdes Nature Preserve (AC 8,9).

Table 1
Summary of Host Plants Present at Survey Transects
and Counts of ESB at Each Transect

Dune Buckwheat				ESB			
Site	**Adult**	**Recruit**	**Total**	**F**	**M**	**Unk**	**Total**
VB-1	8	13	21				
VB-2	30	27	57				
VB-3	30	82	112				
VB-4[1]							
VB-5	11	40	51				
VB-6	7		7				
VB-10	11	4	15				
VB-13	16	10	26				
PC-7	5	3	8				
PC-11	6		6			1	1
PC-12	26		26				
AC-8	12	8	20				
AC-9	32	27	59				
Total	194	214	396				1

[1] Count from Site 5 only

3.0 RESULTS

Only a single identified ESB was observed during the survey. This butterfly was seen flying from Terranea into Site 11 at Pelican Cove via the parking lot. A potential ESB was observed a few meters upcoast from Site 2 on June 27, flying along the base of the bluffs, then turning up the bluff behind a rock. However, this individual could not be positively identified beyond the family level. No other ESBs were observed except at the Terranea Resort's parking lot, where host plant was installed in planters adjacent to Pelican Cove and at the Point Vicente Interpretive Center's native garden (Table 2).

Figure 8. A plant at Site 2 in early June showing the progression of color change as the leaves die.

Figure 9. Several dune buckwheat plants with dead leaves nearest the base of the bluff, while a healthy plant is visible in the upper-left hand corner of the image.

Other lycaenid species was observed during the survey include one gray hairstreak (*Strymon melinus*) at Site 11 on June 21 and again on July 26, and an Acmon blue (*Plebejus acmon*) at Vicente Bluff's Site 2 on July 28. One new site was added; Site 13 located on top of the bluff above site 3 at Vicente Bluffs. Survey dates, sites, times, ESB count, weather, and host plant assessment are detailed in Appendix B (Table B-1). Images of the sites are also provided in Appendix B (Figure B-2).

A large number of juvenile host plants were observed during the surveys (Table 2). The most recruits (82) were observed at Site 3, where a total of 112 dune buckwheats were observed. Site 4 was combined with Site 5 in the host plant counts. At some sites, such as Site 7, sub-adult plants were observed as 2010 recruits (see Appendix B, Table B-1: Comments). The adult plants began flowering by the June 21 survey, with most reaching full bloom by July (Appendix B, Table B-1).

Dune buckwheats located at the base of the bluff at Sites 2, 4, and 5 fared poorly during the survey period. In early June, leaves on the plants were green with a few possessing red leaves (Figure 8). As the survey progressed, more leaves turned red, then brown, and finally dying while the flowers ceased developing (Figure 9), clearly indicating the involved plant was greatly stressed, if not moribund. A plant that exhibited this process in the previous year at Site 5 (Dalkey 2010), has since died, its skeleton still visible during the 2011 survey.

Erosion was observed at several of the sites. Mid-slope failure rendered access to Site 1 impossible, so observations were made from the highest point possible at a distance of 20 m. Upper slope failure occurred above the seaward side of Site 3, destroying an unknown number of existing plants and 2010 recruits at the bottom of the bluff. Base erosion occurred at Site 4, resulting in difficulty in counting host plant in the upper portion of the site, and at Site 6, where slope failure occurred where a mature buckwheat had previously grown.

4.0 DISCUSSION

The results of this survey affirmed the findings from 2010, which showed a scarcity of El Segundo blue butterflies at the base of Vicente Bluffs. The new habitat at Pelican Cove supported few butterflies as during the survey only one was observed investigating the area from the population at Terranea Resort habitat. Naturalist Jess Morton (personal communication) observed some ESBs utilizing the host plants at Pelican Cove.

ESB is certainly present on the Peninsula. Adjacent to Pelican Cove, ESB were observed within habitat installed by Terranea Resort. There, ESB were abundant and could easily be seen when walking casually along the footpath (Figure 10). Also, ESBs were observed during a lunch break in the native garden at the Point Vicente Interpretive Center, which is located directly above Site 6 on the Vicente Bluff. I used these areas as a measure of butterfly activity for determining whether or not butterflies would likely be observed at the base of the bluffs.

Figure 10. A male El Segundo blue butterfly basking on dune buckwheat as viewed by the public walkway at Terranea Resort.

Prior to 2010, butterflies were easily found at the base of Vicente Bluffs. In 2006, ESB were discovered during a survey for dune buckwheat (Dudek 2007). Seven individuals were observed in a single day in early July 2009 during the preliminary survey (Dalkey 2009). But, the past two years has revealed few ESB at the base of the bluffs. In 2010, environmental conditions were suboptimal for the butterflies (Dalkey 2010), but not so in 2011.

Loss of host plant is paramount in considering factors affecting the butterfly. The dune buckwheat survey in 2006 by Dudek (2007) indicated that over 400 plants existed on the bluffs between this survey's Site 1 and Site 6. Despite concerted efforts to locate plants in the areas described by Dudek (2007), much fewer have been found. Only a total of 396 plants were found in the entire survey area, including 277 between Sites 1 and 6 (Table 1). Many of these observed plants were recruits from 2011.

This survey is designed only to describe the number and condition of host plants during the flight season. Factors affecting the number of host plants include: the possible loss of adult host plants that died during the record low rainfall (~3.0 inches) in 2006-07 following the 2006 Dudek survey; competition from non-native plants; and continued erosion of the cliffs where the plants are perched.

In 2010 it was noted that one dune buckwheat died during the survey (Dalkey 2010). In 2011, several adult and juvenile buckwheat plants appeared to be moribund, with their leaves turning red as the flight season progressed (Figures 8 and 9). All of the affected host plants were found at the base of the bluffs, where butterflies are most easily observed. While these plants are positioned above mean high tide, they could be inundated by sea water during stormy weather.

Certainly the possibility of sea water inundation exists. A review if the wave height and wave energy data recorded by the NOAA's Santa Monica Bay buoy number 46221, showed that more winter storms and/or wind events generating higher waves possessing more energy occurred in 2009-10 and 2010-11 than the preceding two years (SCCOOS 2011). Buoy-measured wave height exceeded 3.0 m, with a maximum of 4.0 m in at least 12 events in 2009-10 and nine events in 2010-11. In contrast, only nine events where buoy-measured wave height exceeded 3.0 occurred during two years prior to 2009-10.

The El Segundo blue butterfly responds well to habitat restoration. The butterfly quickly occupies the habitat in areas where host plants are installed. Examples include Terranea Resort, the Point Vicente Interpretive Center, and the sandy dunes at Dockweiler, Redondo, and Torrance Beaches. On occasion, when distances are greater, the butterfly may require more time for colonization. At the Ballona Wetlands Ecological Reserve, where habitat restoration efforts that included plentiful dune buckwheat began in 2004, the butterflies were not found in the habitat until July 2011. Their presence was discovered during a routine bird survey in a scientific survey of the Reserve (Karina Johnston, Santa Monica Bay Restoration Commission, personal communication).

The Palos Verdes Peninsula Land Conservancy is actively working to provide new habitat for the ESB. The restoration at Pelican Cove will receive continued efforts in the form of invasive plant removal and installation of host plant and other native plants. Plans include supplementing the new habitats at the top of the bluff and providing additional dune buckwheat plants along the lower bluff, extending toward Site 7. PVPLC is also a submitting grant request for the purpose of creating bluff habitat on the top of Vicente Bluffs above Sites 1- 6. If awarded, restoration will begin nearest to the Point Vicente Interpretive Center and expand upcoast along the bluff top.

If funding permits, restoration work could create a continuous band of habitat extending from Terranea Resort to the northern-most portion of Vicente Bluffs within the Palos Verdes Nature Preserve. It is expected that the butterfly will rapidly colonize the habitat, once the buckwheat plants mature. The ultimate success will be a continuous ESB population through-out the Vicente Bluffs Reserve. Continued NCCP triennial monitoring will track the ESB's response to the added habitat, with the next survey scheduled for summer 2013.

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APPENDIX A

El Segundo Blue Butterfly

Topographic Map, Data, and Survey Images

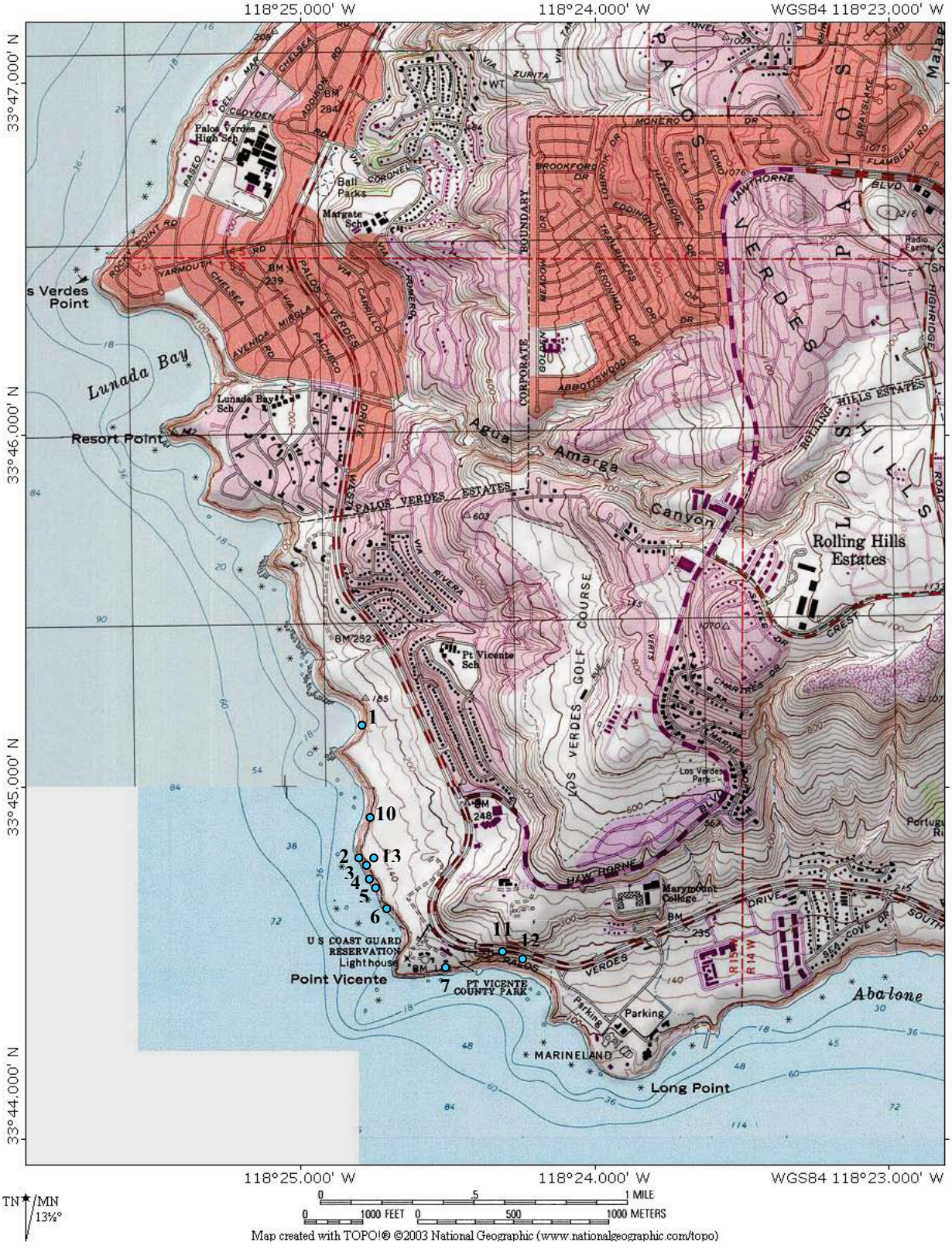

Figure A-1. Topographic map of locations of sites surveyed in the Palos Verdes Nature Preserve, Vicente Bluffs Reserve, Sites 1 – 6, 10, and 13, plus Pelican Cove, Sites 7, 11, and 12.

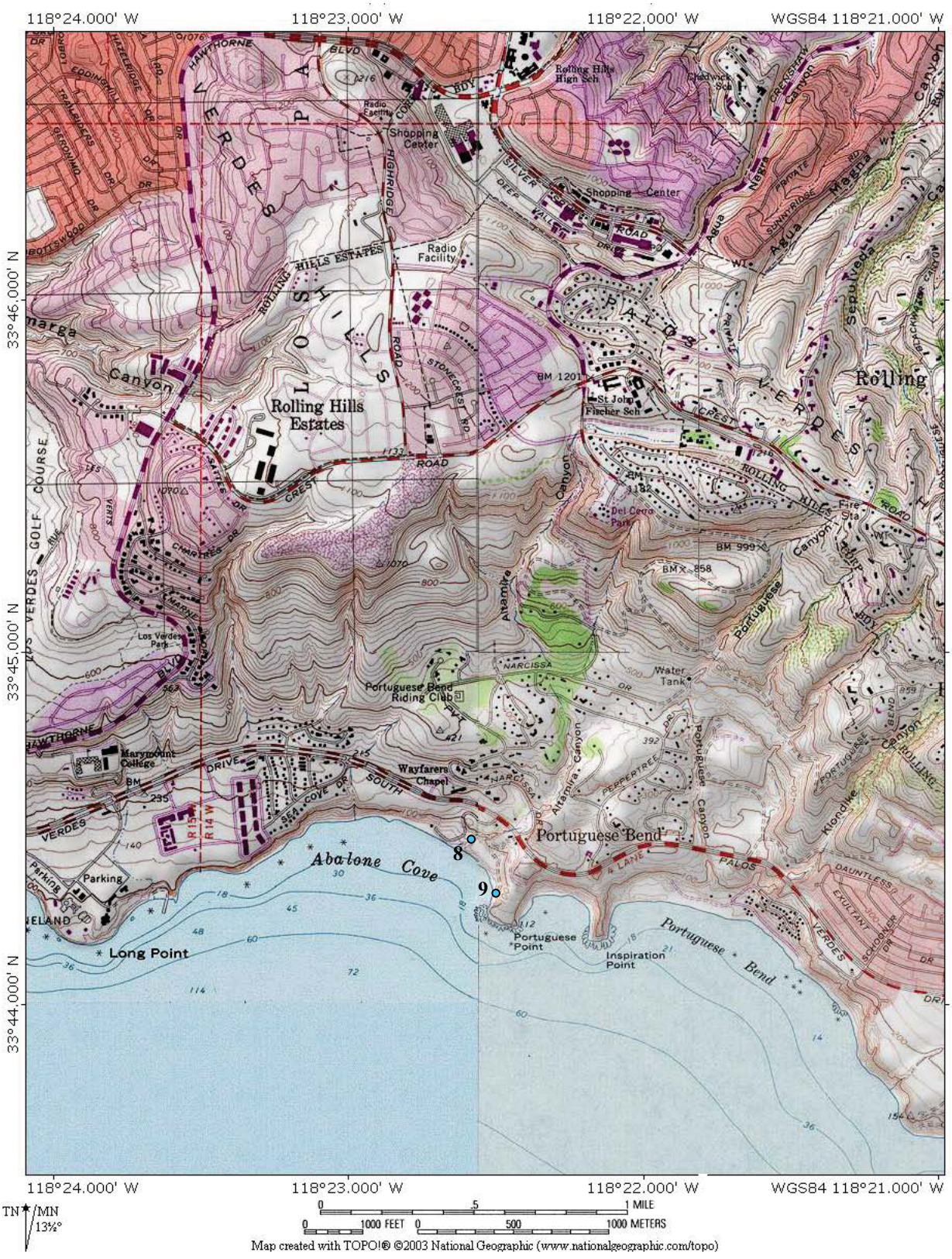

Figure A-2. Topographic map of locations of sites surveyed in the Palos Verdes Nature Preserve, Abalone Cove, Sites 8 and 9.

Table A-1. Detailed observations from El Segundo blue butterfly surveys within the Palos Verdes Nature Preserve 2011.

Preserve	Date	Site	Time	Wind	Temp	Sky	Females	Males	Unknown	Total	Plant Phenology	Site Comments
Vicente Bluffs	7-Jun-11	10	9:45	8.6	69						Non-flr	P35; 21 host plants plants w/13 juv
		6	10:21	2.5	69						Non-flr	P36-37; *Aphanisma* may be present; 7 host plants
		4	10:42	6.2	70						Non-flr	P38; 51 host plants w/40 juv
		3	11:08	1.0	70						Non-flr	P39-41; 112 host plants w/82 juv
		2	11:15	4.9	70						Non-flr	P42-43; 57 host plants w/27 juv
Abalone Cove	10-Jun-11	8	13:13	2.8	68						Non-flr	20 host plants w/8 juv
		9	13:30	2.6	68						Non-flr	P86-90; 59 host plants w/15 juv
Pelican Cove		12	13:59	2.5	69						Non-flr	P91; 11 host plants
		11	14:04	1.6	69						Non-flr	17 host plants; plants larger than during 2010
Vicente Bluffs	21-Jun-11	6	10:04	2.8	70						10 % flr	
		4	10:21	2.0	70						20% flr	
		3	10:34	1.2	71						Non-flr	
		2	10:42	1.0	70						5% flr	
		1	11:31	0.7	72						10% flr	P146-147; ~20 host plants; Slope failure prevents access on upper ledge, *Rhus* also formed barrier at base of cliff
		10	12:20	5.2	74						Non-flr	
Pelican Cove	21-Jun-11	12	13:29	5.2	75						30% flr	Gray hairstreak observed (*Strymon melinus*) ESB observed at Terranea; Fencing fell on large plants
		11	12:53	4.1	75						30% flr	
Abalone Cove	21-Jun-11	8	13:29	1.6	75						Non-flr	
		9	13:48	3.2	74						5% flr	
Vicente Bluffs	27-Jun-11	10	9:40	2.6	74	Clear					Non-flr	
		5	10:05	1.4	74	Clear					50% flr	
		4	10:15	0.8	72	Clear					100% flr	
		3	10:34	1.4	70	Clear					5% flr	
		2	10:49	0.9	74	Clear					50% flr	Lycaenid obsv upon leaving site. Looked like ESB, but too far away

									to confirm.
Pelican Cove	27-Jun-11	12	12:15	n/a	75	Clear		100% flr	
		10	12:27	n/a	75	Clear		25% flr	
		7	12:45	2.9	75	Clear		Non-flr	P182-185; 8 host plants w/3 juv; 2 subadults present from 2010 recruits; *Atriplex semibacata* a threat
Pelican Cove	12-Jul-11	7	10:44	2.5	75	Ovcst		100% flr	
		10	11:07	1.8	79	Ovcst		80% flr	
		11	11:12	3.0	79	Ovcst		100% flr	Fence repaired
Abalone Cove	14-Jul-11	8	10:10	0.8	70	Ovcst		90% flr	
		9	10:25	1.8	72	Ovcst		75% flr	
Vicente Bluffs	15-Jul-11	10	9:44	7.4	70	Pt Cldy		Non-flr	
		5	10:15	3.7	71	Pt Cldy		100% flr	Some *E parvifolium* leaves turning red
		4	10:24	3.0	73	Pt Cldy		100% flr	
		3	10:33	1.4	69	Pt Cldy		50% flr	
		2	10:40	2.8	75	Pt Cldy		100% flr	
Vicente Bluffs	19-Jul-11	10	9:41	2.0	77	Clear		5% flr	
		5	10:04	0.6	75	Clear		100% flr	
		4	10:28	0.8	76	Clear		100% flr	
		3	10:37	1.7	70	Clear		75% flr	
		2	10:51	1.2	73	Clear		100% flr	
		13	11:21	5.3	74	Clear		100% flr	P316; 26 host plants w/10 juv; *Euphorbia terracinea* present
Abalone Cove	21-Jun-11	8	10:37	2.0	69	Ovcst		100% flr	
		9	10:55	0.6	69	Ovcst		100% flr	
Pelican Cove	21-Jul-11	7	11:39	1.8	69	Ovcst		100% flr	P295-296
		11	12:14	4.1	74	Ovcst		100% flr	P297
		12	12:24	6.2	73	Ovcst		100% flr	P298
Pelican Cove	26-Jul-11	11	10:40	2.2	80	Clear	1	100% flr	ESB observed flying through parking lot from the Terranea side. *Strymon melinus* observed.
		12	11:52	2.6	80	Clear		100% flr	
		7	12:16	4.1	80	Clear		100% flr	Plant in rocks w/few flrs, are heavily

								shaded
Vicente Bluffs	28-Jul-11	13	10:22	2.5	67	Ovcst	50% flr	
		10	10:31	2.1	68	Pt Cldy	50% flr	Overcast clearing
		5	10:56	3.0	70	Pt Cldy	25% seed	
		4	11:09	3.9	70	Pt Cldy		
		3	11:17	1.3	70	Clear	90% flr	
		2	11:28	4.6	72	Clear		1 Acmon blue (*Plebejus acmon*)
		1	12:36	1.2	80	Clear	100% flr	Recount of *E. parvifolium*

Figure A-2. Images of El Segundo blue butterfly survey sites at Vicente Bluffs visited during El Segundo blue butterfly surveys, June – August 2011.

Figure A-3. Images of El Segundo blue butterfly survey sites at Pelican Cove and Abalone Cove visited during El Segundo blue butterfly surveys, June – August 2011.

Wildlife Monitoring: Coyote, Gray Fox, and Red Fox in the Palos Verdes Nature Preserve 2010-2012

Prepared By Ann Dalkey

June 3, 2013

1.0 EXECUTIVE SUMMARY

Surveys of canids inhabiting the Palos Verdes Nature Preserve--coyote (*Canis latrans*), gray fox (*Urocyon cinereoargeneus*), and red fox (*Vulpes vulpes*)--were conducted annually from November through April in 2009-10, 2010-11, and 2011-12. All three species are found within the Preserve. An assessment of scat content analysis revealed that our local coyotes prey on cats, which accounts for 17% of its diet. Also, coyotes ingest a high amount of anthropogenic material (8%). This contrasts markedly with coyotes in the Santa Monica Mountains who consume little in the way of domestic cats and anthropogenic material.

Wildlife cameras captured telling images of coyotes, their young, and their prey items. These photos confirm that coyotes raise their pups in the eastern portion of Forrestal Reserve and utilize cat as a prey item. This information will be useful for creating information brochures on how to live with wildlife.

Through the Palos Verdes Peninsula Land Conservancy's new Citizen Science Program, a larger extent of the Palos Verdes Nature Preserve may be regularly scheduled. By creating quality training materials, better scat content data will be collected that should allow for trend analyses to be conducted on the wild canid's response to environmental conditions, including effects of public information programs.

2.0 INTRODUCTION

Three wild species of canids inhabit the Palos Verdes Nature Preserve (PVNP): coyote (*Canis latrans*), gray fox (*Urocyon cinereoargeneus*), and red fox (*Vulpes vulpes*). At one point, coyotes were extirpated from the Palos Verdes Peninsula, but then in the mid-1990s, the species returned (J. Lowery, pers. comm.). As top predators in the Preserve, all three species function as consumers of small mammals, lizards, and birds, along with vegetative matter (Gehrt et al. 2010).

The ranges of these three species are not necessarily confined to the PVNP and will include developed areas as well. Gehrt et al. (2010) provide an excellent documentation of the extent of movement through developed areas, such as the Santa Monica Mountains and Chicago metropolitan area. Knowledge about the canids that occupy the Preserve provides important information about how they are using the habitat and enables the Conservancy to make better informed management decisions and public outreach.

The Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP) for the PVNP includes provisions to describe biological data collected on wildlife movements, and frequency of road-killed wildlife, as such information is available. The NCCP also recommends the development of a program for disseminating information on responsible pet ownership. In

response to these requirements, the Conservancy initiated a wild animal tracking program to develop an understanding of where the animals are found and what they eat.

This report provides a summary of tracking data collected during 2010-2012 on coyote, gray fox, and red fox. Scat investigations were also included and combined with data from the prior triennial survey to develop a more robust assessment on the prey consumed by these wild canids. These observations were augmented by installing wildlife cameras in areas known to be frequented by coyotes.

3.0 METHODS

Tracking activities took place each year, November through April, following established routes in the Preserve (Figure 1). Due to a high amount of activity in the Portuguese Bend and Forrestal Reserves, the tracking effort was constrained to these two reserves throughout the triennial survey period.

Observations of scat and/or tracks were recorded, the species identified following Lowery (2006). Tracks have limited value, for imprints are left only during the dry season in certain sections of trail where fine dust accumulates. Because we cannot identify fox scat to species, only coyotes were considered for scat investigations. When encountered, scat contents were examined on the ground to determine the prey using the following categories:

- Avian
- Cat
- Invertebrates
- Lagomorphs (rabbits)
- Rodent
- Anthropogenic items
- Unknown/Other
- Vegetation

Wildlife cameras were installed along the Ishibashi Trail in the Portuguese Bend Reserve and on the Cristo Que Viento Trail in the Forrestal Reserve. The cameras were only operational at night and posted during the November – April survey periods in 2010-11 and 2011-12.

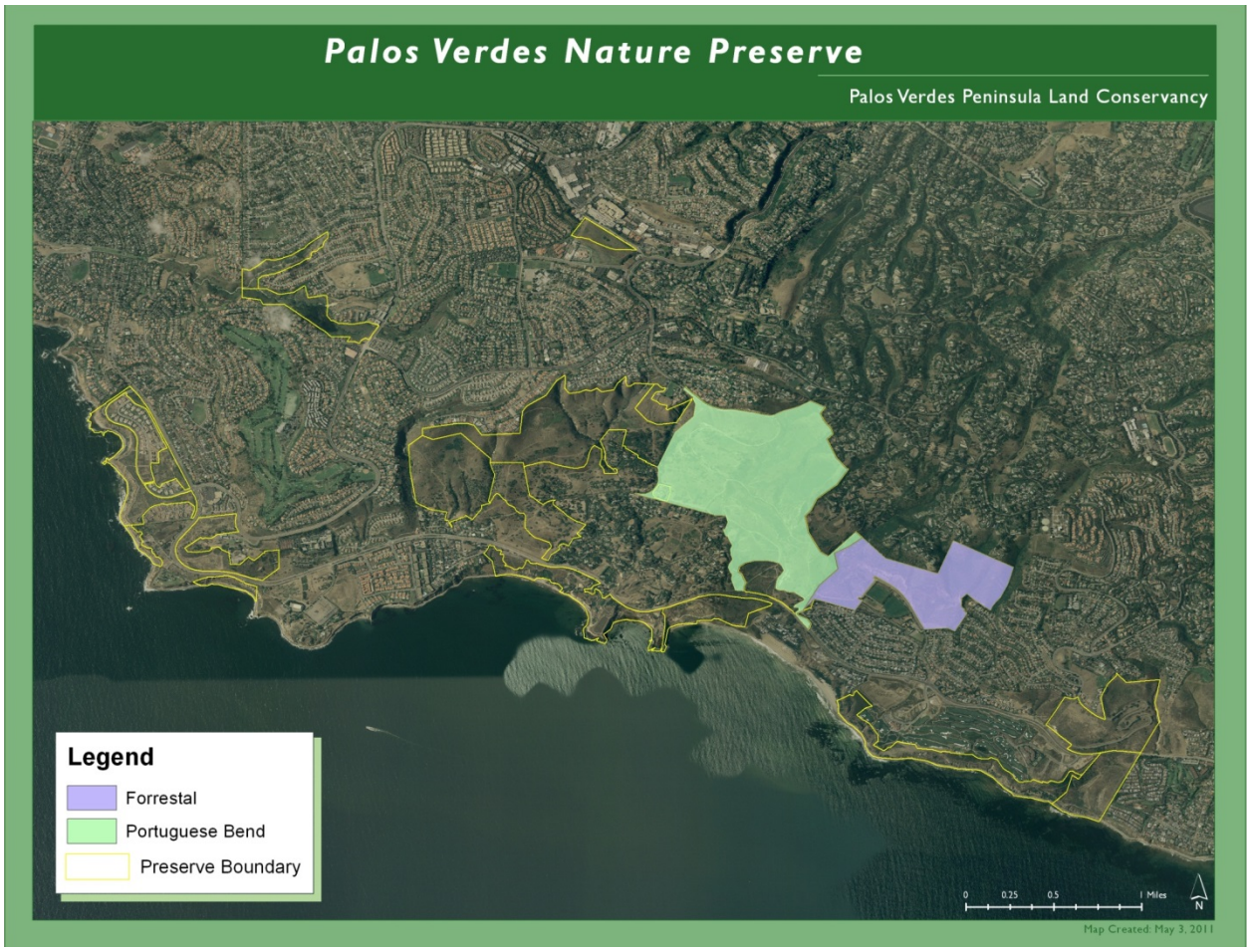

Figure 1. Map of Reserves where tracking activities took place.

4.0 RESULTS

The total number of visits for the period from November 2010 through April 2012 was 78 at Portuguese Bend and 42 at Forrestal. Observations from each trail were divided by the number of visits to generate an observation rate as shown in Tables 1).

More activity was observed at Portuguese Bend than Forrestal Reserves for both coyote and fox. The total coyote observation rate at Portuguese Bend was greater than 100%, indicating that more than one observation was made per survey. The highest coyote activity at Portuguese Bend occurred along Grapevine and Ishibashi Trails (28% and 26%, respectively). Coyote activity was lower at Forrestal (86%) with most activity occurring along Pirate Trail (44%).

Fox observations were similar to coyote observations, though with lower observation rates. At Portuguese Bend, fox observation rates were 37%, with the highest activity on Ishisbashi Trail. The rate was much less at Forrestal (23%) with most activity on Pirate Trail (14%). Rarely were fox scat found at locations adjacent to coyote scat.

In 2011-2012, of the identified items in scat, rodents were the most frequently consumed prey item for coyotes (Figure 2).

5.0 DISCUSSION

5.1 WILD CANID PRESENCE

Coyote, gray fox, and red fox are present in the Preserve, but tend to avoid each other as indicated by the lack of overlap in species occurrences. This is consistent with behavior observed in other localities, including the Santa Monica Mountains, particularly for gray fox, which is preyed upon by coyote (Riley et al. 2003). Coyote activity in Portuguese Bend decreased immediately following the 2009 wildfire (PVPLC 2011). Following winter rains, the vegetation grew back and the coyote visitation rate returned to previous levels.

During this triennial reporting period (2010-12), the most activity at Forrestal was concentrated in the eastern portion, particularly along Pirate Trail, which provides direct access to the neighborhood below the Reserve. This is a change from prior years, when the highest concentration of canids was observed in the western portion of Forrestal (PVPLC 2011). Both areas contain trails providing easy access to high quality habitat as well as the local urban area.

Gray fox is present on the Peninsula, particularly in areas with canyons filled with dense vegetation. While not noted to occupy fragmented and urbanized areas (Gehrt et al. 2010), the Peninsula's gray foxes defy general convention and persist in this environment. During this reporting period, gray fox tracks were observed once each in the Forrestal Reserve along Conqueror and Dauntless Trails. In general, gray fox keep a low profile and illustrate a negative abundance relative to coyotes, that prey on fox, as described by Fedriani et al. (1999) for Santa Monica Mountains.

5.2 SCAT CONTENT ANALYSIS

The scat content analysis focused on coyote because of the difficulty in distinguishing gray fox and red fox scat. Coyote scat was surveyed in 2011-12 with the intent of developing a rapid method to assess prey items consumed. The rapid identification takes place in the field, not after collection using a stereoscope. With this method, nearly 50% of the scat contents was unidentified, and recorded as Unknown (Figure 2). However, when compared to previous years, when scat was analyzed under stereoscopes, the amount of unknown content was much less (Table 2). Still, the year to year differences in prey items were not significant, when subjected to a One Way ANOVA ($p<0.05$).

The coyote scat contained anthropogenic items (i.e. fabric materials such as leash fragments), clearly indicating that the canids visit homes in the urban area, or at least trash cans and improperly discarded trash. This is different from results obtained by Fedriani et al. (2000), who found a much lower rate of anthropogenic items in their studies of coyote and fox in the Santa Monica Mountains (Table 3).

Domestic cat represented 12% of coyote diet in 2011-12, 17% average over time (Table 2). This is in contrast to the lack of cat in scat samples from the Santa Monica Mountains (Fedriani et al. 2000), as shown in Table 3. Coyote is a well-known predator of cats and small dogs within wildland-urban interface areas (Gehrt et al. 2009). The opportunity to prey on cats is readily available within the Forrestal area. One PVPLC tracker observed feral cats at the Ladera Linda Community Center.

Figure 2. Relative Percentage of Prey in Coyote Scat, 2011-2012.

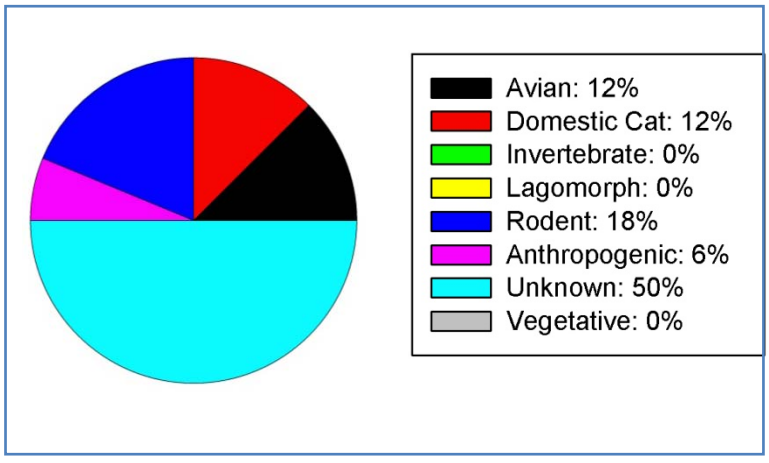

Table 2
Percentage of prey from coyote scat in 2007-08, 2009-10, and 2011 – 12, including the average.

Prey Item	07-08	09-10	11-12	AVG
Avian	5%	0%	12%	6%
Cat	18%	21%	12%	17%
Invertebrate	2%	9%	0%	4%
Lagomorph	4%	12%	0%	5%
Rodent	13%	9%	18%	13%
Anthropogenic	16%	3%	6%	8%
Unknown	15%	12%	50%	26%
Vegetation	27%	33%	0%	20%

Table 3
Comparison of percentages of prey in Palos Verdes and Santa Monica Mountains Scat alongside an image of cat claws extracted from a scat in the field.

Prey Item	PV	SMM
Avian	5%	
Cat	18%	
Invertebrate	4%	4-18%
Lagomorph	6%	10-20%
Rodent	13%	46-59%
Anthropogenic	11%	
Unknown/Other	19%	8-17%
Vegetation	25%	10-27%

5.3 WILDLIFE CAMERA CAPTURES

The easternmost slope within the Forrestal Reserve contains pristine habitat with no invasive plant species. This area is sufficiently remote for rearing pups, and riddled with coyote trails and scat. Therefore, a wildlife camera was installed at the base of the Cristo Que Viento trail, which leads to the area. The images captured at this site were more informative than those collected at a similarly positioned camera within the Portuguese Bend Reserve. The Forrestal camera revealed regular use of the trail, predation events, and sharing prey with young coyotes (Figure 3). These photos confirm that coyotes raise their pups in the eastern portion of Forrestal Reserve and utilize cat as a prey item.

The presence of coyotes in the Preserve provides an opportunity to create informational brochures or other outreach materials for distribution to neighborhoods on how to live with the wildlife. The brochure should emphasize avoiding unintentionally feeding the animals to insure their safety as well as deterring their presence in home-owners' back yards.

Figure 3. Images collected from the wildlife camera located on the Cristo Que Viento Trail in Forrestal showing A: adult and young coyotes, B: young coyote carrying prey, and C: adult coyote facing the camera. The adult and pup shown in Image A were photographed on February 17. Images B and C were collected within hours of each other week later on February 24, 2012.

6.0 RECOMMENDATIONS

Two areas of the wildlife tracking program can be improved. First, a new Conservancy Program scheduled for implementation in Fall 2013, the Citizen's Science Program, will allow for more volunteers to participate, augmenting the college students currently used. This will enable coverage of larger segments of the Palos Verdes Nature Preserve. Secondly, improving training materials with defined guidelines for scat content analysis will improve the reliability of the prey identification.

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PVPLC See Palos Verdes Peninsula Land Conservancy

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Riley, S. P. D., R. M. Savajot, T. K. Fuller, E. C. York, D. A. Kamradt, C. Bromley, and R. K. Wayne. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in Southern California. Conservation Biology 17: 566-576.

Palos Verdes Nature Preserve Three Year Restoration Plan 2014-2016

The proposed restoration plan for 2014-2016 utilizes two previously developed plans: the 2010 Habitat Restoration Plan for the Portuguese Bend Reserve (Newfields 2010), and the 2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve (Dudek 2007).

The proposed restoration plan would be as follows:
2014: Portuguese Bend Phase 4
2015: Portuguese Bend Phase 5
2016: Alta Vicente Phase 3

Portuguese Bend Phase 4, as discussed in correspondence from April 2012, restores 5 acres described in the 2010 Restoration Plan, which covered 21 acres.

Portuguese Bend Phase 5 will extend the restoration covered in the 2010 Restoration Plan, to restore habitat on the eastern side of Peacock Flats, adjacent to Phases 1-4 (Figure 1). By removing invasive weeds (mustard) that can re-infest the restoration site, Phase 5 is an important component in the long-term sustainability of the Peacock Flats restoration. The plant palette for Phase 5 is 2 acres of cactus scrub and 3 acres of Coastal Sage Scrub—south to west-facing slopes, as described in the 2010 Portuguese Bend Habitat Restoration Plan.

The restoration plan for Portuguese Bend Phase 4 and 5 are located in Appendix I.

Alta Vicente Phase 3 will restore 5 acres based on the last phase of the Alta Vicente Restoration Plan, which was not completed because restoration was redirected to Portuguese Bend after the August 2009 fire (Figure 2). The restoration plan for Alta Vicente Phase 3 is located in Appendix II.

Please feel free to contact me with questions regarding this request.

Sincerely,

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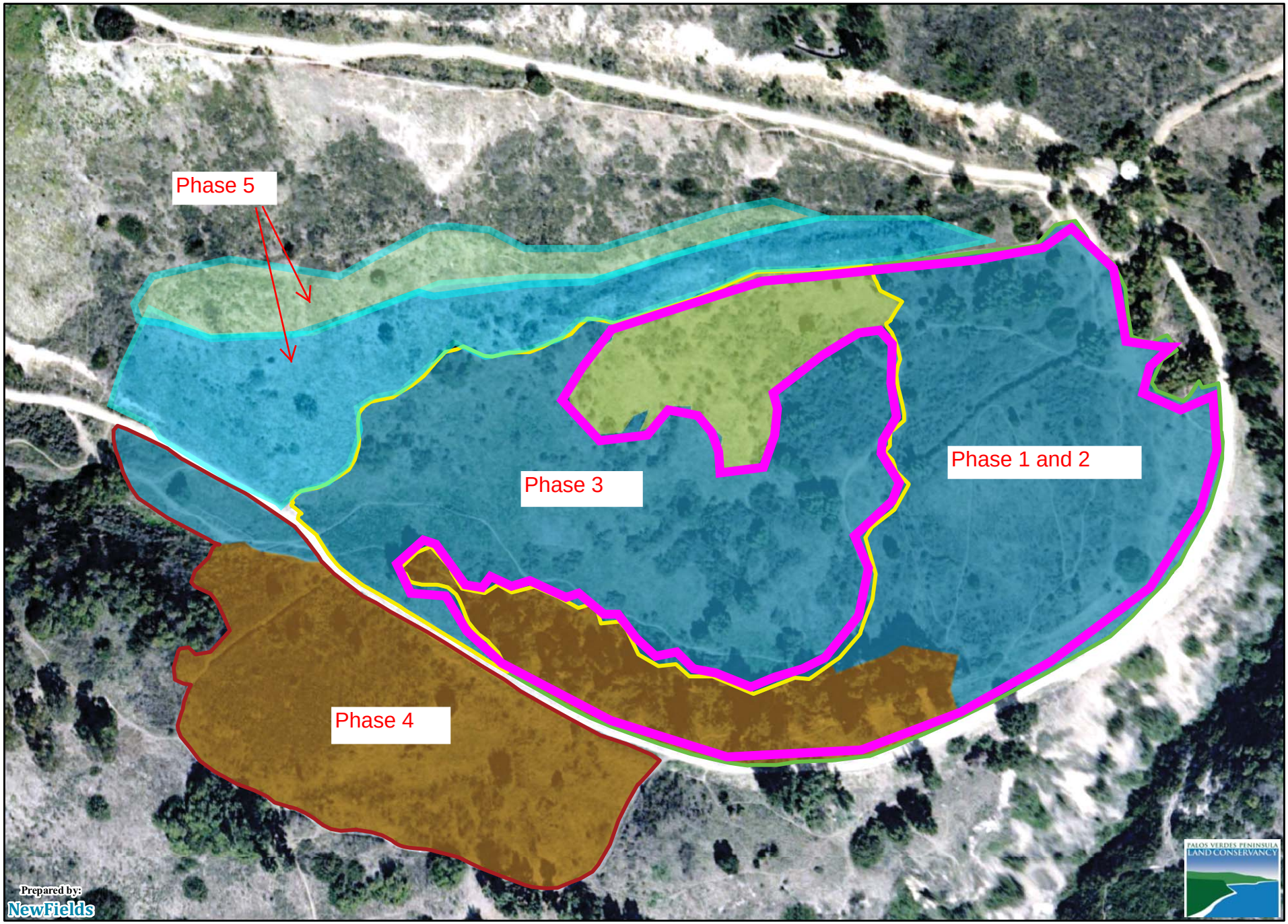


N

0 75 150 300 Feet

Restoration Habitat/Seed Mix

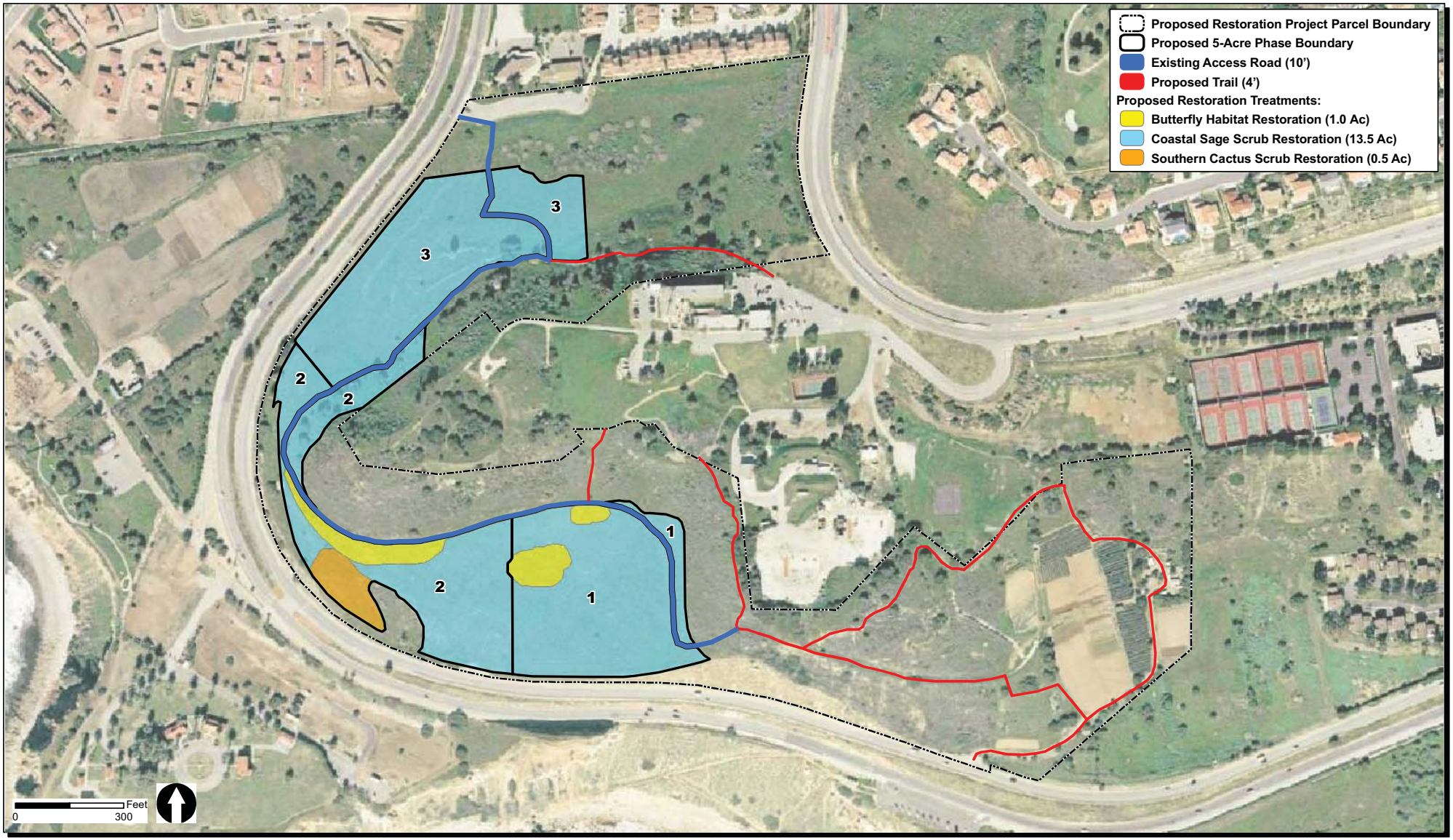
- Cactus Scrub
- Coastal Sage Scrub - North-facing Slopes
- Coastal Sage Scrub - South to West-facing Slopes

Figure 1

Proposed Restoration Habitats

Portuguese Bend Proposed Restoration Area

Palos Verdes Nature Preserve



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Figure 2. Alta Vicente Restoration Plan

Appendix I.

Portuguese Bend NCCP Site Proposed Revised Restoration Plan for Phase 4 and 5

3.5 SEEDING AND PLANTING SPECIFICATIONS

The following methods will be used to seed and plant during the restoration of coastal sage scrub and cactus scrub habitats within the Portuguese Bend Reserve. Seeding and planting should be implemented in October 2012 to take advantage of the entire rain season.

3.5.1 Seeding

Seed shall be applied by hand with a belly grinder in the areas between container plant groupings as well as in between the plants among the container plant groups in all restoration areas. The seed will be mixed together as specified for the seed mix. Specified VAM will be spread by hand with a belly grinder over the seeding area prior to seeding. The seed shall be broadcast and raked, where practical, into the ground to no more than a quarter of an inch to incorporate the seed into the soil to increase germination success. The seed palettes are the same as in the 2010 Restoration Plan (see Table 2, 4, 6).

3.5.2 Planting

Container plant palettes were based on the seed palette in the 2010 Restoration plan (Tables 1, 3, 5).

Container plants consist of dominant shrubs and 40 to 60 plants will be planted in groups of mixed species throughout the restoration area. However, cactus species will be planted in the 2 acre restoration area with no other species planted within the group. The layout for container plants will be determined for each area based on micro topographic features and planting sites will be marked on the site using different colored pin flags under the supervision of the restoration ecologist or PVPLC biologist. Spacing of plants within the groups will follow the specifications presented in the tables for container plant palettes. Groups of container plants will be spaced in a natural looking mosaic in each area.

All container plants are to be planted to the following specifications:

- Planting holes shall be made with the minimum disturbance to accommodate the containers.
- Prior to planting, the planting hole shall be filled with water, and allowed to drain.
- Plants shall be set in the planting hole so that the crown of the root ball is approximately 0.25 inch above finish grade. Under no circumstance should the plant crown be buried.
- A watering basin shall be provided around each plant from 18 – 24 inches in diameter.
- Watering basins shall be filled with water after planting, at least twice.
- The irrigation system should be tested to ensure that all emitters are functioning.

3.6 IRRIGATION SYSTEM

A temporary above ground irrigation system is specified for the groups of container plants within the coastal sage scrub restoration areas. The irrigation system will be used, as necessary to supplement the annual rainfall during the establishment period. The temporary irrigation system will be installed in summer prior to planting to permit “grow and kill” weed treatments.

The temporary above ground irrigation system will be used in the early fall and late spring seasons. The irrigation system will slightly lengthen the growing season to maximize the development of the habitat. Depending on rainfall, irrigation likely will be required for the first two growing seasons for establishment.

3.7 SITE MAINTENANCE

One of the goals for the restoration is to provide self-sustaining habitats. However, initially, maintenance of the restoration area will be necessary to establish the newly planted and seeded areas. Maintenance will include any activities required to meet the performance standards set forth in this plan, in the estimation of the restoration specialist or PVPLC biologist. For the Three Sisters Reserve, these include the following:

- Weed control, at a minimum for fennel, acacia, mustards, wild oats and purple false brome;
- Irrigation for the container plants;
- Replacement hand seeding in areas of more than 200 sq. ft where target seed germination failed after one good season of rainfall;
- Replacement of container plants in areas with less than 80 percent survival in years two and three, based on visual observations of substantial mortality; and
- Pest and disease control, if necessary.

The establishment maintenance period is generally three years duration with the most intense maintenance in the first and second year, and only seasonal weeding activities in the third year. The amount of maintenance each year will depend on weather conditions and how well the site develops. The following specifications for maintenance may require adjustments as determined by the restoration specialist or PVPLC biologist over the three-year maintenance period.

3.7.1 Weed Control

During the active maintenance period, the target cover from exotic weed species will be generally 10 percent or less. Control of the wild oats and purple false brome is especially important because annual grasses have been shown to compete with shrub species in restoration (Eliason and Allen 1997; Corbin and D’Antonio 2004). Purple false brome is a relatively recent invader to southern California, and the habitat of this species is relative dense growth.

Weeds will be controlled during late winter through early summer, as necessary, before they set seed and/or before they reach approximately 12 inches in height. Three weeding events should

be estimated for a normal rainfall season, with more or less as dictated by rainfall. Weeds, such as purple false brome will be removed from the site if seeds have set prior to weeding. Since removal of weeded material is expensive, weeded material may be left on site as organic mulch material if seeds have not yet set. Removal of herbicide treated material is not an issue.

Weed control will mainly employ hand pulling, mechanical methods, and spot spraying of herbicides for certain species such as fennel and acacia as described in Section 3.2.1.

3.7.2 Irrigation of Container Plants

Temporary irrigation will only be used in the areas where groups of container plants are to be planted. Irrigation will be used in the first two seasons from planting to extend the rainy season and establish the shrubs, as necessary. The timing of irrigation events will depend on evapo-transpiration between irrigation events and soil moisture. The following management scheme is anticipated as a guideline for water management of native trees and shrubs:

- Irrigate soil to full field capacity to the desired depth (approximately 18 inches after planting; and 18–24 inches during plant establishment).
- Allow soil to dry down to approximately 50-60 percent of field capacity in the top 6-12 inches before the next irrigation cycle. Depth of soil dry down between irrigation events will depend on development of container plants.

Wetting of the full root zone and drying of the soil between irrigation events is essential to the maintenance of the plants and the promotion of a deep root zone that will support the vegetation in the years after establishment. A soil probe or shovel should be used to examine soil moisture and rooting depth directly.

3.7.3 Seeding and Plant Replacement

Target values for relative cover of the native vegetation, including nurse and erosion control species, will be as follows with at least 20 percent cover in Year 1, 30 percent in Year 2, and 40 percent in Year 3. Actual cover values will depend mainly on weather conditions (seasonal rainfall and temperature) during the establishment period.

Areas of significant erosion shall be repaired and re-seeded in the first fall season after damage. Re-seeding will occur in areas if coverage is less than 20 percent of native species over any contiguous area of 200 sq ft.

Survival of the container plants within the first growing season should be 80 percent. Plants shall be replaced if survivorship falls below 80 percent in the first season. Replacements will be planted as previously specified and maintained for one growing season, as necessary. As sites develop, it is impractical to implement direct counts of all the container plants. Replacement planting after the first season shall only be specified if the visual estimate indicates substantial mortality and the function of these species has not been replaced by seeded material and natural recruitment.

Table 1. Northerly Facing Slope Coastal Sage Scrub Container Plant Palette.

Species	Spacing	# of plants per acre
Artemisia californica	5’	148
Encelia californica	4’	111
Eriogonum cinereum	4’	148
Eriogonum fasciculatum	4’	222
Hazardia squarrosa	4’	37
Heteromeles arbutifolia	5’	7
Leymus condensatus	5’	74
Isocoma menziessi	5’	111
Lotus scoparius	4’	74
Malosma laurina	15’	7
Melica imperfecta	4’	148
Rhus integrifolia	15’	7
Salvia leucophylla	5’	111

Table 2. Northerly Facing Slope Coastal Sage Scrub Seed Mix.

Species	Lbs. Per Acre
Artemisia californica	2
Castilleja exserta	0.5
Deinandra fasciculata	1.5
Encelia californica	1.5
Eriogonum cinereum	2
Eriogonum fasciculatum	3
Eschscholzia californica var. maritima	1.5
Hazardia squarrosa	0.5
Gnaphalium californicum	0.5
Heteromeles arbutifolia	0.1
Leymus condensatus	1
Isocoma menziessi	1.5
Lotus strigosus	1
Lotus scoparius	1
Lupinus succulentus	1
Lupinus bicolor	1

Malosma laurina	0.1
Melica imperfecta	2
Nassella lepida	1
N. pulchra	1
Phacelia cicutaria	0.4
Plantago insularis	20
Rhus integrifolia	0.1
Salvia leucophylla	1.5
Vulpia microstachys	1
Bloomeria crocea	as available
Dichelostemma capitatum	as available
Calochortus catalinae	as available
Total Lbs./Grams per Acre	**46.7**

Table 3. Southerly and Westerly Facing Slope Coastal Sage Scrub Plant Palette.

Species	**Spacing**	**# of plants per acre**
Artemisia californica	5’	125
Encelia californica	4’	125
Eriogonum cinereum	4’	125
Eriogonum fasciculata	4’	375
Heteromeles arbutifolia	5’	19
Isocoma menziessi	5’	94
Lotus scoparius	4’	94
Malosma laurina	15’	6
Melica imperfecta	5’	63
Rhus integrifolia	15’	6
Salvia mellifera	5’	94

Table 4. Southerly and Westerly Facing Slope Coastal Sage Scrub Seed Mix.

Species	**Lbs. Per Acre**
Artemisia californica	2

Castilleja exserta	0.5
Deinandra fasciculata	1.5
Encelia californica	2
Eriogonum cinereum	2
Eriogonum fasciculata	6
Eschscholzia californica var. maritima	1.5
Gnaphalium californicum	0.5
Heteromeles arbutifolia	0.3
Isocoma menziessi	1.5
Lotus strigosus	1.5
Lotus scoparius	1.5
Lupinus succulentus	1
Lupinus bicolor	1.5
Malosma laurina	0.1
Melica imperfecta	1
Nassella lepida	3.5
N. pulchra	1.5
Phacelia cicutaria	0.4
Plantago insularis	20
Rhus integrifolia	0.1
Salvia mellifera	1.5
Sisyrinchium bellum	0.5
Vulpia microstachys	2
Bloomeria crocea	as available
Dichelostemma capitatum	as available
Calochortus catalinae	as available
Total Lbs./Grams per Acre	**53.9**

Table 5. Cactus Scrub Container Plant Palette.

Scientific Name	Common Name	Container Size[1]	Container Plant Spacing[2]	Plants per Acre[3]
Cylindropuntia prolifera	coastal cholla	1-gallon	3’	40
Opuntia littoralis	coast prickly pear	1-gallon	3’	120
			TOTAL	160

[1] A combination of pads, 1-gallon, and 5-gallon cactus can be used.
[2] Spacing = feet on-center distance from other cactus within planting groups. Spacing of 5-gallon cactus should be 6’ from next closest cactus.
[3] Cactus should be planted in groups of 30. Planting groups can consist of a combination of cactus pads, 1-gallon, and 5-gallon plants at the specified number of plants per acre.

Table 6. Cactus scrub seed mix.

Scientific Name	Common Name	Pounds of bulk seed per acre
Artemisia californica	California sagebrush	2.0
Deinandra fasciculata	fascicled tarweed	1.5
Encelia californica	California encelia	1.5
Eriogonum cinereum	ashyleaf buckwheat	2.0
Eriogonum fasciculatum	California buckwheat	6.0
Gnaphalium californicum	California everlasting	0.5
Isocoma menziesii	coast goldenbush	1.5
Lotus scoparius	deerweed	6.0
Lotus strigosus	strigose lotus	1.5
Lupinus bicolor	miniature lupine	3.0
Lupinus succulentus	arroyo lupine	1.0
Melica imperfecta	melic grass	2.0
Nassella lepida[3]	foothill needlegrass	2.5
Phacelia ramosissima	branching phacelia	0.4
Plantago insularis[4]	wooly plantain	20.0
Rhus integrifolia	lemonadeberry	0.1
Salvia mellifera	black sage	0.5
Sambucus Mexicana	Mexican elderberry	0.5
Sisyrinchium bellum	blue-eyed grass	0.5
Vulpia microstachys[4]	small fescue	6.0

D R A F T

2007 HABITAT RESTORATION PLAN for Alta Vicente Ecological Reserve in the Portuguese Bend Nature Preserve for the Rancho Palos Verdes Natural Community Conservation Plan and Habitat Conservation Plan

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EXECUTIVE SUMMARY

This 2007 Draft Habitat Restoration Plan for the Alta Vicente Ecological Reserve in the Portuguese Bend Nature Preserve outlines appropriate revegetation locations and methodology to adequately comply with the Preserve Management requirements of the Rancho Palos Verdes Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP). The NCCP/HCP Section 6.3.5 requires a 3-year Habitat Restoration Plan. This plan provides guidelines for the restoration of 5 acres per year for a total of 15 acres over a 3-year period. The recommended project site, Alta Vicente Ecological Reserve, is located in the southwestern portion of the City of Rancho Palos Verdes, California adjacent to the Rancho Palos Verdes City Hall.

This Draft Habitat Restoration Plan includes the restoration implementation strategy and provides guidelines for the establishment of coastal sage scrub (CSS), coastal cactus scrub (CCS), and butterfly habitat on a total of 15 acres over 3 consecutive years at the Alta Vicente Ecological Reserve. The primary functional goal of the restored coastal sage scrub, cactus scrub, and butterfly habitats is to restore vegetation that contains a diversity of native coastal sage scrub and cactus scrub plant species that provide habitat value for sensitive wildlife species.

This Draft Habitat Restoration Plan presents information on project location and work descriptions, planting recommendations, maintenance requirements, monitoring methodology and revegetation success criteria.

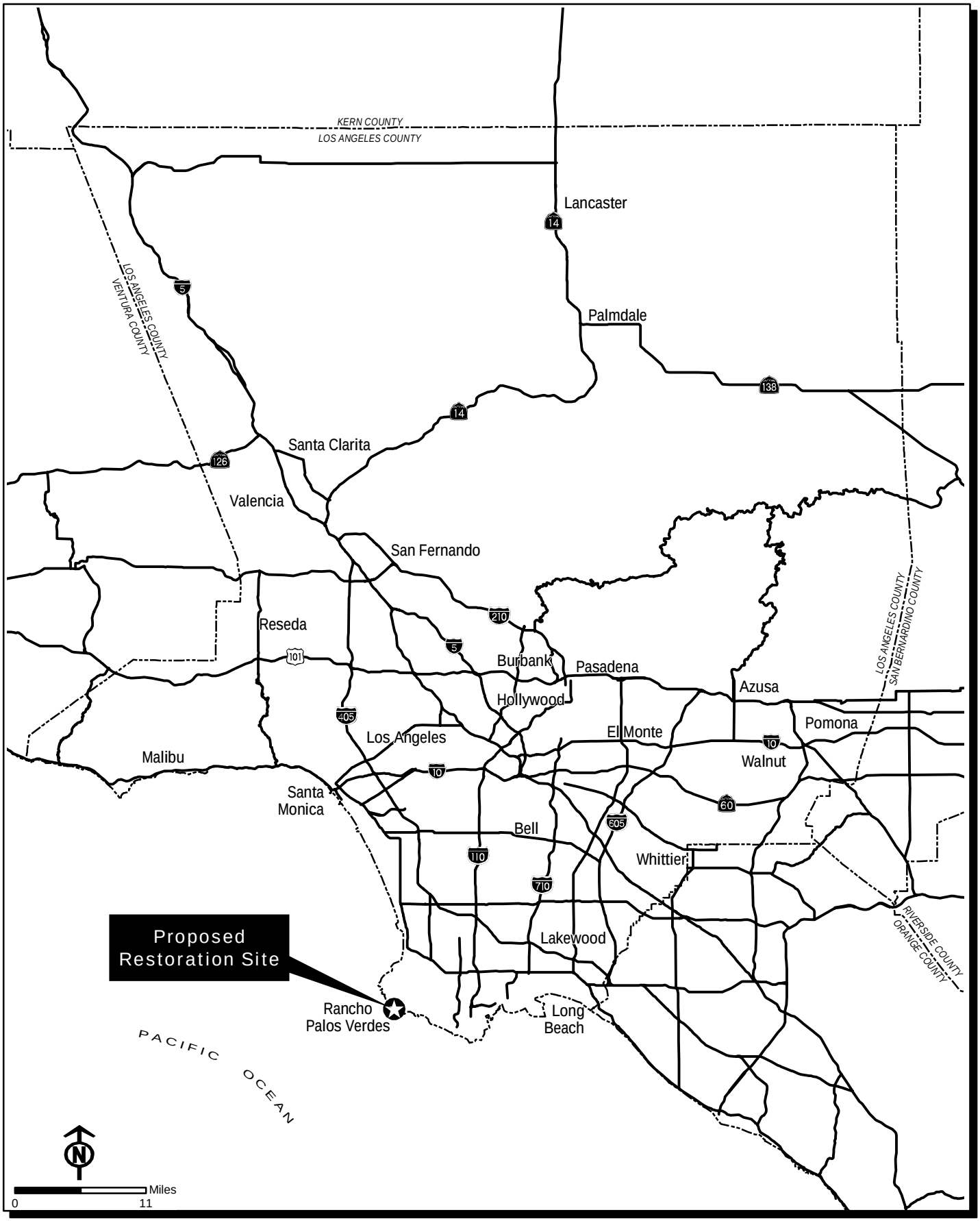
1.0 INTRODUCTION

The Natural Communities Conservation Planning Subarea Plan and Habitat Conservation Plan (NCCP/HCP) was prepared 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 (URS 2004a)." As a primary component of the Plan, a Preserve design was proposed to conserve regionally important habitat areas and provide habitat linkages in order to benefit sensitive plants and wildlife. The result of the Preserve design as designated in the Rancho Palos Verdes NCCP/HCP is the 1,200 acre Portuguese Bend Nature Preserve (PBNP) in the City of Rancho Palos Verdes, California (*Figure 1* and *2*).

This Draft Habitat Restoration Plan (HRP) for the Alta Vicente Ecological Reserve in the PBNP was prepared in accordance with the requirements of the NCCP/HCP (2006) by the Palos Verdes Peninsula Land Conservancy (Land Conservancy) with assistance from Dudek, an environmental services consultant. This HRP discusses sites and methodology for 15 acres of habitat restoration over a 3-year time frame as well as provides general recommendations for the restoration of sites beyond the 3-year period. This HRP will be reviewed and approved by the City and the California Department of Fish and Game and the U.S. Fish and Wildlife Service (Wildlife Agencies) prior to implementation. The Land Conservancy will review this plan every 3 years, and recommend 15 additional acres for habitat restoration for the next 3-year cycle, incorporating changes in priorities, conditions or unique situations while maintaining long-range planning perspective. The plan addresses restoration design, installation procedures, maintenance and monitoring program, and performance criteria. This plan also incorporates the results from the Alta Vicente portions of the initial focused surveys for NCCP/HCP-covered plant and wildlife species within the Portuguese Bend Nature Preserve (PBNP), (Appendices A and B).

Every effort will be made to obtain funding for additional restoration within the Preserve. In situations where supplemental sites are added to those included in the Restoration Plan, a site-specific HRP will be developed with monitoring requirements appropriate to the situation.

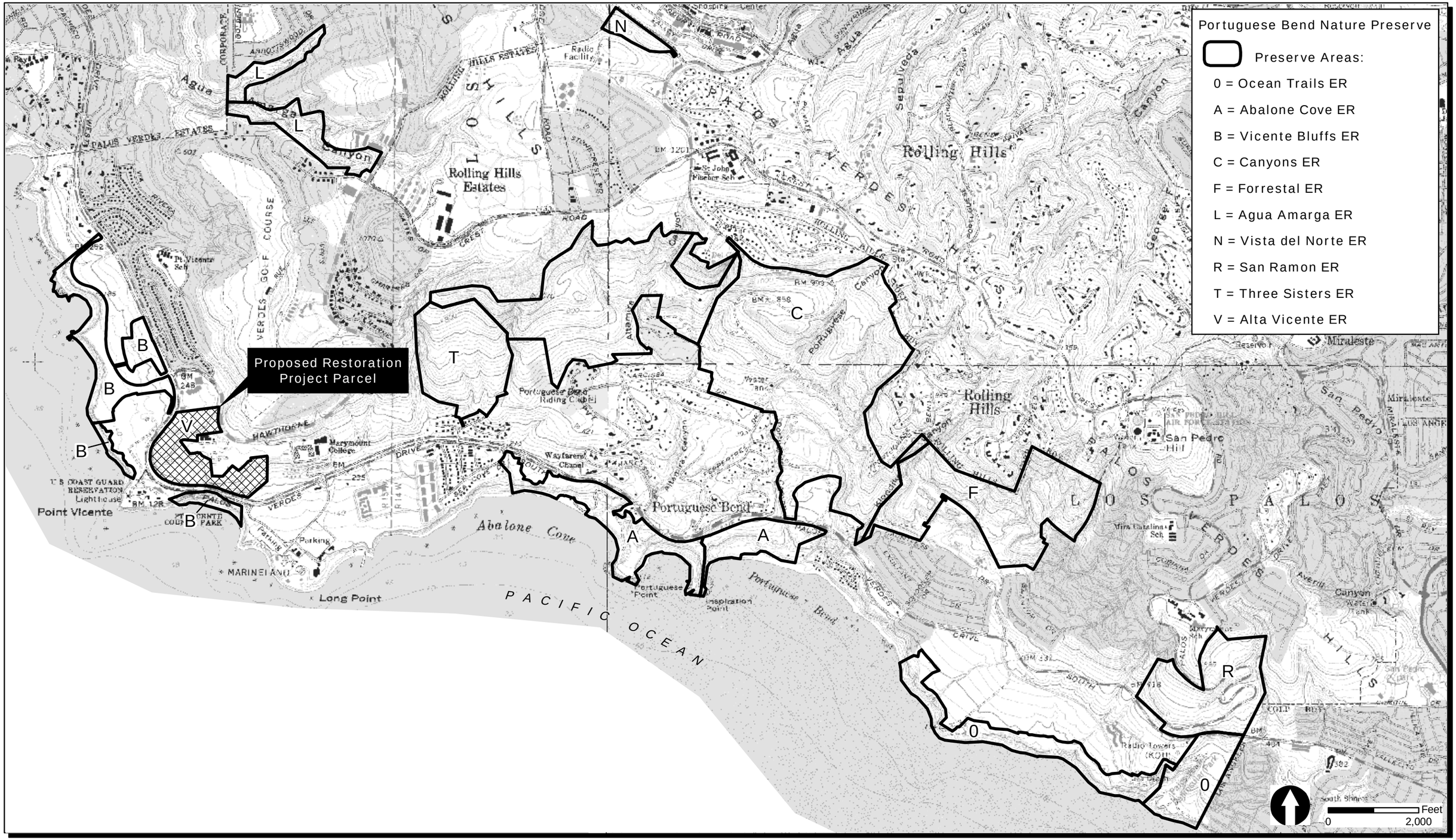
As of the writing of this report, the NCCP/HCP Implementing Agreement has not been signed by the Wildlife agencies, and therefore the NCCP/HCP is technically not officially executed. However, because it is anticipated that the NCCP/HCP Implementing Agreement will be signed in the near future, this Draft HRP was prepared for agency review to allow for project implementation.



2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Regional Map

FIGURE
1



SOURCE: USGS 7.5 Minute Series, Redondo Beach, San Pedro, Torrance and Rancho Palos Verdes Quadrangles

2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Vicinity Map

FIGURE 2

2.0 SITE SUITABILITY ANALYSIS

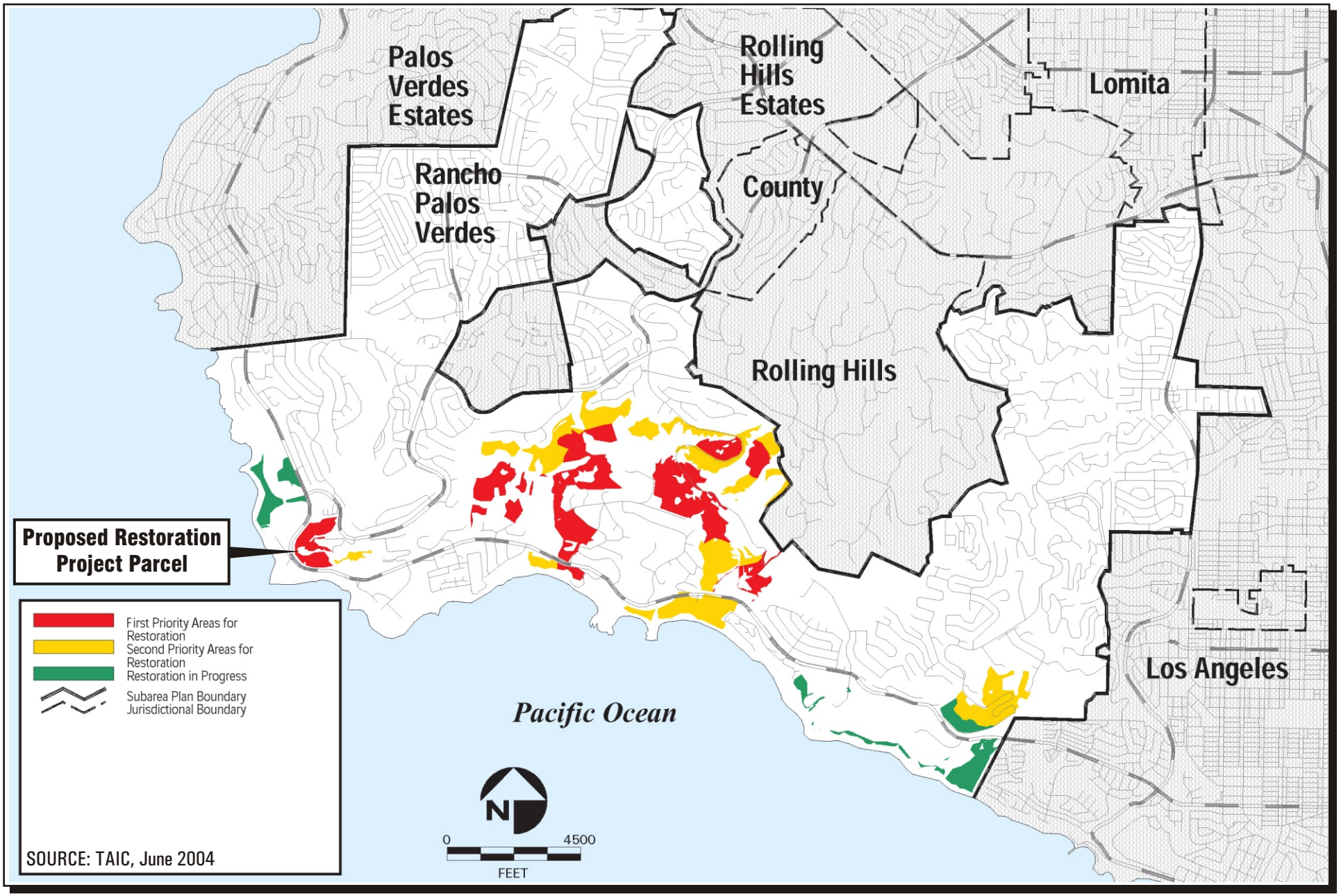
2.1 Portuguese Bend Nature Preserve Ecological Reserves

The PBNP has been divided into ten Ecological Reserve (ER) areas, including Agua Amarga (Area L), Vicente Bluffs (Area B), Alta Vicente (Area V), Three Sisters (Area T), Abalone Cove (Area A), Canyons (Area C), Forrestal (Area F), Ocean Trails (Area O), San Ramon (Area R) and Vista del Norte (Area N) (*Figure 2*). Topography 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 Areas B, A, and O to approximately 1,300 feet above mean sea level at the northernmost parcel, Area N. Adjacent land uses include single-family residences on most sides, open space associated with neutral lands on the Peninsula that are included in the plan for possible inclusion in the Preserve at some future time, 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 study area.

2.2 Evaluation Criteria

A site suitability analysis was conducted by the Land Conservancy and habitat restoration specialists from Dudek to best determine the most appropriate locations for habitat-specific restoration. Initially considered were the high priority sites from the NCCP/HCP "Priority Habitat Restoration Areas within the Preserve" (*Figure 3*). These NCC/HCP identified priority habitat restoration areas included Area V, Area T, and the majority of Area C. In addition to these preliminary prioritized areas, the Land Conservancy and Dudek also considered Area S and Area A for suitability of habitat restoration. Areas excluded from analysis include Area B, Area L, Area F, Area O, and Area N.

The Ecological Reserves that were excluded from the site suitability analysis remain eligible for consideration in future restoration planning. Current habitat restoration programs within the Preserve include 30 acres of CSS revegetation on the Oceanfront Estates property (Area B) and 125 acres of CSS revegetation associated with the Trump National/Ocean Trails development (Area O). Since these are pre-existing restoration programs, these areas were excluded from this current potential site analysis. Area L was excluded from this analysis because the majority of Aqua Amarga Canyon has fairly intact habitat that is difficult to access and the adjacent Lunada Canyon has recently undergone habitat restoration projects in some portions by the Land Conservancy. Area F was excluded from analysis because the majority of



2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Priority Habitat Restoration Areas

FIGURE 3

the land is relatively high quality habitat. Area N was excluded from the analysis because this parcel is rather isolated and currently requires large portions of brush clearance due to the existing utility easement.

Each area analyzed for restoration potential (Area V, Area T, Area C, Area S and Area A) was visited to based on a variety of factors critical to the success of restoration efforts including: adjacency to existing habitat or development, access to the site, water availability, presence of target wildlife species on adjacent land, density and species of exotic weeds present onsite or in adjacent areas and level of prior soil disturbance. Other factors that were assessed for each potential site were the availability of volunteer access and parking, how visible the restoration site will be to the public, the amount of contiguous acreage, and the potential to provide quality habitat for target species. These factors were placed into a matrix and given a value for each site of 1-3, with 3 ranking the highest. Table 1 shows the breakdown of rankings for each site.

TABLE 1
Restoration Site Suitability Analysis

	Alta Vicente (Area A)	Fennel Flats (Area C)	Peacock Flats (Area C)	Three Sisters (Area T)	Switchbacks (Area S)	Abalone Cove (Area A)
Access	3	2	3	1	3	3
Irrigation	3	1	1	2	2	1
Weeds	2	2	2	2	1	2
Adjacency	3	3	2	1	2	3
Soil Disturbance	2	2	2	2	2	2
Volunteer Access	3	2	2	2	1	2
Public visibility	3	3	3	2	2	2
wildlife	3	3	3	3	3	3
Acreage (15 acres min for restoration)	3	3	3	3	3	1
Total Score	25	21	21	18	19	19
Ranking	**1**	**2**	**2**	**4**	**3**	**3**

2.2 Site Selection

From the site suitability analysis, the Alta Vicente site was ranked the highest. This is due to the availability of at least 15 contiguous acres available for habitat restoration, good site access via an existing utility road, adjacency to intact habitat with high numbers of sensitive wildlife, and the opportunity to irrigate the site. The option to utilize irrigation for restoration of Alta Vicente greatly assists in the success of both the site preparation and habitat restoration efforts. In addition, the Alta Vicente site provides public visibility which allows for a successful volunteer component for this project.

It is recommended that the other sites in this analysis be considered for habitat restoration during future year's planning efforts.

3.0 EXISTING CONDITIONS- PROPOSED RESTORATION SITE

3.1 Site Description

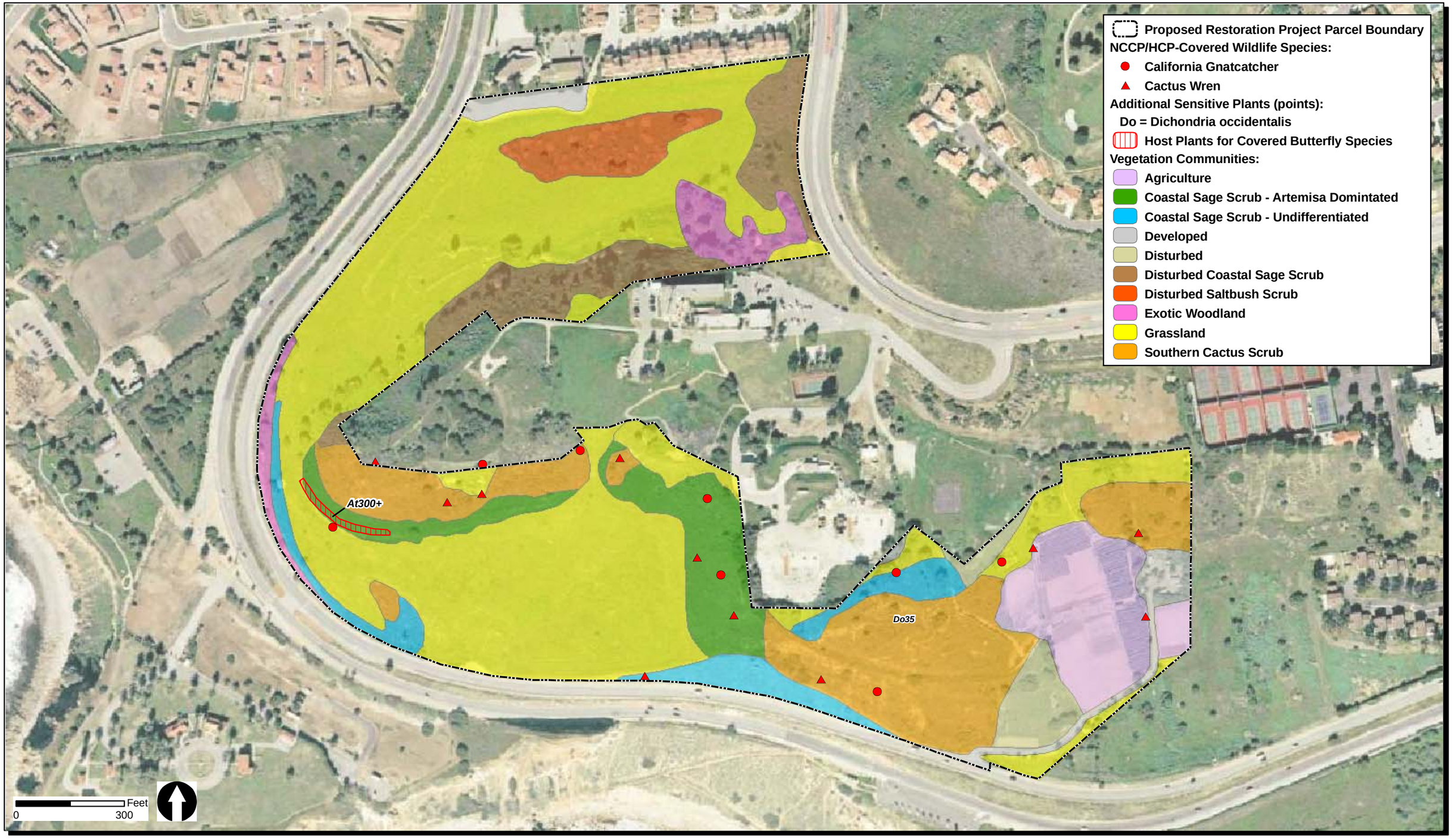
The Alta Vicente ER is located on the southwestern portion of the Palos Verdes Peninsula, north of the Pacific Ocean in the City of Rancho Palos Verdes, California (*Figure 1*). The 55.4-acre survey area lies in unsectioned lands in the following U.S. Geological Survey (USGS) 7.5 minute topographic map Redondo Beach; Township 5 South, Range 15 West.

3.2 Vegetation Communities

Plant communities and land covers within the Alta Vicente parcel are representative of some of the plant communities found in this region. Vegetation mapping of the Peninsula used in the NCCP/HCP was prepared by Atwood et al. (1994) and updated and verified by Ogden (1999). For the Alta Vicente site, this vegetation mapping was further updated by Angelika Brinkmann-Busi and Andrea Vona in 2007. Plant community classification in the NCCP/HCP generally follows Holland (1986), with some minor adaptations following Sawyer and Keeler-Wolf (1995). Plant communities and land covers within the Alta Vicente site include coastal sage scrub (and coastal sage scrub sub-associations), disturbed coastal sage scrub, southern cactus scrub, disturbed saltbush scrub, grassland, exotic woodland, agriculture and developed areas (*Figure 4*). These habitats/land covers are briefly described below in terms of constituent species.

3.2.1 Southern Cactus Scrub

Southern cactus scrub is a low, dense scrub (less than 2 meters [6.6 feet]) with succulent shrubs consisting primarily of prickly pear species (*Opuntia littoralis, O. oricola*) and coastal cholla (*O. prolifera*) as dominant constituents (Magney, 1992; Sawyer and Keeler-Wolf, 1995). Although the dominant species are succulent, woody species can also be present as co-dominants with the succulents. Typical woody species in this association at the Alta Vicente site include California sagebrush (*Artemisia californica*), Ashy leaved buckwheat (*Eriogonum cinereum*) and California sunflower (*Encelia californica*), bladderpod (*Isomeris arborea*), and wishbone bush (*Mirabilis californica*). Southern cactus scrub ranges from coastal southern Santa Barbara County southward to northern San Diego County and inland to the cismontane valley areas of San Bernardino and Riverside Counties (Magney, 1992). Southern cactus scrub occurs mostly on steep, south facing slopes in sandy soils or rocky areas below 1,200 meters (3,397 feet) elevation (Magney, 1992; Sawyer and Keeler-Wolf, 1995).



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Biological Resources Map

FIGURE 4

3.2.2 Coastal Sage Scrub including Disturbed Coastal Sage Scrub

Coastal sage scrub is composed of low, soft-woody subshrubs approximately 1 meter (3 feet) high, many of which are facultatively drought-deciduous (Holland, 1986). This association is typically found on dry sites, such as steep, south-facing slopes or clay-rich soils slow to release stored water. Dominant shrub species in this vegetation type may vary, depending on local site factors and levels of disturbance.

Dominants within the project area include California sagebrush and California sunflower. One CSS sub-association has been identified in the Alta Vicente site: Artemisia-dominated scrub; it is classified according to the dominant species. This sub-association corresponds to the California sagebrush series, as described in Sawyer and Keeler-Wolf (1995).

The shrub layer in general for this community primarily forms a continuous canopy with little understory, but has some areas with a more open canopy with widely spaced shrubs and a fairly well-developed understory. Native understory species present in this association include coast range melic (*Melica imperfecta*), ocean locoweed (*Astragalus trichopodus* var. *lonchus)*, cliff aster (*Malacothrix saxatilis*), and blue dicks (*Dichelostemma capitatum*).

Disturbed coastal sage scrub consists of approximately 20 percent native cover with the remaining vegetation dominated by exotic species including non-native tress.

3.2.3 Disturbed Saltbush Scrub

Saltbush scrub is dominated by quailbush (*Atriplex lentiformis*). Shrubs are less than 3 meters (10 feet) with closed to open canopies (Sawyer and Keeler-Wolf, 1995). Saltbush scrub corresponds to the mixed saltbush series, as described in Sawyer and Keeler-Wolf (1995). The understory at the Alta Vicente site consists of ruderal species, such as black mustard (*Brassica nigra*), a variety of non native annual grasses, sea lavendar (*Limonium perezii*) and an occasional acacia (*Acacia Cyclops).*

3.2.4 Grassland

Non-native annual grasses and other annual species dominate grasslands portions of the Alta Vicente site. Annual or non-native grassland generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. This association is characterized by a dense to sparse cover of annual grasses, often with native and non-native annual forbs (Holland, 1986). The number of natives versus non-natives is site-specific, and varies according to rainfall and other factors (Heady, 1995). Estimates for the

proportion of non-native species in this association range from 29 to 80 percent (White, 1967; Bentley and Talbot, 1948; Heady, 1995; Holland and Keil, 1990). Talbot et al. (1939) report that annuals comprise approximately 94 percent of the herbaceous cover in annual grassland; Ewing and Menke (1983) state that annuals comprise 50 to more than 90 percent of the vegetative cover in annual grassland, and that most of the annuals are non-native species. Species composition varies within annual grassland and is a function of climatic conditions, soils, and allelopathic effects of above-ground plant residue (e.g., mulch) (Evans and Young, 1989; Heady, 1995; Bartolome et al., 1980).

Annual grassland is a disturbance-related community most often found in old fields or openings in native scrub habitats. This association may have replaced native grassland and CSS at many localities. Typical grasses within the site include slender oat (*Avena barbata),* wild oat *(Avena fatua),* false brome *(Brachypodium distachyon),* soft brome *(Bromus. hordaceus [mollis]),* rescue grass *(Bromus catharticus),* ripgut brome *(Bromus diandrus),*red brome *(Bromus madritensis ssp. Rubens),* Bermuda grass *(Cynodon dactylon),* foxtail barley *(Hordeum murinum ssp. leporinum),* common barley *(Hordeum vulgare),* Kikuyu grass *(Pennisetum clandestinum),* and fountain grass *(Pennisetum setaceum).* Characteristic forbs include red-stem filaree (*Erodium cicutarium*), black mustard, and garland daisy (*Chrysanthemum coronarium*).

Within annual grassland, grasses are less than 1 meter (3 feet) high and form a continuous or open cover. Emergent shrubs and trees may be present as well (Sawyer and Keeler-Wolf, 1995).

3.2.5 Exotic Woodland

Exotic woodland includes non-native trees and shrubs planted in Rancho Palos Verdes in the past. Some of these introduced species are invasive and have dispersed into the adjacent grassland and native habitats. Exotic species include acacia, Brazilian pepper (*Schinus terebinthifolius*), myoporum (*Myoporum laetum*), gum tree (*Eucalyptus* spp.), Phoenix palm (*Phoenix canariensis*) and Chinese Elm (*Ulmus Parvifoli.*).

3.2.6 Agriculture

Agriculture includes actively cultivated lands and lands that support nursery operations. One area in the Alta Vicente site is actively farmed. This area is southeast of City Hall in the western portion of the City of Rancho Palos Verdes.

3.2.7 Developed Areas

Developed areas in the Alta Vicente site are lands that have been permanently altered by human activities and that support no native vegetation. These areas include roads, buildings, ornamental landscapes, and other areas where the land has been altered to such an extent that natural vegetation cannot become reestablished.

3.3 Geology and Soils

The area is an old marine terrace with relatively steep eroded canyons which drain southwesterly into the Pacific Ocean. According to the Report and General Soil Map for Los Angeles County (USDA 1967), two soil types occur within the study area; the Diablo-Altamont association (2 percent-9 percent slopes), and the Altamont-Diablo association (30 percent-50 percent slopes). Soils of the Diablo-Altamont association occur on gently sloping to rolling foothills throughout the Los Angeles basin as far north as Point Dume. Diablo soils are 22 to 52 inches deep, are well drained, and have slow subsoil permeability. Altamont soils are 24 to 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 Diablo-Altamont association is comprised of approximately 60 percent Diablo soils, 30 percent Altamont soils, and 5 percent each of Cropley and San Benito soils. Cropley soils are over 60 inches deep, are well-drained, and have slow subsoil permeability. San Benito soils are 36 to 48 inches deep, are well drained, and have moderately slow subsoil permeability. The Altamont-Diablo association is comprised of approximately 60 percent Altamont soils, 30 percent Diablo soils, and 10 percent San Benito soils.

3.4 Zoology and Botany-Species Diversity

From June 16, 2006 – July 27, 2006 four focused surveys for coastal California gnatcatcher (Polioptila californica californica) and cactus wren (Campylorhynchus brunneicapillus) (CAWR) were conducted by wildlife biologists from Dudek and Associates: Jennifer Turnbull and Paul Lemons along with biologists from the Land Conservancy: Andrea Vona and Becky Harper. From these surveys it was determined that a total of 38 species of wildlife were detected onsite including: three reptiles, 25 bird species, six mammal, and four butterfly and moth species (*Appendix A*).

Most of the species observed are active during the daytime hours; nocturnal species were not recorded. In addition, due to the time of year of the survey, winter visitors were not observed which could include additional bird species.

A total of 93 plant species was identified within the Alta Vicente property in 2006 (*Appendix B*). Of these, 40 species (43 percent) are native to the region and 53 species (57 percent) are non-native.

3.5 Sensitive Biological Resources

The following resources are discussed in this section:(1) plant and animal species present on the project site that are NCCP/HCP-covered (which includes all species listed as endangered or threatened by the State and/or Federal Endangered Species Act (ESA), as well as selected species that are currently not listed, but could be listed during the permit period)(2) host plants for the Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdesensis),*a federally endangered species and (3) sensitive species that aren't covered under the NCCP but through the circumstance of natural distribution or habitat destruction, have declined in population to a level so low that professional biologists are concerned about he longevity of vitality of the species. These sensitive species include species listed by the State or Federal Wildlife Agencies under the ESA, listed by CDFG as a Species of Special Concern (SSC), or listed on the California Native Plant Society's inventory or rare or endangered plants (CNPS 2001).

3.5.1 NCCP/HCP Covered Plant and Wildlife Species

During 2006, focused surveys were conducted for the six covered plant species under the NCCP/HCP. No occurrences of NCCP/HCP covered plant species were observed at the Alta Vicente site during these surveys.

In 2006, two NCCP/HCP-covered wildlife species were identified within the Alta Vicente site of PBNP, including CAGN and CAWR. Twenty individual CAGN were observed including seven pairs, one lone adult, and five juveniles. Fifteen individual CAWR were observed including four pairs and seven lone adults.

3.5.2 Host Plants for the Palos Verdes Blue Butterfly

Ocean locoweed was documented during the initial surveys because it is one of two primary host plants for the NCCP-covered Palos Verdes blue butterfly. Ocean locoweed is typically found in coastal bluffs at elevations between sea level and 300 meters (0 – 846 feet) AMSL. It is a perennial herb that blooms between April and July. One population of this species was observed, with a population size of approximately 300 individuals.

3.5.3 Sensitive Species

Observations of Western dichondra (*Dichondra occidentalis*), a CNPS List 4.2 plant species was identified at the site, with a population size approximating 35 individuals. According to CNPS (2006), it is typically found in chaparral, cismontane woodland, coastal scrub or valley and foothill grassland at elevations between 50 and 500 meters. It is a rhizomatous herb that typically blooms between March and July.

4.0 RESTORATION PROGRAM

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed in order to re-establish or enhance historical biological functions and values. This Habitat Restoration Plan outlines the restoration implementation strategy for upland habitat on the Alta Vicente property and proposes to provide for the creation of approximately 13.5 acres of coastal sage scrub, 0.5 acre of southern cactus scrub, and 1 acre of butterfly habitat.

4.1 Restoration Site Goals and Objectives

The fragmented habitat existing in these areas limits wildlife use and provides opportunity for the further establishment of invasive weed species. The planting of native coastal sage scrub, cactus scrub, and butterfly habitat via container plants and seed mix will provide contiguous native habitat that includes a mosaic of shrub cover that is resistant to the invasion of invasive weed species and provides increased nesting, cover and foraging opportunities for wildlife.

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. Key habitats for restoration are coastal sage scrub, cactus scrub, and Palos Verdes blue butterfly habitat. Coastal sage scrub restoration is intended to provide improved foraging habitat for resident and migrating wildlife species, and potential nesting and foraging habitat for target species such as the coastal California gnatcatcher, southern California rufous-crowned sparrow, Pacific pocket mouse, and other sensitive wildlife species. Cactus scrub restoration is intended to provide potential nesting and foraging habitat for the coastal cactus wren. Palos Verdes Blue Butterfly habitat restoration is intended to provide improved habitat and increased numbers of larval host plants for the Palos Verdes Blue Butterfly. Achievement of the performance criteria 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 Alta Vicente restoration site have been incorporated into this Draft Habitat Restoration Plan in the interest of minimizing adverse impacts to biological resources:

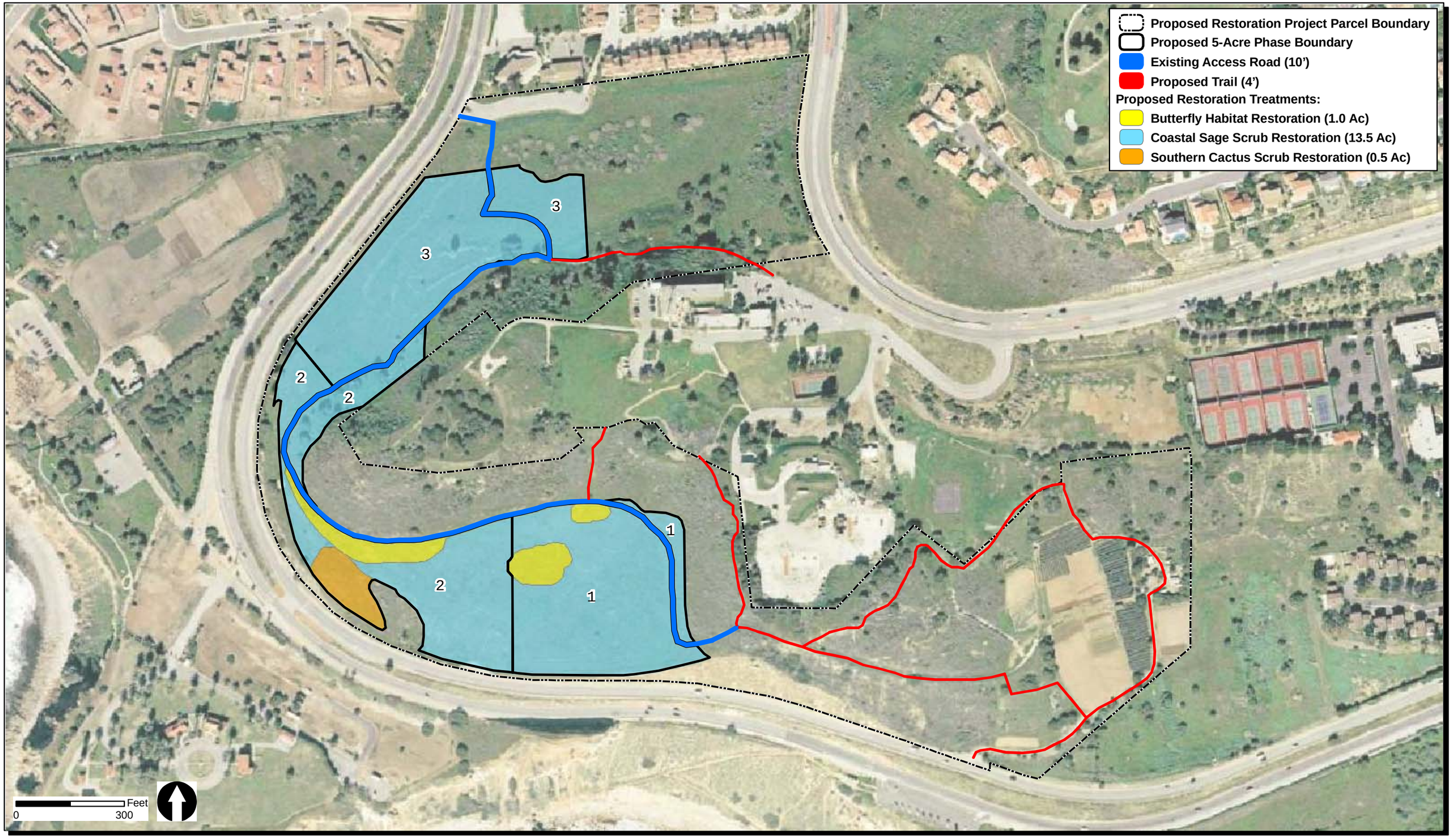
- Avoid additional or unplanned disturbance to existing habitats during implementation of the project construction and long-term maintenance activities.
- Prevent any impacts to sensitive wildlife species during implementation of the project construction and long-term maintenance activities.
- Control all non-native, exotic/invasive weed species considered to be highly invasive on the Cal-IPC invasive plant inventory (2006).
- Utilize erosion control measures in the form of "Best Management Practices" (BMPs) on the site as conditions necessitate.

4.2 Habitats to be Established

Habitat revegetation consists of exotic vegetation and weed removal, installation of a temporary irrigation system and native planting/seeding. Proposed planting for the coastal sage scrub, cactus scrub, and Palos Verdes blue butterfly habitat restoration areas will include a plant palette consisting of native container plants and a seed mix.

Areas proposed for restoration are currently classified as grassland. In these non-native annual grasslands there is an herbaceous cover of at least 80 percent, with about 10 percent tree cover from Phoenix palm, Brazilian pepper, and acacia. This area currently has less than 5 percent native cover. There is a high presence of non-native exotic and invasive species. Non-native cover in these areas consists of invasive perennial species including fennel (*Foeniculum vulgare*), hotentot fig (*Carpobrotus edulis*), as well as annual black mustard, wild oat grasses, and Russian thistle (*Salsola tragus*). These areas include 13.5 acres (net) proposed for native coastal sage scrub restoration, 0.5 acre proposed for cactus scrub restoration, and 1 acre proposed for butterfly habitat restoration over a 3-year time frame (*Figure 5*).

Each specific habitat type to be restored is described below. For the restoration areas in general, it is expected that in addition to the planting and seeding of appropriate native plant species, the exchange of existing native seed onsite will contribute to the development of a healthy native plant community. It is expected that all planting shall be installed to mimic the natural distribution and vegetation mosaic of adjacent healthy habitats.



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Conceptual Restoration Plan

FIGURE 5

4.2.1 Coastal Sage Scrub

The restoration strategy for coastal sage scrub habitat on the Alta Vicente 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 mimic the native composition of a healthy coastal sage scrub plant community similar to target coastal sage scrub habitat present on the Alta Vicente site.

TABLE 2
Proposed Coastal Sage Scrub Planting Palette (13.5 Acres)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)
Container Plants					
Artemisia californica	California sagebrush	1 gallon	6	5	240
Astragalus trichopodus var. *lonchus*	Ocean locoweed	Rose pot	3	7	98
Bloomeria crocea	Common goldenstar	Bulb	TBD	TBD	As-available
Calochortus catalinae	Mariposa lily	Bulb	TBD	TBD	As-available
Dichelostemma capitatum	Blue dicks	Bulb	TBD	TBD	As-available
Dudleya lanceolata	dudleya	4-inch	3	3	48
Epilobium canum	California fuchsia	1 gallon	3	5	100
Eriogonum cinereum	Ashy-leaf buckwheat	1 gallon	5	5	175
Eriogonum elongatum	Wand buckwheat	1 gallon	5	5	70
Eriogonum parvifolium	Coast buckwheat	1 gallon	5	5	85
Heteromeles arbutifolia	Toyon	1 gallon	10	1	13
Horkelia cuneata	Horkelia	1 gallon	3	5	50
Isomeris arborea	Bladderpod	1 gallon	6	5	120
Leymus condensatus	California-Aster	1 gallon	3	3	99
Malosma laurina	Laurel sumac	1 gallon	12	1	9
Mirabilis californica	Wishbone bush	1 gallon	3	5	250
Opuntia littoralis	Prickly-pear	pads	4	3	135
Opuntia prolifera	Coast cholla	1 gallon	4	3	135
Rhus integrifolia	Lemonadeberry	1 gallon	12	1	30
Salvia leucophylla	Purple sage	1 gallon	5	5	85
Salvia mellifera	Black sage	1 gallon	6	3	60
Stachys rigens	Hedge nettle	1 gallon	3	3	96
Total Container Plants					**1,898**

Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre	Collected Locally*
Seed Mix				
Artemisia californica	California sagebrush	10	4	✓
Encelia californica	California sunflower	25	2	✓
Eriogonum cinereum	Ashy-leaf buckwheat	8	3	✓
Eriogonum parvifolium	Coast buckwheat	20	5	✓

TABLE 2 (Cont.)

Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre	Collected Locally*
Eriophyllum confertiflorum	Golden-yarrow	25	1	✓
Gnaphalium bicolor	Everlasting	2	0.5	✓
californicum	California cudweed	2	0.5	✓
Gnaphalium	Everlasting	1	1	✓
Isocoma menziesii	Goldenbush	15	1	✓
Lessingia filaginifolia	California-Aster	3	1	✓
Lotus scoparius	Deerweed	85	4	✓
Lupinus succulentus	Arroyo lupine	90	3	✓
Malacothrix saxatilis	Cliff aster	10	0.5	✓
Melica imperfecta	California melic	70	1	✓
Nassella lepida	Foothill needle-grass	65	1	
Nassella pulchra	Purple needle-grass	75	3	
Total Lbs. Per Acre			**31.5**	

TBD = To be determined
N/A = Not applicable
*Seed from these species will be collected locally, and will be included in the seed mix if available.

4.2.2 Coastal Cactus Scrub

The restoration strategy for coastal cactus scrub habitat on the Alta Vicente site includes reintroducing regionally appropriate native coastal cactus scrub species that are currently present in adjacent native habitats. The plant palette includes a container plant and seed mix composition (*Table 3*) that has been designed to mimic the native composition of a healthy coastal cactus scrub plant community similar to target coastal cactus scrub habitat present on the Alta Vicente site.

TABLE 3
Proposed Coastal Cactus Scrub Planting Palette (0.5 Acre)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)
Container Plants					
Artemisia californica	California sagebrush	1 gallon	6	5	300
Eriogonum cinereum	Ashy-leaf buckwheat	1 gallon	5	5	350
Isomeris arborea	Bladderpod	1 gallon	6	5	120
Mirabilis californica	Wishbone bush	1 gallon	4	5	135
Opuntia littoralis	Prickly-pear	pads	4	5	545
Opuntia prolifera	Coast cholla	1 gallon	6	5	120
Opuntia oricola	Big prickly-pear	pads	6	5	120
Total Container Plants					**1,690**

TABLE 3 (Cont.)

Seed Mix				
Botanical Name	**Common Name**	**Pure Live Seed**	**Lbs. Per Acre**	**Collected Locally***
Artemisia californica	California sagebrush	10	3	✓
Encelia californica	California sunflower	25	3	✓
Eriogonum cinereum	Ashy-leaf buckwheat	8	15	✓
Eriophyllum confertiflorum	Golden-yarrow	25	1	✓
Lupinus succulentus	Arroyo lupine	90	10	✓
Melica imperfecta	California melic	70	3	✓
Nassella lepida	Foothill needle-grass	65	2	
Total Lbs. Per Acre			**37**	

TBD = To be determined
N/A = Not applicable
*Seed from these species will be collected locally, and will be included in the seed mix if available.

4.2.3 Butterfly Habitat

The restoration strategy for the Palos Verdes blue butterfly habitat on the Alta Vicente site includes reintroducing regionally appropriate native coastal species that are currently present in adjacent native habitats and known to be present on the Peninsula, while focusing on the host plants for the Palos Verdes blue butterfly. Host plants for the Palos Verdes blue butterfly are Ocean locoweed and deerweed (*Lotus scoparius)*. Both of these plant species are early successional, exploiting areas of disturbance, and are normally found in the gaps and open areas within the coastal sage scrub community. The plant palette includes a container plant and seed mix composition (*Table 4*).

TABLE 4
Proposed Butterfly Habitat Planting Palette (1.0 Acre)

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)
Container Plants					
Artemisia californica	California sagebrush	1 gallon	6	5	60
Astragalus trichopodus var. *lonchus*	Ocean locoweed	1 gallon	3	12	540
Bloomeria crocea	Common goldenstar	bulb	TBD	TBD	As-available
Calochortus catalinae	Mariposa lily	bulb	TBD	TBD	As-available
Dichelostemma capitatum	Blue dicks	bulb	TBD	TBD	As-available
Eriogonum elongatum	Wand buckwheat	1 gallon	6	5	85
Eriogonum parvifolium	Coast buckwheat	1 gallon	5	5	36
Fritillaria biflora	Chocolate lily	bulb	TBD	TBD	As-available
Mirabilis californica	Wishbone bush	1 gallon	4	5	80
Verbena lasiostachys	verbena	1 gallon	4	3	108
Total Container Plants					**909**

TABLE 4 (Cont.)

Seed Mix				
Botanical Name	**Common Name**	**Pure Live Seed**	**Lbs. Per Acre**	**Collected Locally***
Amsinckia menziesii	Rancher's fireweed	25	5.0	✓
Asclepias fascicularis	Narrow-leaf milkweed	50	As-Available	✓
A. eriocarpa	Indian milkweed	---	As-Available	✓
Astragalus trichopodus var. *lonchus*	Ocean locoweed	---	As-Available	✓
Caladrinia ciliata	Red maids	60	0.5	
Camissonia bistorta	California suncup	60	4.0	✓
Castilleja exserta	Purple owl's clover	25	0.5	✓
Chaenactis glabriuscula	Yellow pincushion	---	As-Available	
Clarkia purpurea	Clarkia	80	0.5	✓
Deinandra (Hemizonia) fasciculata	Tarplant	20	1.0	✓
Descurainia pinnata	Tansy mustard	---	As-Available	✓
Dichelostemma capitatum	Blue dicks	80	0.5	✓
Eriophyllum confertiflorum	Golden-yarrow	25	1.0	✓
Eschscholzia californica var. *maritima*	California poppy	85	2.0	
Gilia capitata	Globe gilia	80	1.0	
Gnaphalium bicolor	Bicolor everlasting	2	1.0	✓
G. californicum	California everlasting	1	3.0	✓
Grindelia camporum	Gumplant	70	2.0	
Gutierrezia californica	California matchweed	2	2.0	✓
Lasthenia californica	Common goldfields	50	0.5	
Layia platyglossa	Tidy tips	60	1.0	
Lessingia filaginifolia	California-aster	3	2.0	✓
Lotus scoparius	Deerweed	85	4.0	✓
Lupinus bicolor	Miniature lupine	90	3.0	✓
L. succulentus	Arroyo lupine	90	2.0	✓
Melica imperfecta	Coast melic grass	70	1.0	
Nassella lepida	Foothill needlegrass	65	1.0	
N. pulchra	Purple needlegrass	75	3.0	
Nemophila menziesii	Baby blue-eyes	75	2.0	
Platystemon californicus	Cream cups	20	2.0	
Sisyrinchium bellum	Blue-eyed grass	80	1.0	
Trichostema lanceolatum	Vinegar weed	40	As-Available	✓
Trifolium willdenovii	Clover	85	1.0	✓
Total Lbs. Per Acre			**48.5**	

TBD = To be determined
N/A = Not applicable
*Seed from these species will be collected locally, and will be included in the seed mix if available.

Historically these host plant species were associated with natural occurrences as fire, landslides and animal burrowing. With the introduction of human intervention, this natural cycle of disturbance and growth has changed. Humans have introduced many highly adaptable annual exotic grasses that flourish in these same open areas inhabited by both ocean locoweed and deerweed and out-compete the native species for both water and nutrients. In addition, fire suppression has resulted in the establishment of continuous bands of mature coastal sage scrub communities, whereby not only is species diversity decreased, but open areas required for the establishment and development of species such as ocean locoweed and deerweed are decreased as well.

To maximize the potential for the continued presence of the two Palos Verdes blue butterfly host plant species, restoration efforts must follow a two-fold approach. First, is the establishment of additional Palos Verdes Blue butterfly habitat to provide the necessary resources to support the blue butterfly. In addition, newly established habitat must be maintained on a continuous basis to ensure the continued existence of gaps within which provide the open areas necessary for both ocean locoweed and deerweed species to persist. Since fire, in the form of controlled burns, is not an option at the Alta Vicente site, open areas require regular on-going maintenance through mechanical means.

4.3 Revegetation Materials

Plant materials for the restoration planting areas will include container stock of coastal sage scrub species and seed mixes of coastal sage scrub and native grassland species, as indicated in the plant palettes provided in *Tables 2-4*. It is preferred that container plant materials are grown from native seed at the Palos Verdes Peninsula Land Conservancy's nursery or alternative source approved by the project's restoration ecologist.

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. Backfill soil will contain no amendments and fertilizers unless recommended by soil test results and/or by the recommendation of the project's restoration ecologist.

Seed for inclusion in the hydroseed mixtures may be obtained from locally collected sources. Seed shall be broadcast throughout the restoration site using hydroseed equipment or other method as recommended by the restoration ecologist.

Seed for hydroseeding will be mixed uniformly in a slurry composed of water, fertilizer (if determined to be necessary after soil tests) and virgin wood fiber mulch at the following rates:

- Seed mixture at indicated lbs. per acre.
- 100 percent Virgin wood cellulose fiber mulch at 2,500 Lbs. per acre.
- Fertilizer (11-52-0) Mono Ammonium Phosphate, plus 19 percent soil sulphur @ 150lbs./acre.

Appropriate timing of planting (and application of the hydroseed) will limit the need for supplemental watering and will increase the survival of the plants. The best survival rates are achieved when container plants and seed are installed between 15 November and 15 April. Planting and seeding at the site should be timed to take advantage of seasonal rainfall patterns and most appropriate growing season temperatures (*Chart 1-2*) and should be accomplished no later than early spring of the implementation year.

Chart 1
2005-2006 Average Monthly Precipitation for the Portuguese Bend Nature Preserve

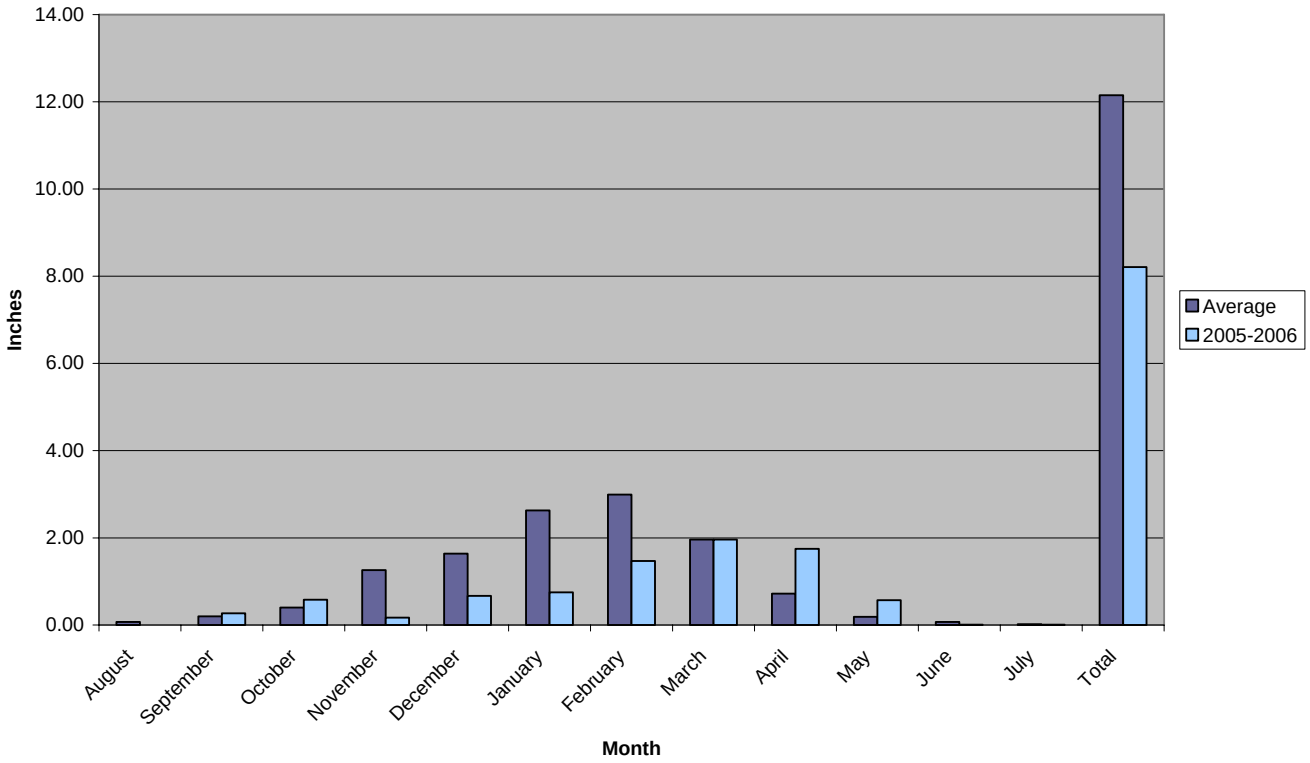
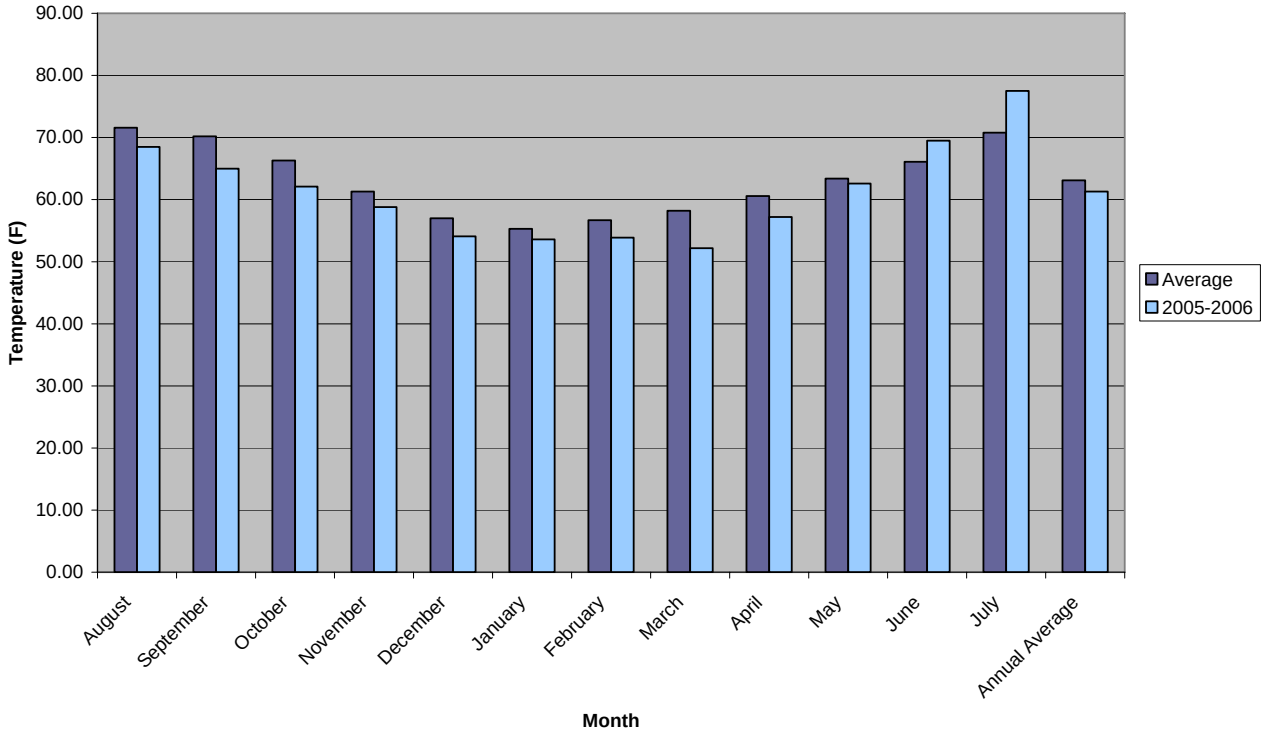


Chart 2
2005-2006 Average Monthly Temperatures for the Portuguese Bend Nature Preserve



4.4 Target Functions and Values

The primary functional goal of the restored coastal sage scrub, cactus scrub, and butterfly habitats is to restore vegetation that contains a diversity of native coastal sage scrub and cactus scrub plant species and that provides habitat value for sensitive wildlife species. A secondary consideration is to create contiguous and intact habitat which resists the establishment of invasive plant species.

4.5 Time Lapse

Under optimal conditions, coastal sage scrub may take approximately 3 years from the installation of seed and container plants 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 coastal other sage scrub species. Due to the slower growth of cactus, coastal cactus scrub may take approximately 4 years or more from the installation of seed and container plants to develop the appropriate structure and to provide the functions and values needed for habitation of wildlife, including suitable nesting habitat for cactus wren

and other cactus scrub species. The butterfly habitat may take approximately 3 years from the installation of seed and container plants to develop the appropriate structure to provide the functions and values needed for habitation of wildlife, including suitable habitat for the Palos Verdes Blue Butterfly. As all of the habitats mature, they will become increasingly suitable for a greater diversity of plant and wildlife species.

The length of time to develop high quality habitat depends on a variety of factors including weather, soil conditions, herbivory, and weed competition. As a hedge against drought, the addition of a temporary irrigation system will ensure timely seedling germination and seedling survival until seedlings have become established and are capable of surviving without supplemental water. The anticipated increase in the survival rate will help the vegetation develop more quickly than would be expected from a non-irrigated revegetation effort.

5.0 IMPLEMENTATION PLAN

5.1 Rationale for Expecting Success

Locations for restoration on the Alta Vicente Ecological Reserve are directly adjacent to viable and self-sustaining target habitats, indicating appropriate environmental conditions to support the intended upland habitat. This plan provides for the installation of temporary irrigation to promote establishment and survival of native species included in the plant palette, as well as naturally recruiting species from existing onsite native seed sources. Invasive non-native weeds that currently displace desirable species within the restoration site will be removed and controlled as part of this plan. Native plant materials will be grown or collected from sources from the Palos Verdes Peninsula, thus preserving genetic integrity and increasing the potential for long-term success.

5.2 Preliminary Schedule

The proposed 15 acres of habitat restoration at the Alta Vicente ER will be completed in three phases consisting of five acres per phase. One phase will be initiated each year. The first 5 acres of restoration (Phase 1) will begin with site preparation and is anticipated to commence as early as Fall 2007. Phase 2 and Phase 3 will also begin with site preparation in Fall 2008 and Fall 2009 respectively. Updates to this schedule will be provided to all parties involved in the restoration program, as necessary (*Table 5*). For Phases 2 and 3, the tasks 1 year later for Phase 1

TABLE 5
Preliminary Restoration Project Schedule for Phase 1

Task	Date
Site clearing and soil preparation	Fall 2007 or per Migratory Bird Treaty Act restrictions
Installation of temporary irrigation system	Fall 2007 (following site clearing and soil preparation)
Weed/exotic removal and grow-kill cycles	Fall 2007 (following site preparation)- Spring 2008, Fall 2008-Spring 2009
Planting container stock	Early Winter 2009
Hydroseed application	Winter 2009-2010 (following planting)
Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period
5-year biological monitoring and maintenance	To begin upon successful installation of restoration work
Phase one completion	2014, end of Year 5

5.3 Site Preparation

The Land Conservancy will be responsible for site and soil preparation which includes invasive weed species removal and soil preparation in the restoration areas. Clearing of weeds and site preparation shall be performed outside of the migratory bird nesting season (Feb 15 to Sept 15), where feasible. However, if vegetation removal needs to occur during this time period, a focused nesting bird survey shall be performed 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, fennel, black mustard, limonium, hottentot fig, and Russian thistle shall be removed or treated within the restoration areas. This should also include exotic trees such as acacia, palm, and castor bean (*Ricinus communis*). The initial weed control effort will involve chemical and/or mechanical treatment. Prior to the installation of native seed and container plants, at least three "grow and kill" weed removal treatments will be conducted by activating the irrigation system over an approximate four-week period to encourage non-native seedling emergence. When weeds have begun to grow, a foliar application of an appropriate systemic herbicide will be applied to kill target weeds. The cycle shall be repeated. Additional cycles may be required as recommended by the project's restoration ecologist. The restoration ecologist shall oversee any use of herbicide 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.

5.4 Temporary Irrigation System

A temporary above-grade irrigation system is proposed to provide supplemental irrigation to the coastal age scrub, cactus scrub, and butterfly habitat creation areas to ensure native container plants and seed installed at the site become adequately established. Irrigation is allowable on the Alta Vicente site since it is located outside of the City's Landslide Moratorium Area and the City's coastal setback zone. The irrigation system will only be used until the plants are established such that they can survive on their own from seasonal rainfall. It is expected that the irrigation system will be shut-off/abandoned at the end of Year 3 or four of the 5-year maintenance and monitoring period, depending upon the level of plant establishment achieved by that time. Watering onsite will gradually be decreased prior to the irrigation system being abandoned in order to allow the plants to become acclimated to the site's natural conditions.

The irrigation system will be installed as an above-ground system, so that irrigation equipment may be removed once the system has been decommissioned, and the site has reached the final year of monitoring. The irrigation system will utilize a water source located as close to the site as possible. All onsite irrigation will consist of PVC pipe staked on grade at approximately ten feet on-center and at all corners, providing 100 percent coverage of the revegetation areas using spray and/or rotor heads where appropriate. The irrigation system will be designed and installed by a landscape contractor in coordination with the Land Conservancy.

5.5 Erosion Control

Where needed, erosion control measures, such as the installation of hay bales, sandbags, fiber rolls, silt fencing, and/or erosion-control matting may be required until target vegetation establishes. No erosion control devices shall be used that contain seed from non-native plants. The need and location of erosion control shall be determined in the field by the project's restoration ecologist.

5.6 120-Day Establishment Period

During the initial 120-day plant establishment period, following the container plant installation and seeding, the project's restoration ecologist will monitor site conditions, including irrigation timing and efficiency, seedling germination, container plant survival, soil erosion, and weed and exotic species control to determine if the plants are becoming adequately established and to verify that the seed application has been successful. If the seed application has been successful and adequate germination occurs, then rapid seedling emergence should limit the need for

erosion control devices. If germination is not sufficient potential remedial actions include reseeding, installation of additional erosion control devices, and follow-up weed control.

6.0 5-YEAR MAINTENANCE PLAN

The purpose of the maintenance plan is to provide guidelines for long-term maintenance of the restoration site during the 5-year establishment period. Maintenance activities shall occur at the direction of the project's restoration ecologist on an as-needed basis. The maintenance period shall begin after the installation of the container plants and the application of the hydroseed mix. The maintenance is scheduled to last for 5 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 plant materials become more established and local competition from non-native plants for resources on the site is minimized through direct removal and treatment of non-natives. However, long-term maintenance concerns for the site will include non-native, exotic and invasive plant species adjacent to the site and potential establishment from wind-borne seed.

The risk of large-scale reinvasion of non-native plants onto the site can be adequately minimized during the first 5 years by adhering to these specific maintenance and management guidelines.

- Remove or control invasive exotic species. Weed control will require constant diligence by the maintenance personnel. Invasive exotic species, such as pepper trees (Schinus spp.), gum tree, castor bean, tree tobacco (Nicotiana glauca), and fennel, will be removed wherever possible within the restoration area. Annual weeds such as black mustard, and annual grasses will also need to be controlled. The project's restoration ecologist will determine what annual weeds need to be controlled to ensure restoration success.
- Access to the restoration site should be on foot or via the existing dirt road maintained for the Sanitation Department. Other than maintenance vehicles along the dirt access road, all vehicles should remain outside the restoration areas. If off-road vehicle or human activities become a problem in the restoration area, the project's restoration ecologist may recommend the installation of fencing.

6.1 Maintenance Activities

- Areas of container stock and applied seed will be irrigated when natural rainfall is not adequate to sustain container plants and seeds. The project's restoration ecologist shall

be responsible for scheduling the irrigation to promote plant and seed growth, and establishment. The irrigation system shall be maintained in proper working order.

- Native understory species will not be cleared in the revegetation areas.
- Generally, the sites 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.
- Non-native species may invade the revegetation areas and become a problem before or during the establishment of native plant associations. Weedy, invasive, non native species, such as fennel, castor bean, pampas grass (Cortaderia sp.), tree tobacco, tocalote (Centaurea melitensis), geraldton carnation spurge (Euphorbia terracina) and others, as indicated by the project's restoration ecologist, shall be hand removed or treated with the appropriate systemic herbicide as soon as they begin to invade.
- Deadwood and leaf litter of native vegetation shall not be removed (see 6.2.3, Clearing and Trash Removal). Deadwood and leaf litter provide valuable microhabitats for invertebrates, reptiles, small mammals and birds. Non-organic trash and debris will be removed from the revegetation areas by hand on a regular basis, at no less than one month intervals. Trash consists of all man made non organic materials, equipment, or debris thrown, dumped, or washed down within the revegetation areas.
- Repair any erosion on the site and maintain any temporary BMP's within the revegetation areas until they are deemed no longer necessary by the project's restoration ecologist. Potential erosion-control measures include hay bales, sandbags, silt fencing, and/or erosion-control matting. The project's restoration ecologist will identify the need for erosion control during regular site visits.

6.2 General Habitat Maintenance Guidelines

6.2.1 Pest Management/Weed Control

Weeds and non-native/exotic plant species are expected to be the primary pest problem in the restoration area during the first several years of the maintenance period. Weeds shall be controlled so they do not prevent the establishment of the native species or invade adjacent areas. Weeds shall be controlled prior to setting seed and removed from the site. The Land Conservancy shall control weeds and invasive exotic species within the restoration site. A combination of physical removal, mechanical treatments (weed whipping) and appropriate herbicide treatments shall be used to control the non-native/invasive plant species.

Removal of weeds by hand where possible is the most desirable method of control and shall be used around individual plantings and native seedlings. The project's restoration ecologist shall oversee any use of herbicide 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.

6.2.2 Irrigation System

The irrigation system shall be checked regularly to ensure proper operation and adequate coverage of the revegetated areas. Problems with the irrigation system shall be repaired immediately to reduce potential plant mortality. The frequency and duration of irrigation applications shall be adjusted seasonally in coordination with the project's restoration ecologist to meet habitat needs. The irrigation system will be terminated when deemed appropriate by the project's restoration ecologist. Plants growing near the sprinkler heads may be pruned to maintain adequate sprinkler coverage. Irrigation heads may need to be raised up on staked risers to reach above developing plants to avoid head blockage. The irrigation system may be (but is not required to be) completely removed from the site at the successful completion of the project. Cessation and removal of the irrigation system shall be determined by the project's restoration ecologist.

6.2.3 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 will not be allowed 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 shall 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.

6.3 Schedule of Maintenance Inspections

The project's restoration ecologist will perform quarterly maintenance/monitoring inspections during the 5-year maintenance and monitoring period. Recommendations for maintenance efforts will be based upon these site observation visits. Weed control by the Land Conservancy shall be conducted monthly during Years 1 and 2 of the maintenance and monitoring period, and then quarterly during Years 3 through 5 of the maintenance and monitoring period, as directed by the project's restoration ecologist.

7.0 MONITORING PLAN

Monitoring of the restoration site has a two-fold purpose: **(1)** To monitor the progress of the Alta Vicente restoration area by assessing native habitat establishment, (percent native and non-native coverage via quantitative and qualitative methods) based on the established performance criteria; **(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 shall be performed by the project's restoration ecologist.

The project's restoration ecologist shall be responsible for monitoring activities of all the work crews and contractors during preparation of the restoration area including site clearing and soil preparation, irrigation installation, container plant and seed application, monthly monitoring during the 120-day plant establishment/maintenance period and quarterly monitoring for the 5-year maintenance and monitoring period.

7.1 Performance Standards

Performance standards have been established for the habitat restoration area based on expected vegetative development within a properly functioning habitat of the same type. Specific performance criteria should be attained by 3 years after the installation. Established success criteria are listed in *Table 6*.

TABLE 6
Performance Standards

Year	Percent Cover of Native Species (%)		
	CSS	Cactus Scrub[1]	PVB Habitat[2]
Year 1*	10%	10%	10%
Year 2*	20%	20%	20%
Year 3	>40%	>30%	30%-60% max.
Year 5*	>50%	>40%	30%-60% max.

* Percentage based upon visual estimates
[1] Percent coverage of cactus species should be at least 1% for Year 1, 3% for Year 2, 5% for Year 3, and 10% for Year 5.
[2] From Year 3 on, there should be at least 10% coverage from *L. scoparius* and/or *A. trichopodus* and the woody shrubs should be maintained at 10-20%

These performance criteria shall be utilized to assess the annual progress of the restoration areas, and are regarded as interim project objectives designed to reach the final goals. Fulfillment of these criteria will indicate that the restoration areas on the project site are progressing toward the habitat types and functions that constitute the long-term goals of the plan. If the restoration efforts fail to meet the performance standards in any 1 year, the

project's restoration ecologist may recommend remedial action to be implemented the following year which will enhance the vegetation to a level of conformance with the original standard. These remedial actions may include re-seeding, applying soil amendments, additional weed control measures, erosion control, or adjustments to the irrigation and maintenance practices.

7.2 Monitoring Methods and Schedule

The Land Conservancy will monitor and report on the restoration work underway in at the Alta Vicente. Each 5-acre site will be monitored for 5 years, with reports prepared in Years 1 through 3, and 5.

The project's restoration ecologist will conduct annual qualitative monitoring visits for Years 1, 2 and 5, of the 5-year monitoring period. Permanent vegetation transect points will be established within the coastal sage scrub, the coastal cactus scrub, and the butterfly habitat restoration areas at appropriate representative locations. Transect data shall be collected during the 3rd year in the spring and shall be used to determine compliance and achievement of the restoration success standards; there will be a minimum of one 50 meter transect installed within each habitat restoration vegetation type per five acre area. Qualitative assessment through visual analysis of the restoration area will be used during the first 2 years to assess percent cover of target vegetation and weed cover, and plant composition. In the spring of Year 3, a point intercept method will be used to determine percent target vegetation cover and weed cover. This will follow the California Native Plant Society field sampling protocol (CNPS 1995). If the restoration project is in compliance with the criteria established for Year 3, then qualitative assessment will continue during Year 5. If the restoration site is performing below the criteria established for Year 3, the project's restoration ecologist will determine if remedial measures are necessary and if point intercept transects will be continued in Year 5.

Qualitative monitoring will include reviewing the health and vigor of container plants and seed plantings, checking for the presence of pests and disease, soil moisture content and the effectiveness of the irrigation system, erosion problems, invasion of weeds/exotics, and the occurrence of trash and/or vandalism. Photographs of the restoration site, viewing the site from different locations will be taken annually. Photographs will be taken at the same locations each year. Each monitoring visit will be followed by a summary of observations, recommendations, and conclusions.

Quantitative evaluation of container plant survival shall be determined through counts of dead container plants. Site visits shall assess plant mortality and recommend container plant replacement, if needed. Cover of invasive exotics shall be determined by visual inspections of the restoration site. Removal of invasive exotics shall be recommended if detected.

7.3 Monitoring Reports

The PVPLC will monitor and report on the restoration work underway in the Preserve. Each site will be monitored for 5 years, with reports prepared in Years 1 through 3, and 5. Monitoring should document restoration progress and provide direction and maintenance recommendations. Monitoring will include both horticultural and botanical components as described in (Section 7.2).

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APPENDIX A

Wildlife Species Observed at Alta Vicente (2006)

APPENDIX A

Wildlife Species Observed at Alta Vicente (2006)

REPTILES

IGUANIDAE – IGUANID LIZARDS

Sceloporus occidentalis – western fence lizard
Uta stansburiana – side-blotched lizard

COLUBRIDAE – COLUBRID SNAKES

Pituophis melanoleucus – gopher snake

BIRDS

ACCIPITRIDAE – HAWKS

Buteo jamaicensis – red-tailed hawk

FALCONIDAE – FALCONS

Falco sparverius – American kestrel

CHARADRIIDAE – PLOVERS

Charadrius vociferus – killdeer

LARIDAE – GULLS and TERNS

Larus sp. – gull

COLUMBIDAE – PIGEONS and DOVES

* *Columba livia* – rock dove
Zenaida macroura – mourning dove

TYTONIDAE – BARN OWLS

Tyto alba – barn owl

TROCHILIDAE – HUMMINGBIRDS

Calypte anna – Anna's hummingbird

HIRUNDINIDAE – SWALLOWS

Petrochelidon pyrrhonota – cliff swallow

CORVIDAE – JAYS and CROWS

Aphelocoma californica – western scrub-jay
Corvus brachyrhynchos – American crow
Corvus corax – common raven

APPENDIX A

Wildlife Species Observed at Alta Vicente (2006)

AEGITHALIDAE – BUSHTITS

Psaltriparus minimus – bushtit

TROGLODYTIDAE – WRENS

Campylorhynchus brunneicapillus – cactus wren

SYLVIIDAE – GNATCATCHERS

Polioptila californica californica – coastal California gnatcatcher

TIMALIIDAE – LAUGHINGTHRUSH and WRENTITS

Chamaea fasciata – wrentit

MIMIDAE – THRASHERS

Mimus polyglottos – northern mockingbird
Toxostoma redivivum – California thrasher

STURNIDAE – STARLINGS

* *Sturnus vulgaris* – European starling

EMBERIZIDAE – BUNTINGS and SPARROWS

Melospiza melodia – song sparrow
Pipilo crissalis – California towhee
Pipilo maculatus – spotted towhee

FRINGILLIDAE – FINCHES

Carpodacus mexicanus – house finch
Carduelis psaltria – lesser goldfinch

PASSERIDAE – OLD WORLD SPARROWS

* *Passer domesticus* – house sparrow

MAMMALS

DIDELPHIDAE – NEW WORLD OPOSSUMS

* *Didelphis virginiana* – Virginia opossum

LEPORIDAE – HARES and RABBITS

Sylvilagus bachmani – brush rabbit

SCIURIDAE – SQUIRRELS

Spermophilus beecheyi – California ground squirrel

APPENDIX A

Wildlife Species Observed at Alta Vicente (2006)

GEOMYIDAE – POCKET GOPHERS

Thomomys bottae – Botta's pocket gopher

CANIDAE – WOLVES and FOXES

Canis latrans – coyote

MUSTELIDAE – WEASELS, SKUNKS, and OTTERS

Mephitis mephitis – striped skunk

BUTTERFLIES AND MOTHS

PAPILIONIDAE – SWALLOWTAILS

Papilo zelicaon lucas – anise swallowtail

PIERIDAE – WHITES AND SULFURS

Pieris rapae rapae – cabbage butterfly
Pontia protodice – checkered white

LYCAENIDAE – BLUES, HAIRSTREAKS, and COPPERS

Leptotes marina – marine blue

* *signifies introduced (non-native) species*

APPENDIX B

Vascular Plant Species Observed at Alta Vicente

APPENDIX B

Vascular Plant Species Observed at Alta Vicente

FILACEAE

POLYPODIACEAE – POLYPODY FAMILY

Polypodium californicum – California polypody

ANGIOSPERMAE (DICOTYLEDONES)

AIZOACEAE – FIG-MARIGOLD FAMILY

* *Carpobrotus edulis – Hottentot fig*
* *Mesembryanthemum crystallinum* – crystalline iceplant

ANACARDIACEAE – SUMAC FAMILY

Malosma laurina – laurel sumac
Rhus integrifolia – lemonade-berry
* *Schinus molle* – Peruvian pepper tree
* *Schinus terebinthifolius* – Brazilian pepper tree

APIACEAE – CARROT FAMILY

* *Foeniculum vulgare* - fennel

ASCLEPIADACEAE – MILKWEED FAMILY

Asclepias fascicularis – narrow-leaf milkweed

ASTERACEAE – SUNFLOWER FAMILY

Artemisia californica – coastal sagebrush
Baccharis pilularis ssp. consanguineae – coyote brush
Centaurea melitensistocolote
* *Chrysanthemum coronarium* – garland chrysanthemum
Encelia californica – California bush sunflower
Filago californica – California fluffweed
* *Gazania* sp. – gazania
Gnaphalium bicolor – bicolor cudweed
Gnaphalium californicum – California everlasting
Gutierrezia californica – California matchweed
Hazardia squarrosa Sawtooth Goldenbush
Heterotheca grandiflora – telegraph weed
Isocoma menziesii ssp. *vernonioides* – coast goldenbush
Malacothrix saxatilis var. *tenuifolia* – cliff malacothrix
* *Picris echioides* – bristly ox-tongue
* *Silybum marianum* – milk thistle
Stephanomeria virgata – twiggy wreathplant

APPENDIX B

Vascular Plant Species Observed at Alta Vicente

BORAGINACEAE – BORAGE FAMILY

* *Echium fastuosum* – pride of Madeira

BRASSICACEAE – MUSTARD FAMILY

* *Brassica nigra* – black mustard
* *Hirschfeldia incana* – short-podded mustard
* *Lobularia maritima* – sweet-alyssum

CACTACEAE – CACTUS FAMILY

Cylindropuntia (= Opuntia) prolifera – coast cholla
Opuntia littoralis – coastal prickly-pear
Opuntia oricola – prickly-pear cactus

CAPPARACEAE – CAPER FAMILY

Isomeris arborea – bladderpod

CHENOPODIACEAE – GOOSEFOOT FAMILY

Atriplex lentiformis ssp. breweri – big saltbush, quail brush
* *Atriplex semibaccata* – Australian saltbush
* *Chenopodium murale* – nettle-leaved goosefoot
* *Salsola tragus* – Russian-thistle

CONVOLVULACEAE – MORNING-GLORY FAMILY

* *Convolvulus arvensis* – bindweed
Dichondra occidentalis – western dichondra

CRASSULACEAE – STONECROP FAMILY

Dudleya lanceolata – lanceleaf dudleya

CUCURBITACEAE – GOURD FAMILY

Marah macrocarpus – wild cucumber

EUPHORBIACEAE – SPURGE FAMILY

Chamaesyce albomarginata – rattlesnake spurge
* *Ricinus communis* – castor-bean

FABACEAE – PEA FAMILY

* *Acacia cyclops* – acacia
Astragalus trichopodus var. *lonchus* – ocean locoweed
* *Medicago polymorpha* – California burclover
* *Melilotus alba* – white sweet-clover
* *Melilotus indica* – yellow sweet-clover
* *Vicia sativa* – spring vetch

APPENDIX B

Vascular Plant Species Observed at Alta Vicente

GERANIACEAE – GERANIUM FAMILY

* *Erodium cicutarium* – red-stemmed filaree
* *Geranium carolinianum* – Carolina geranium

HYDROPHYLLACEAE – WATERLEAF FAMILY

MALVACEAE – MALLOW FAMILY

* *Malva sylvestris* – mallow

MYOPORACEAE – MYOPORUM FAMILY

***** *Myoporum laetum* – myoporum

MYRTACEAE – MYRTLE FAMILY

* *Eucalyptus* sp. – eucalyptus

NYCTAGINACEAE – FOUR O'CLOCK FAMILY

Mirabilis californica – California wishbone-bush

OLEACEAE – OLIVE FAMILY

* *Olea europaea* – mission olive

OXALIDACEAE – OXALIS FAMILY

* *Oxalis pes-caprae* – Bermuda buttercup

PLANTAGINACEAE – PLANTAIN FAMILY

***** *Plantago lanceolta* – English plantain

PLUMBAGINACEAE – LEADWORT FAMILY

* *Limonium perezii* – Perez's sea-lavender; statice

POLYGONACEAE – BUCKWHEAT FAMILY

Eriogonum cinereum – ashyleaf buckwheat
Eriogonum fasciculatum – California buckwheat
* *Rumex crispus* – curly dock

ROSACEAE – ROSE FAMILY

Heteromeles arbutifolia – toyon

SCROPHULARIACEAE – FIGWORT FAMILY

Castilleja exserta – owls clover

APPENDIX B

Vascular Plant Species Observed at Alta Vicente

SOLANACEAE – NIGHTSHADE FAMILY

Lycium californicum – California boxthorn
Nicotiana glauca – tree tobacco

ULMACEAE ELM FAMILY

*Ulmus parvifolia*Chinese elm

ANGIOSPERMAE (MONOCOTYLEDONES)

ARECACEAE – PALM FAMILY

* *Phoenix canariensis* - Canary Island date palm

LILIACEAE – LILY FAMILY

Calochortus catalinae – Catalina mariposa lily
Dichelostemma capitatum – blue dicks

POACEAE – GRASS FAMILY

* *Avena barbata* – slender oat
* *Avena fatua* – wild oat
* *Brachypodium distachyon* – false brome
* *Bromus catharticus* – rescue grass
* *Bromus diandrus* – ripgut grass
* *Bromus hordeaceus* (mollis) – soft chess
* *Bromus madritensis* ssp. *rubens* – foxtail chess
* *Cortaderia selloana* – pampas grass
* *Cynodon dactylon* – Bermuda grass
* *Hordeum murinum* ssp. *leporinum* – foxtail barley
* *Hordeum vulgare* - barley
* *Lamarckia aurea* – goldentop
* *Lolium multiflorum* – Italian ryegrass
Melica imperfecta – California melic
Nassella cernua – nodding needlegrass
Nassella lepida – foothill needlegrass
Nassella pulchra – purple needlegrass
* *Pennisetum clandestinum* – kikuyu grass
* *Pennisetum setaceum* – fountain grass
* *Piptatherum miliaceum* – smilo grass
* *Phalaris minor* – canary grass

* *signifies introduced (non-native) species*

PREDATOR CONTROL PLAN

Prepared By

Danielle LeFer

PALOS VERDES PENINSULA

LAND CONSERVANCY

May 2013

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APPENDICES

Appendix A 5

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4.1 INTRODUCTION

This 2012 Predator Control Plan 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 surveys taking place from 2010 through 2012, and recommends specific actions to be taken to reduce predation of covered species within the PVNP for the following 3 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 PVPLC and associated volunteers conducts monthly monitoring walks of all properties under management and completes a "Stewardship Review Sheet." A sample of this form is provided as Appendix A. This form includes an area to document evidence of feral or domestic animal use in the PVNP. 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 during surveys. This monitoring will allow the PVPLC to document evidence of use 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 in the future.

The monthly monitoring program includes scanning 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

PVPLC will establish an education program for homeowners regarding responsible pet ownership. The program could consist of information distributed via the PVPLC's webpage, signage on the PVPNP, 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 PVNP over the last three years, except at Vicente Bluffs, in the area adjacent to the Palos Verdes Interpretive Center. Evidence of cats in the Reserve, was in the form of what appeared to be "cat trails" through the vegetation. Feral cat activity was due to a long-established feral cat feeding station near the Reserve. 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 continue to monitor throughout the Preserve, and if a significant impact is determined, PVPLC 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.

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 2012, 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.

4.5 NATIVE LARGE PREDATORS

Monitoring

The monthly monitoring of the Stewardship Program offers a mechanism to monitor various attributes of the Preserve. The "Property Review Form" includes a section for fauna, in which observations of large predators are recorded. A monitoring program using wildlife cameras and scat analysis has been in place since 2007. Results indicate that coyote numbers are increasing in the Preserve, particularly in Portuguese Bend and Forrestal Reserves. Detailed results can be found in Section 2.4.

Native Predator Education Program

The PVPLC will continue to educate the general public regarding the role of native predators. This program could consist of information via the PVPLC'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.

4.6 MESOPREDATOR MONITORING AND CONTROL

Mesopredators are smaller carnivores that are principle predators of birds and other small vertebrates. Declines in larger mammalian carnivores due to habitat fragmentation often leads to an increase in mesopredators. This increase in mesopredators has been implicated in the decline and extinction of prey species.

Monitoring

The monthly monitoring of the Stewardship Program offers a mechanism to monitor various attributes of the Preserve. The "Property Review Form" includes a section for fauna, in which observations of mesopredators are recorded. A monitoring program using wildlife cameras and scat analysis has been in place since 2007. Detailed results can be found in Section 2.4.

Control

If key native predator species are extirpated from the Preserve and studies indicate that these specific mesopredators are adversely affecting sensitive native wildlife, PVPLC will consult with the agencies about further actions, which may include initiating a program to control mesopredators.

4.7 CONCLUSION

The PVPLC will plan for predator control as follows:

- Note observations and impacts of potential predators within the PVNP as a part of its regular monitoring schedule
- Provide education programs regarding the impacts of predators on natural open spaces and habitat;
- Consult with agencies or establish a trapping program for brown-headed cowbirds if necessary;
- Consult with agencies or control predators such as feral cats and mesopredators if necessary.

Management of the PVNP for predator control would benefit from research on the presence or absence of predators and the impacts they generate. As funding or relevant student research permits, the PVPLC will endeavor to provide more focused monitoring of predators.

APPENDIX A

STEWARDSHIP REVIEW SHEET

		Preserve:	
	For the month of:		**Date Surveyed:**
	KEEPER Name:		**Start Time:** **End Time:**
Property Condition	Drainage or Erosion	☐ None ☐ Limited ☐ Moderate ☐ Heavy ☐ No significant change	
	Authorized Trails	☐ No change ☐ Good ☐ Fair ☐ Poor ☐ Impassible	
	Encroachments	☐ None ☐ Limited ☐ Moderate ☐ Heavy	
	Hazards	☐ None ☐ Bee hive ☐ Obstruction ☐ Trail ☐ Excessive fuels ☐ Other	
	Signage	☐ Good ☐ Missing ☐ Damaged ☐ Unauthorized	
	Unauthorized Uses	☐ None ☐ Trails ☐ Construction ☐ Other uses	
	Trash or Dumping	☐ None ☐ Limited ☐ Moderate ☐ Heavy	
	Vandalism	☐ None ☐ Fence ☐ Graffiti ☐ Facilities ☐ Cutting/Clearing of Vegetation ☐ Other	
	Trail Markers	Number replaced and trail:	
Habitat	Vegetation	☐ Healthy ☐ Healthy/dormant/dry ☐ Moderate non-natives ☐ Dominated by non-natives	
	Irrigation *(contact PVPLC immediately if visible water is running)*	☐ No change ☐ Damaged PVC ☐ Damaged sprinkler head ☐ Damaged mainline ☐ Other	
	Seed availability	☐ No ☐ Yes	
	Insects	Birds	
	Reptiles	Mammals	
	Predators	Cowbird #____ Fox #____ Coyote #____ Cat #____	
Community	Dogs	Present on leash #_____ Present off leash #_____	
	Bicycles	Present on authorized trails# ____ On unauthorized trails #_____ Present in habitat #_____	
	Hikers	Present on authorized trails #____ On unauthorized trails #_____ Present in habitat #_____	
	Equestrian	Present on authorized trails #____ On unauthorized trails #_____ Present in habitat #_____	
	Community comments		

Ranger Emergency Hotline: 310-491-5775

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

Prepared by:
Palos Verdes Peninsula Land Conservancy
Danielle LeFer

August 2013

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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 exotic 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 effort from 2006 to 2009 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, documents sites selected for eradication, and field methods for removal.

As of the writing of this report, the NCCP is still in draft format and the regulatory agencies have not yet signed the final plan. However, the City of Rancho Palos Verdes and PVPLC currently perform the responsibilities outlined in the draft NCCP, including fulfillment of the TERPP requirements.

Each TERPP site is tracked via GIS, a tool that aids planning and monitoring efforts. Since 2006, PVPLC has treated 88 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. 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 mapping system to map all TERPP sites over time, with plans to implement for the 2013 report. In 2012, interns started mapping invasive species locations in the Preserve. These maps will assist in selecting sites for invasive species eradication.

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 PVNP exotic species based on State and Federal guidelines, PVPLC staff locate TERPP sites to target for the calendar year, assess the best method for eradication, photo and map document the population/s, and conduct weed removal accordingly (Appendix B-G).

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 exotic species control across the entire NCCP area.

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 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. A sample reporting form is located in Appendix A.

4.0 SUMMARY OF ACTIVITIES FROM 2010 TO 2012

4.1 2010 TERPP

In 2010, we treated 7 populations of *Euphorbia terracina* (Geraldton spurge, Euphorbia) in addition to treating the Euphorbia at the 95-acre San Ramon Reserve (Figure 1).

4.2 2011 TERPP

In 2011, PVPLC treated 20 populations of Euphorbia in addition to treating approximately 5 acres of Euphorbia at the San Ramon Reserve (Figure 1). Euphorbia grows rapidly in disturbed areas, is a prolific seeder and is rapidly expanding its distribution in southern California. In addition, PVPLC removed two populations of *Arundo donax* (Lunada and Abalone Cove Reserves).

4.3 2012 TERPP

In 2012, PVPLC treated 15 populations of *Euphorbia terracina*, in addition to treating approximately 0.5 acre of Euphorbia at the San Ramon Reserve (Figure 2 and 3). PVPLC treated a population of *Ricinus communis* (castor bean) along the Rim Trail in Portuguese Bend, by cutting the plant and applying herbicide to the stump (Figure 3). This population has been spreading downward throughout the canyon, which is otherwise healthy. This will prevent its continued spread through Portuguese Bend. PVPLC treated with herbicide (drill and kill) but did not remove the snags of one population of 12 acacia at Three Sisters Reserve, in the area burned by the 2012 fire (Figure 3).

PVPLC also removed 4 populations of *Acacia cyclops* (acacia) at Vicente Bluffs (Pelican Cove, northern Vicente Bluffs (bluff top and lower bluffs), and the restoration site within Ocean Front Estates (Figure 3). This invasive removal does not count toward TERPP requirements because it was funded by a Coastal Conservancy grant.

Figure 1. *Euphorbia terracina* TERPP Sites 2008 to 2011.

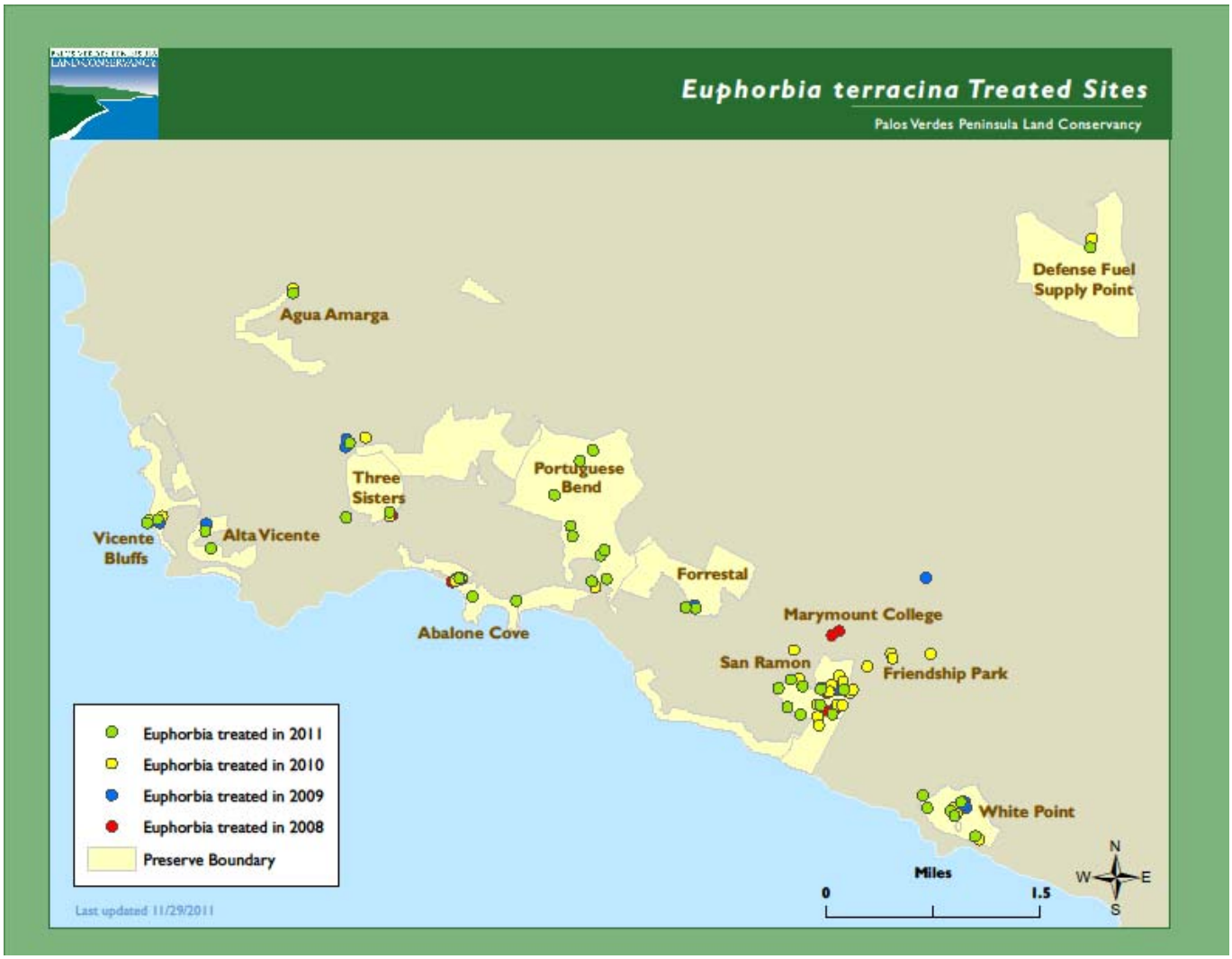


Figure 2. Euphorbia TERPP Sites 2012.

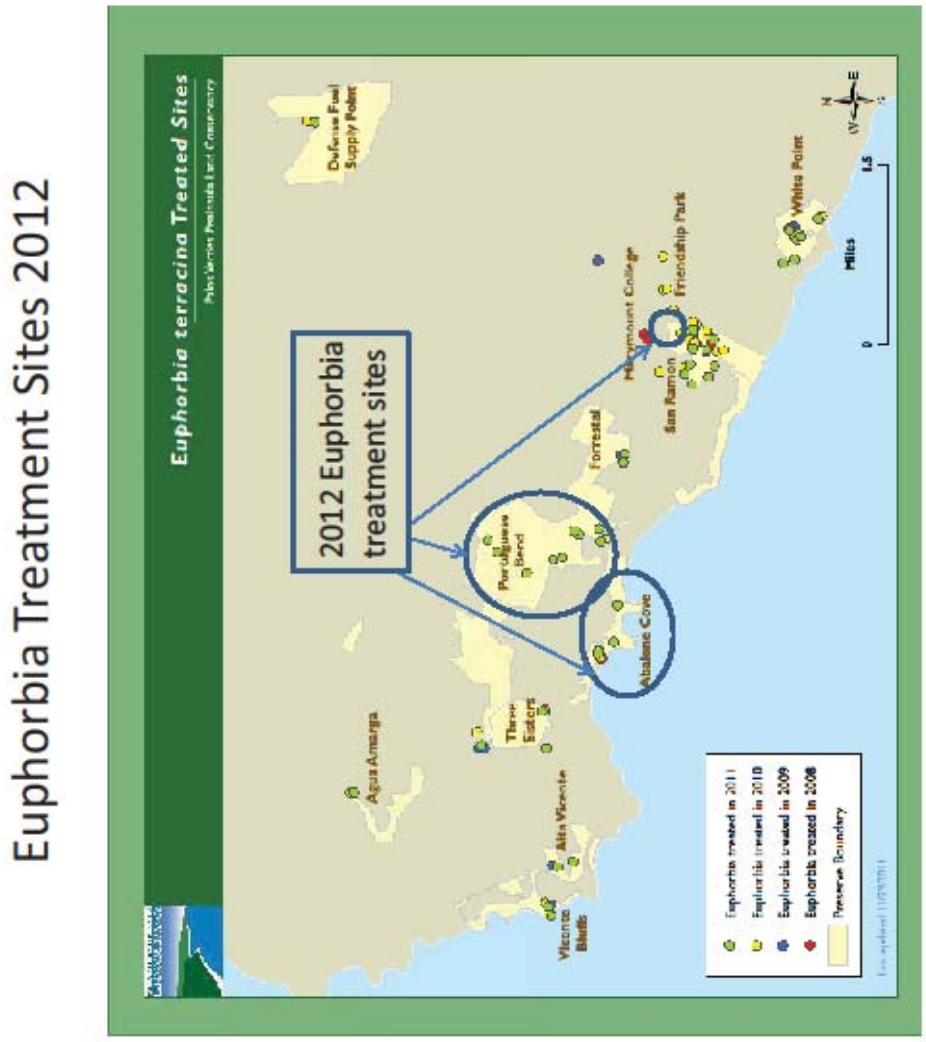
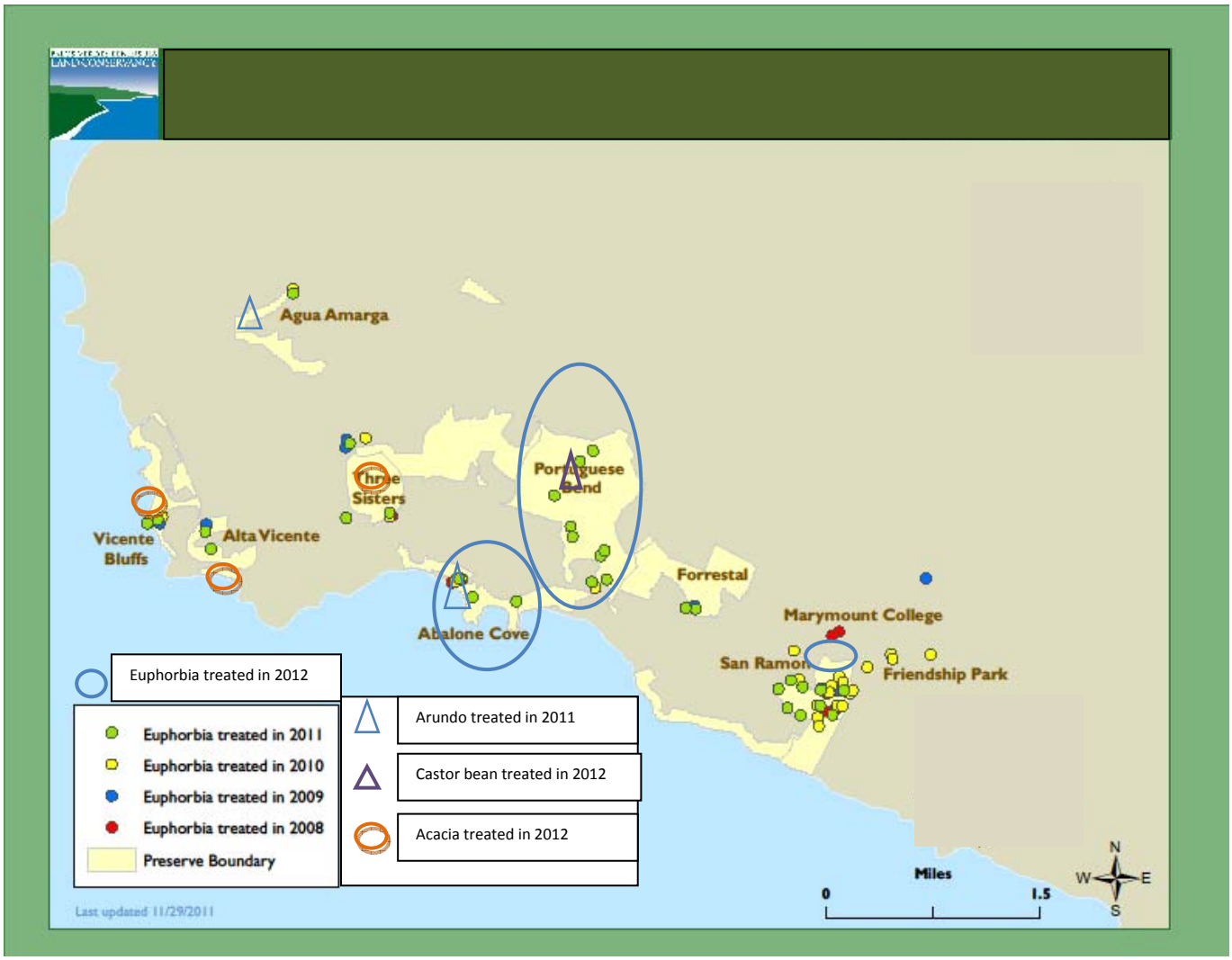


Figure 3. All TERPP Sites 2010 to 2012.



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Habitat Conservation Plan. June 9.

APPENDIX A: SAMPLE TERPP FORM

Invasive Weed Mapping Field Datasheet

Survey Type New Infestation Assesment 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 ft² - 10 ft² 10 ft² - 100 ft² 100 ft² -300ft² 300 ft² - 600 ft² 600 ft² - 1000 ft² > 1000 ft²	
No. Individuals 1-10 10-50 50-100 100-200 200-500 500-1000 >1000	**Stand Comments:**
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	**Treatment Comments:**
Area Treated 1 ft² - 10 ft² 10 ft² - 100 ft² 100 ft² - 300 ft² 300 ft² - 600 ft² 600 ft² - 1000 ft² > 1000 ft²	
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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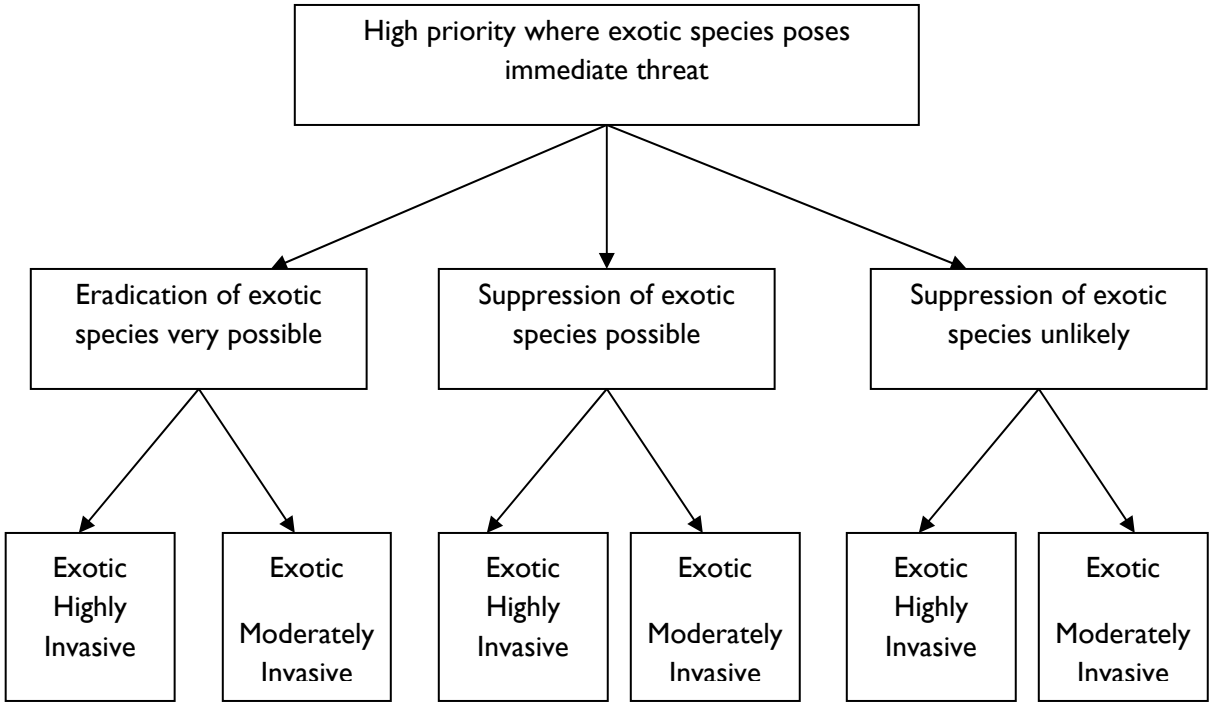
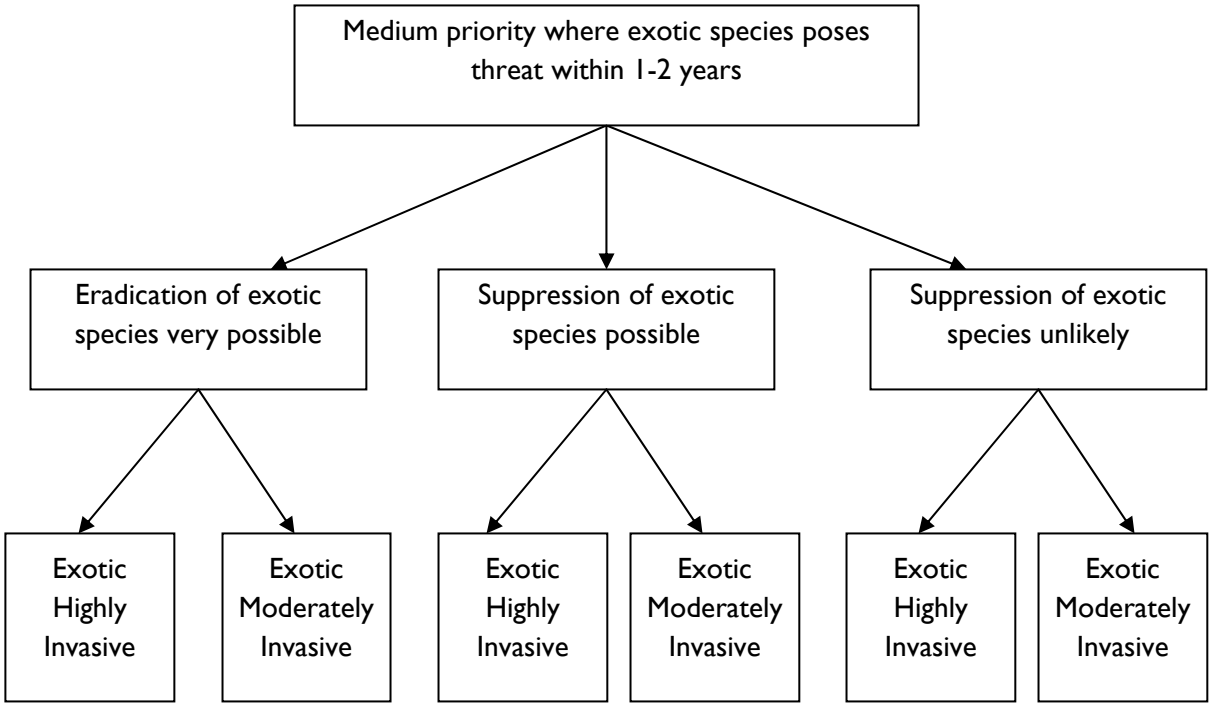
APPENDIX B: FLOWCHART FOR HIGH PRIORITY THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

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

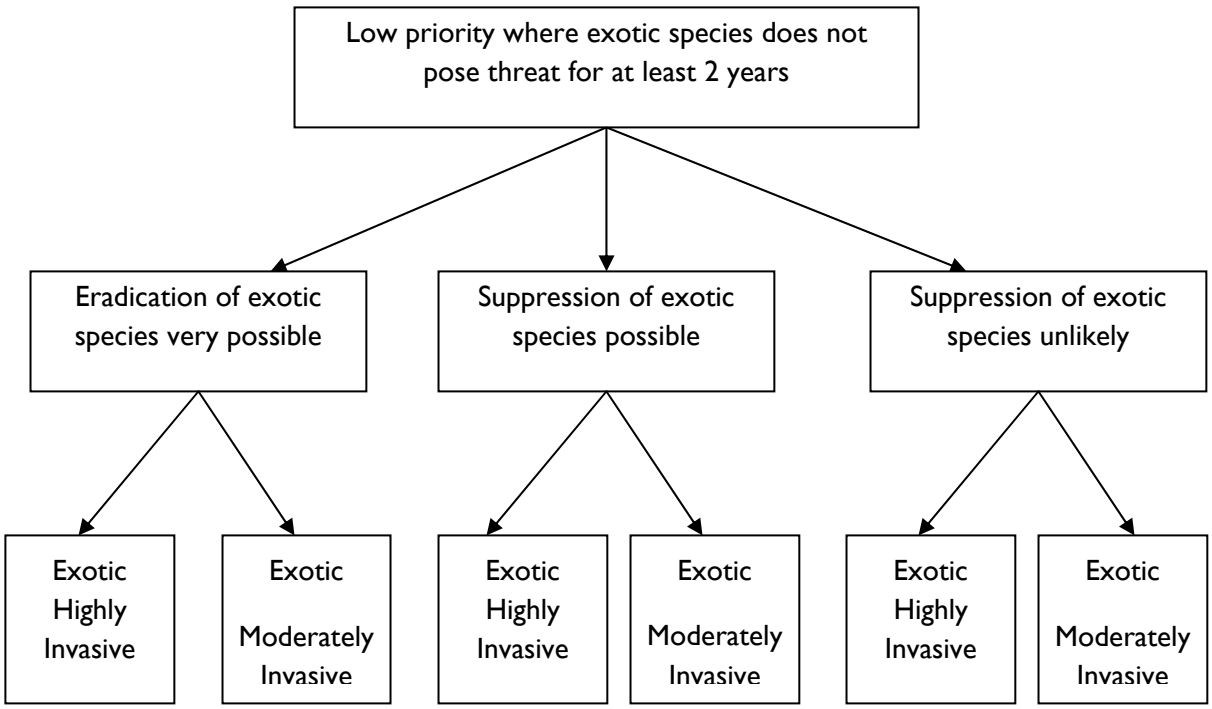
APPENDIX C: FLOWCHART FOR MEDIUM PRIORITY DEGREE OF THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

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

APPENDIX D: 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 E: HIGHLY INVASIVE SPECIES

Genus species	**Common name**
Arundo donax	Giant reed
Asparagus asparaagoides	Bridal creeper
Avena barbata	Slender oat
Avena fatua	Wild oat
Brachypodium distachyon	False brome
Brassica nigra	Black mustard
Bromus diandrus	Ripgut grass
Bromus madritensis ssp. rubens	Red brome
Carpobrotus edulis	Hottentot fig
Caesalpinia spinosa	Spiny holdback
Centaurea melitensis	Tocalote
Chrysanthemum coronarium	Garland chrysanthemum
Cortaderia selloana	Pampas grass
Cynodon dactylon	Bermuda grass
Euphorbia terracina	Spurge
Foeniculum vulgare	Fennel
Malva nicaeensis	Bull mallow
Malva parviflora	Cheeseweed
Malva sylvestris	Mallow
Mesembryanthemum crystallinum	Annual iceplant
Nicotiana glauca	Tree tobacco
Pennisetum clandestinum	Kikuyu grass
Pennisetum setaceum	Fountain grass
Picris echioides	Bristly ox-tongue
Pistacia atlantica	Pistachio
Pittosporum undulatum	Pittosporum
Raphanus sativus	Wild radish
Ricinus communis	Castor bean
Salsola tragus	Russian thistle
Silybum marianum	Milk thistle
Sonchus asper	Prickly sow thistle
Sonchus oleraceus	Sow thistle
Spartium junceum	Spanish broom
Tamarix species	Tamarisk
Tropaeolum majus	Garden nasturtium

APPENDIX F: MODERATELY INVASIVE SPECIES

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

APPENDIX G: EXOTIC, NON-INVASIVE SPECIES

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

SECTION 6 DISCUSSION AND MANAGEMENT RECOMMENDATIONS

6.1 INTRODUCTION

This section discusses management recommendations based on the results of the 2010-2012 covered species surveys, 15-acre habitat restoration plan, TERPP report, and predator management report. Because the covered species surveys, habitat restoration plan, predator 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 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.

6.2 HABITAT RESTORATION

Habitat monitoring of restoration areas show that seed germination has been low, perhaps due to several years of low rainfall, seed predation, or competition by weeds. To meet success criteria, fill-in planting was necessary in parts of Alta Vicente. Based on this, future restoration plans will incorporate higher numbers of container plants, and rely less on seed germination for meeting success criteria. Seeding will nonetheless be an important component for developing a native seed bank.

6.2 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.

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 2011 "State of the Trails" workshop and public comments.

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

Visitors have been creating new unauthorized trails on the Preserve, and tampering with PVPLC's trail closures. PVPLC recommended that RPV City Council consider increasing ranger hours on the Preserve and increasing the City's violation fines to reduce unauthorized trail use on the Preserve. From 2010 to 2012, PVPLC staff and volunteers have closed off spur trails at Pelican Cove, the eastern portion of Alta Vicente, Forrestal (Flying Mane, Mariposa), and Portuguese Bend (Ishibashi, Peppertree, Rim, Peacock flats). Staff time will be required to ensure closures.

PVPLC and the City of RPV have collaborated to create 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 rangers about times and locations of problematic activities.

Covered Species

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 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 PVPLC conducted covered plant species monitoring during 2010 and 2011. Numbers for the annual species *Atriplex* and *Aphanisma* were lower due to variation in rainfall but also from methodological variation. The number of stands in which *Atriplex pacifica* was observed was reduced to one out of the 3 survey stands. A new approach to better quantify the number of *Crossosoma californicum* individuals resulted in a total count of 776 plants, more than during the prior three surveys. The remaining three species' populations (*Dudleya, Lycium, Suaeda*) did not change from that observed during the initial 2006 survey. Threats to all species include invasive non-native species, cliff erosion, long-term drought, and trampling.

PVPLC is collecting seed for plant propagation and out-planting at restoration sites. In 2013, as part of a restoration funded by two grants (National Fish and Wildlife Foundation and Santa

Monica Bay Restoration Commission/Coastal Conservancy grant), invasive plants will be removed and covered species (*Atriplex, Aphanisma, Dudleya, Lycium*) will be installed along the coastal bluffs at Abalone Cove.

PVPLC recommendations are to:

- Create GIS maps with accurately measured areas for each photo point
- Continue seed collection for plant propagation and out-planting
- Remove threatening invasive species in the following priority areas (See Figure 1 in Section 2.1):
    a. *Atriplex pacifica* – in the vicinity of Site Ap2
    b. *Aphanisma blitoides* – remove all non-native species except crystalline iceplant (*Mesembryanthemum crystallinum*) which may help promote this species
    c. *Dudleya virens* spp. *insularis* – At Sites Dv1 and Dv3
    d. *Suaeda taxifolia* – Upcoast from Vicente Bluffs in the vicinity of the El Segundo blue butterfly habitat at ESB Sites 2-5 (see Figure 6 in Sec 2.3).
- Continue to seek restoration funding directed toward enhancing populations of these six species.

Covered Wildlife Species

El Segundo Blue Butterfly

Surveys for the El Segundo blue butterfly (ESB) were conducted in 2010 and 20122. Within the Palos Verdes Nature Preserve, ESB inhabit the steep ocean bluffs around Point Vicente. The NCCP mandates triennial surveys for long-term population trending.

The 2011 survey was conducted as a follow-up to the 2010 triennial survey where only two ESB were observed. Surveys were conducted at 13 sites with host plants: Twelve sites surveyed in 2010 and one additional site where host plants were discovered. Weekly surveys were conducted from June 7 through July 28, with a hiatus between June 11 and 20. Only one ESB was observed in the survey areas--an individual flying from Terranea Resort to Pelican Cove across the parking lot. Loss of host plants is most likely the reason for the paucity of observed ESB. A number of factors could affect the host plant, and thereby the butterfly, including slope failure, competition from invasive plants, and sea water inundation. In 2011, PVPLC increased ESB habitat and removed invasive plants around Point Vicente that will substantially benefit the butterfly. PVPLC will continue to remove invasive plants that compete with the ESB host plant. The next survey will take place during the next triennial monitoring period in summer 2013.

California Gnatcatcher and Cactus Wren

Surveys for California gnatcatcher and cactus wren were conducted in 2012.

The California gnatcatcher was present at 8 reserves. The species was absent at Filiorum and Vista del Norte, and may not be resident at Agua Amarga. Compared with previous surveys, the estimate of California gnatcatcher territories for 2012 (33) was lower than that of both 2006 (65) and 2009 (40). However, the CAGN population documented in 2012 is within the range of the annual counts of 26–56 CAGN breeding pairs reported by Atwood et al. (1996).

Lower numbers in 2012 may be cause for some concern in the reserves where gnatcatchers are now very rare or absent after being more numerous on prior years' surveys (Agua Amarga, Three Sisters, and San Ramon). It is however possible that surveys did not detect the birds. PVPLC recommends monitoring the CAGN populations in the Palos Verdes Nature Preserve every three years, according to current plans. If funding allows, directed searches in the Preserve over the next three years could help to better understand population changes in the Preserve.

Cactus wrens were present at 8 reserves. They have not been detected in any surveys at Vicente Bluffs or Vista del Norte. Compared with previous surveys, the estimates of numbers of cactus wren territories (38-48) were up from 2009 (18) and similar to counts made in 2006. The first surveys in Filiorum Reserve indicate that cactus wren numbers at that location are high (9). Cactus wren numbers have increased at Alta Vicente, Portuguese Bend, and Three Sisters, three sites where restoration has taken place. Lower numbers at Abalone Cove, Forrestal, and San Ramon could be due to variation in detectability, or to lower habitat quality due to increases in invasive plants. PVPLC will continue to restore habitat for CACW in the preserves as part of the annual NCCP-required 5 acres of restoration. PVPLC will identify cactus stands that can be expanded by removing invasive plants, as part of TERPP activities. One focal site will be the area near Water Tank trail and Burma Road at Portuguese Bend Reserve. The PVPLC will continue to participate in the Coastal Cactus Wren Working Group that has formed to develop a coordinated approach to conserving cactus wren populations.

Threats

Invasive Plants

Invasive species are a ubiquitous problem in wildlands, and are present throughout much of the PVNP. Invasive species 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 is conducting 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:

2. Reduce invasive plant expansion into otherwise high quality habitat. For example, invasive trees are spreading from the Abalone Cove parking lot into occupied California gnatcatcher habitat; or
3. Control invasive plants in areas where clearing invasive plants will create higher quality habitat. For example, the large stands of cactus near the Water Tank trail at Portuguese Bend can be exposed by clearing acacia trees that are growing over them.

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.

In response to the August 2009 that burned 165 acres of Portuguese Bend Reserve, PVPLC focused its immediate restoration program on the burned area, and received funding to enhance additional acreage. The burn area was centrally located within the Portuguese Bend Reserve, affecting both native and non-native vegetation and known nesting sites of the California gnatcatcher and coastal cactus wren. To assist in the recovery of the burn site, PVPLC has conducted post-fire monitoring of covered species, and restored native habitat through non-native plant control and removal, supplemental native planting in areas of historic cactus scrub.

In 2012, two fires occurred on the Preserve, at Three Sisters (12.7 acres) and Portuguese Bend (0.2 acre). PVPLC has written Fire Recovery Plans for and is monitoring both sites. At Three Sisters, PVPLC has replanted some areas, particularly burned cactus scrub, and controlled non-native plants to allow native plants to recolonize the site.

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., Fishing Access) 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.

Implementing the Preserve Trails Plan involves closing many trails that were previously in use and no longer authorized. PVPLC focused its attention on these at Portuguese Bend Reserve in 2012, primarily thanks to an HCF grant that provided funding to assist with these. With the approval of the Preserve Trails Plan for Filiorum, PVPLC's plan is to install initial signage on closed trails and placing brush to make them less noticeable.

PVPLC's primary focus is on closing newly created unauthorized trails, before they become established and damage habitat. This is very intensive work, that requires continuously closing down the trail as signage, and elements placed to close the trail (branches, plants) are removed. Problem areas include the Peppertree trail area and Fire Station Trail areas of Portuguese Bend. At Peppertree trail, new trails are created to bypass newly closed trails. In 2012, a loop on private property between Fire Station and Rim Trail was closed by the landowner, and since then people have been vandalizing signs and destroying habitat trying to create a new connection through a very steep canyon. PVPLC has discussed the possibility of a new connector with contractors but the canyon is too steep to create a sustainable trail. Support from the City of RPV is crucial to the success of trail closure activities, because of its ability to enforce regulations. This may include citations by rangers and prosecution of acts of vandalism.

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 reduce cliff erosion at this site. PVPLC has obtained funding for habitat restoration at Abalone Cove Reserve, including closing and replanting unauthorized trails. PVPLC will continue to monitor for erosion and develop erosion control plans when necessary.

In 2012 PVPLC and the City of RPV outreached to the utilities that access the Preserve to educate them about accessing the Preserve and avoiding habitat impacts due to their activities. PVPLC also noted habitat loss related to fuel modification activities in 2012, when goats escaped from the fenced area and entered coastal sage scrub habitat. PVPLC recommends that the City develop a protocol for 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, in the area adjacent to the Palos Verdes Interpretive Center. Evidence of cats in the Reserve, was in the form of what appeared to be "cat trails" through the vegetation. Feral cat activity was due to a long-established feral cat feeding station near the Reserve. 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, 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 species, such as Crossosoma and the annuals Aphanisma and Atriplex. 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.

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. Adaptive management combines data from monitoring species and natural systems with new information from management and targeted studies to continually assess the effectiveness and adjust 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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Annual Report
January 2012-Dec. 2012

For the

Rancho Palos Verdes Draft Natural Communities Conservation Plan and Habitat Conservation Plan

August 15, 2013

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Restoration

In 2012, PVPLC installed plants on 10 acres (Phase 1 and 2) at Portuguese Bend Reserve NCCP site, in accordance with the Portuguese Bend Habitat Restoration Plan. An additional 0.25 acre was planted at Lunada Canyon; 0.8 acre additional acres at Ishibashi and Peppertree by closing spur trails, thanks to additional funding.

Two fires occurred: 12.7 acres were burned at Three Sisters Reserve, and 0.2 acres at Portuguese Bend Reserve.

Monitoring

Monitoring at Alta Vicente Reserve (Phase 1 and Phase 2) took place in spring 2012. For Phase 1, the CNPS Rapid Vegetation Assessment protocol in the coastal sage scrub showed that native plant cover was 49%, but transect data showed only 14% native cover. In the PVB habitat, native cover was 32% with the CNPS protocol, and 8% with the transect survey. The discrepency between the two survey techniques is due to gaps between shrubs created by low seed germination. Plans to fill-in plant in fall 2013 will increase native plant cover in the future. indicated that success criteria for percent cover of native plants at the NCCP restoration sites are being met, and the plants in the restoration area are healthy.

Targeted Exotic Removal Program for Plants (Terpp)

PVPLC treated 15 populations of the highly invasive *Euphorbia terracina.* At San Ramon Reserve, 0.5 acre was mulched to test a new treatment for controlling large areas. *Euphorbia terracina* seeds can persist in the soil for 3 to 5 years, and treatment will need to be repeated to successfully control this species on the Preserve. A population of *Ricinus communis* was removed from Portuguese Bend, along the Rim trail. Five populations of *Acacia cyclops* were controlled: four at Vicente Bluffs, and one in Three Sisters Reserve.

Trail Management and Monitoring

The Preserve Trails Plan approving trail locations and designations in the Preserve was approved by City Council. The City Council recommended quarterly public meetings to discuss trail concerns and inform the public about past and future trail projects.

PVPLC staff continues to maintain trail markers, and provide trail brochures. PVPLC conducted trail monitoring to monitor conditions such as erosion, and track unauthorized trails. In 2012, PVPLC continued to work on closing spur trails along Ishibashi and Peppertree trails. Rangers help enforce trail designations, dogs on leash, and other Preserve rules.

Ability to Accomplish Resource Management Goals

PVPLC has been successful at completing restoration under the NCCP, and meeting the goals for targeted invasive plant removal. However, because *Euphorbia terracina* has been difficult to eradicate, and has required treatment over several years, many of the same areas have been treated since 2009.

Concerns about Preserve management in the future include the ability to successfully close unauthorized trails, and to prevent new trails from being created. Closing these trails is time consuming and expensive because of continuous vandalism. PVPLC has been collaborating with the rangers to help determine which areas need more ranger attention. The Volunteer Trail Watch, set to begin in 2013, is expected to assist in creating a better trail etiquette. Support from the City by ensuring that vandalism is prosecuted.

To minimize the risk of habitat damage during fuel modification and other contractor activities, PVPLC recommends that the City write protocols to ensure that contractors are aware of the Preserve boundaries and Best Management Practices associated with their activities.

Another concern is the potential for wild fires to destroy habitat. The two fires that occurred in 2012 did not destroy all of the native vegetation, making it more likely to recover from the incident.

Funding Needs

PVPLC would benefit from continued funding to control highly invasive species on the Preserve. PVPLC continues to apply for funding to increase the amount of acreage restored for the species listed under the plan.

1.0 INTRODUCTION

The 2012 Palos Verdes Nature Preserve Report for the Rancho Palos Verdes Natural Community Conservation Plan provides annual submittal requirements by the Palos Verdes Peninsula Land Conservancy (PVPLC) on the status of 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, 2012 through December 31, 2012.

PVPLC serves as the management agency for the Palos Verdes Nature Preserve (Preserve) for the City of Rancho Palos Verdes (RPV). 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 a Draft Natural Community Conservation Plan (NCCP) 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 (URS 2004a)." As a primary component of the NCCP, 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 Preserve under an operating agreement with RPV.

The primary focus of management for the Preserve is to maintain or restore habitat for the covered plant and animal species listed in the draft NCCP. A Habitat Management Plan was adopted in 2007 that outlines the restoration of 5 acres per year for a total of 15 acres over a 3-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. The Habitat Management Plan will be updated and revised in coordination with the wildlife agencies and requirements of the NCCP. PVPLC attempts to seek additional funding when possible, to perform restoration on more than the minimum 5 acres per year required in the NCCP. Several opportunities of this nature occurred during the reporting period that will enable PVPLC to conduct additional restoration over the next 3 years (2012-2014).

PVPLC also facilitates scientific research and trail maintenance projects in the Preserve. Volunteers make up a large component of the management strategies for the Preserve. They assist in monitoring the properties, wildlife, and habitat as well as help restore habitat and maintain trails. Partnering with regional high schools and colleges allows for scientific research that expands our understanding of the Preserve.

The Management Agreement with RPV requires that PVPLC submit an annual report to the RPV City Council describing management activities with respect to habitat enhancement and restoration, property maintenance and monitoring, vegetation and wildlife monitoring, and efforts on targeted exotic plant removals. This report provides annual submittal requirements

on the status of the Preserve for the period of January 1, 2012-December 31, 2012. It is accompanied by a status report for the Targeted Exotic Removal Program for Plants (TERPP). Volunteer involvement and support and student-based scientific research are also described in this report.

The NCCP Implementing Agreement has not been signed by the regulatory agencies, and therefore, the NCCP is technically not officially executed. However, because it is anticipated that this agreement and federal/state permits will be signed in the near future, this annual report is intended function as the framework management and monitoring plan for the upcoming federal/state NCCP and has been provided to satisfy the requirements the Management Agreement between PVPLC and the City. Annual reporting requirements for the Draft NCCP are detailed below and will be updated once the final NCCP is approved. Additionally, once every three years, a Comprehensive Report is required under the NCCP. The most recent Comprehensive Report covered the period 2007 through 2009. The Comprehensive Report for the period from 2010 through 2012 is attached to this report.

Annual Submittals (Included in This Report)

1. A monitoring report on habitat restoration areas using standard monitoring protocol as detailed in the Preserve Habitat Restoration Plan
2. Report on Targeted Exotic Plant Removal Efforts
3. Report on trail maintenance projects.

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 ten areas referred to as Reserves (Figure 1).

Table 1
Reserve Names of the Palos Verdes Nature Preserve. See Figure 1 for locations.

Abalone Cove Reserve	Portuguese Bend Reserve
Agua Amarga Reserve	San Ramon Reserve
Alta Vicente Reserve Filiorum Reserve	Three Sisters Reserve Vicente Bluffs Reserve
Forrestal Reserve	Vista del Norte Reserve

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.

2.0 FIRES IN THE PRESERVE

2012 Three Sisters Fire

On January 9, 2012, the Crest Fire burned approximately 12.7 acres of the 99-acre Three Sisters Reserve, as well as some habitat in McCarrell's canyon, outside of the Preserve. The wildfire burned native and non-native vegetation and known habitat of the threatened coastal California gnatcatcher (*Polioptila californica californica*) and the special status cactus wren (*Campylorhynchus brunneicapillus*). The Fire report is in Appendix C1.

2012 Portuguese Bend Narcissa Fire

The May 25, 2012, the Narcissa fire burned approximately 0.2 acres of the 399-acre Portuguese Bend Reserve (Figure 1). The area burned had previously burned during the August 2009 fire. The fire was on a slope along the side of Burma Road. Since the area had previously burned, the vegetation was sparse. Several shrubs were partially burned during this fire. The Fire report is in Appendix C2.

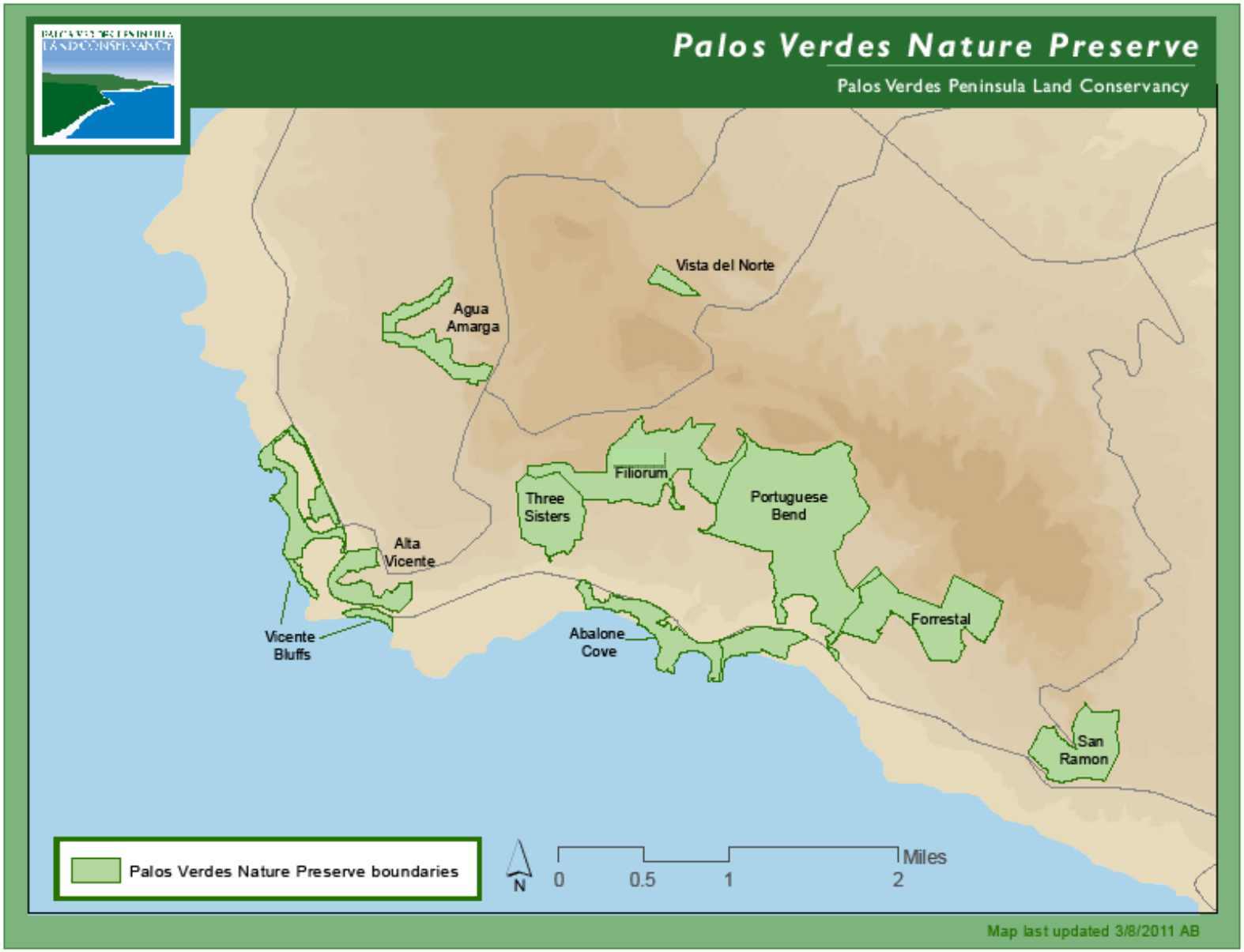
3.0 HABITAT RESTORATION

3.1 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 the restoration of 5 acres per year for a total of 15 acres over the first 3-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.

Figure 1. Map of the Palos Verdes Nature Preserve with associated Reserves locations.



The following provides a brief description of work done to fulfill the NCCP during the reporting period. Table 2 provides the implementation schedule for Phase 1 and Phase 2 at Alta Vicente and Portuguese Bend.

3.2 ALTA VICENTE RESERVE

The habitat restoration at the Alta Vicente Reserve consists of two 5-acre phases, with one phase initiated each year. The first 5 acres of restoration (Phase 1) began with site preparation during the fall of 2007 and 2008 to minimize weeds after planting (as per the timeline in the Alta Vicente Restoration Plan, Table 5). Phase 1 plants were installed and hydroseeded during the winter of 2009/2010. Site preparation for Phase 2 began in Fall 2008. In December 2010, staff removed *Acacia cyclops* and completed planting and seeding in the Phase 2 area. Staff weeded and maintained Phase 1 and 2. In spring 2012, additional container plants were installed to fill in areas with low native cover.

Draft NCCP annual reporting requirements include a monitoring report on habitat restoration areas using a standard monitoring protocol for years 1, 2, 3 and 5 during the 5-year maintenance and monitoring period that follows plant installation. Monitoring at Alta Vicente began in 2010.

Table 2
Restoration Project Schedule for Alta Vicente Reserve Phases 1 and 2. This table has been modified from its original content in the 2007 Habitat Restoration Plan to reflect activities only in Phase 1 and 2.

	Task	Date
PHASE 1	Site clearing and soil preparation	Fall 2007, Fall 2008
	Installation of temporary irrigation system	Fall 2008
	Weed/exotic removal and grow-kill cycles	Fall 2008-Spring 2009
	Planting container stock	Early Winter 2009/2010
	Hydroseed application	Winter 2009/2010 (following planting)
	Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period
	5-year biological monitoring and maintenance	Spring 2010-Spring 2014
	Phase one completion	2014, end of Year 5
PHASE 2	Site clearing and soil preparation	Fall 2008, Fall 2009
	Installation of temporary irrigation system	Fall 2008, Fall 2009
	Weed/exotic removal and grow-kill cycles	Fall 2008, Fall 2009,-Spring 2010
	Planting container stock	Winter 2010/2011
	Seed application	Winter 2010/2011 (following planting)
	Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period
	5-year biological monitoring and maintenance	Spring 2011-Spring 2015
	Phase two completion	2015, end of Year 5

Figure 2: Map of Restoration Areas at Alta Vicente Reserve. Phase 3 has been postponed to implement burn recovery at Portuguese Bend.

3.3 PORTUGUESE BEND RESERVE

A restoration plan for Portuguese Bend Reserve was completed July 2010, and can be found in the Comprehensive Management and Monitoring Report 2007-2009. The July 2010 restoration plan subdivided the restoration area into 3 polygons to be completed in 3 phases. The total acreage covered by the Portuguese Bend Restoration Plan is 21 acres, sufficient acreage for four years of restoration at 5 acres per year. Therefore, the agencies approved a revised restoration plan with 4 phases, to be installed in 4 years rather than 3 (Figure 3; Appendix D).

Site preparation at Portuguese Bend began in February 2010. Field staff weeded (hand/herbicide) the burn area, and targeted fennel with herbicide. In February, 2011, goats were deployed in the NCCP area to clear vegetation. Since then, staff has been controlling weeds, with plans for "grow and kill" cycles in 2012 to reduce weed density prior to planting in fall 2012. Due to the high density of weeds, an additional year of weeding was implemented, and 10 acres were installed in fall 2012. In 2012, PVPLC installed container plants on all of the Phase 1 site described in the Restoration Plan (8 acres) and the cactus scrub portion of Phase 2 site described in the Plan (2 acres), totaling 10 acres of restoration.

PVPLC obtained permission to install irrigation on 8 acres to enable "grow and kill" prior to plant installation, and improve seed and plant survival after planting. Two acres of cactus scrub will not be irrigated.

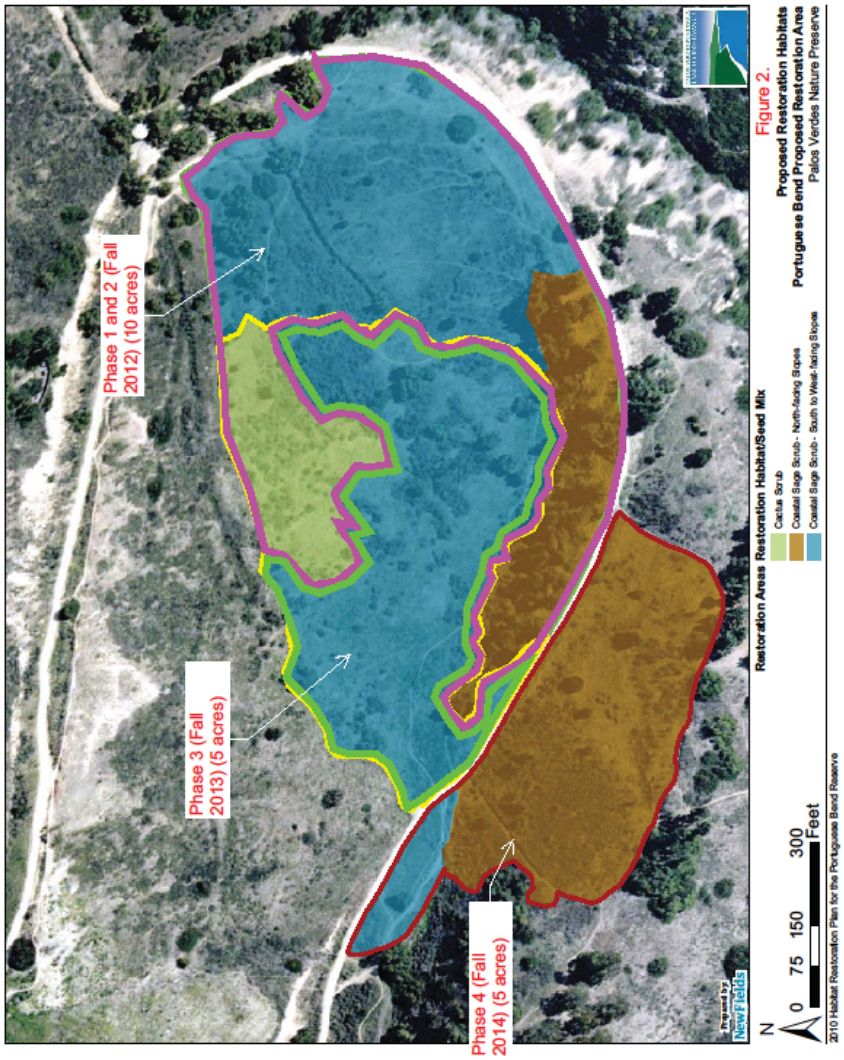
Table 3
Restoration Project Schedule for Portuguese Bend Reserve Phases 1, 2, 3, and 4, based on the Portuguese Bend Reserve Habitat Restoration Plan.

	Task	Date
PHASE1 and PHASE 2	Begin site preparation, weed removal	Fall 2010
	Install irrigation	Winter 2012
	Final site preparation: weed and thatch removal	Fall 2012
	Installation: Seeding and planting	Fall 2012-Early Winter 2013
	Maintenance weeding	Winter 2013-Spring 2014
	Fill-in planting, as needed	Fall 2013-Fall 2014
	5-year biological monitoring and maintenance	Spring 2013-Spring 2017
	Phase one and two completion	2017, end of Year 5
PHASE 3	Site preparation, weed removal	Fall 2012-Fall 2013
	Final site preparation: weed and thatch removal	Fall 2013
	Installation: Seeding and planting	Fall 2013-Early Winter 2014
	Maintenance weeding	Winter 2014-Spring 2015
	Remedial seeding, as needed	Fall 2014-Fall 2015
	5-year biological monitoring and maintenance	Spring 2014-Spring 2018
	Phase three completion	2018, end of Year 5

Table 3
Restoration Project Schedule for Portuguese Bend Reserve Phases 1, 2, 3, and 4, based on the Portuguese Bend Reserve Habitat Restoration Plan.

PHASE 4	Site preparation, weed removal	Fall 2013-Fall 2014
	Final site preparation: weed and thatch removal	Fall 2014
	Installation: Seeding and planting	Fall 2014-Early Winter 2015
	Maintenance weeding	Winter 2015-Spring 2016
	Remedial seeding, as needed	Fall 2015-Fall 2016
	5-year biological monitoring and maintenance	Spring 2015-Spring 2019
	Phase three completion	2019, end of Year 5

Figure 3. Map of restoration areas at portuguese bend reserve.



4.0 ADDITIONAL RESTORATION

PVPLC attempts to seek additional funding when possible, to perform restoration on more than the minimum 5 acres per year required in the NCCP. Several opportunities of this nature occurred during the reporting period. Table 4 shows the timeline for each additional restoration project.

4.1 ABALONE COVE

The National Fish and Wildlife Foundation (NFWF) provided funding in 2012 to restore and enhance 3 acres of coastal sage scrub and coastal bluff scrub at Abalone Cove Reserve.

4.2 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 2013, the PVPLC began implementation of weed control and the removal of invasive plants (castor bean, ice plant, fennel). In Fall 2013 362 container plants were installed.

4.3 MCCARRELL'S CANYON

In June 2008, a grant agreement was signed with the State Coastal Conservancy to remove invasive species and provide restoration of coastal sage scrub and riparian habitats at McCarrell's Canyon, which is the western boundary of Three Sisters Reserve. In Fall 2011, one acre of riparian habitat and 3 acres of coastal sage scrub were installed. PVPLC continues to maintain this restoration area with as needed weed control.

4.4 PELICAN COVE/FISHING ACCESS

In June 2008, a grant agreement was signed with the State Coastal Conservancy to provide 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 continues to maintain this restoration area, weeding as necessary.

4.5 PORTUGUESE BEND

On August 27, 2009, the Palos Verdes Fire burned approximately 165 acres of the Portuguese Bend Reserve, affecting both native and non-native vegetation and known nesting sites of the threatened coastal California gnatcatcher (*Polioptila californica californica*) and the special status cactus wren (*Campylorhynchus brunneicapillus*). To address the impacts of the fire, PVPLC created a Fire Recovery Plan in October 2009 (PVPLC 2009).

A Department of Fish and Game Local Assistance Grant funded restoration in the burn area at Portuguese Bend. The grant provided funding to restore native habitat through non-native plant control and removal, provide supplemental native planting in areas of historic cactus scrub, and perform post-fire monitoring for California gnatcatchers and cactus wrens. Invasive species removal and planting was implemented from Fall 2010 to Fall 2011. A total of three (3) acres of cactus scrub was installed (see map).

In March 2010, the City of El Segundo provided funding to conduct 9.5 acres of coastal sage scrub and perennial grassland restoration at Portuguese Bend as part of mitigation for the Plaza El Segundo Development. The restoration site is on the upper portion of the Ishibashi Trail. In Fall 2010, the 9.5 acre-site was seeded with native grasses and coastal sage scrub. In Fall 2011, container plants were installed in 5 foot-wide strips, separated by 10-foot buffers because germination rates were low. In 2012 PVPLC controlled weeds in the buffer zones and maintained container plants.

4.6 THREE SISTERS

In January 2007, Los Angeles World Airports (LAWA) provided funding to conduct twenty-one acres of coastal sage scrub and perennial grassland restoration in the Three Sisters Reserve as part of mitigation for the Southwest Airfield at Los Angeles International Airport. PVPLC continues to maintain this restoration area with as needed weed control.

Figure 4 provides a site map for each restoration project, including the restoration at Alta Vicente and Portuguese Bend Reserves that fulfills the requirements of the NCCP Habitat Restoration Plan.

Figure 4. Site map for all 2012 restoration projects in the Palos Verdes Nature Preserve.

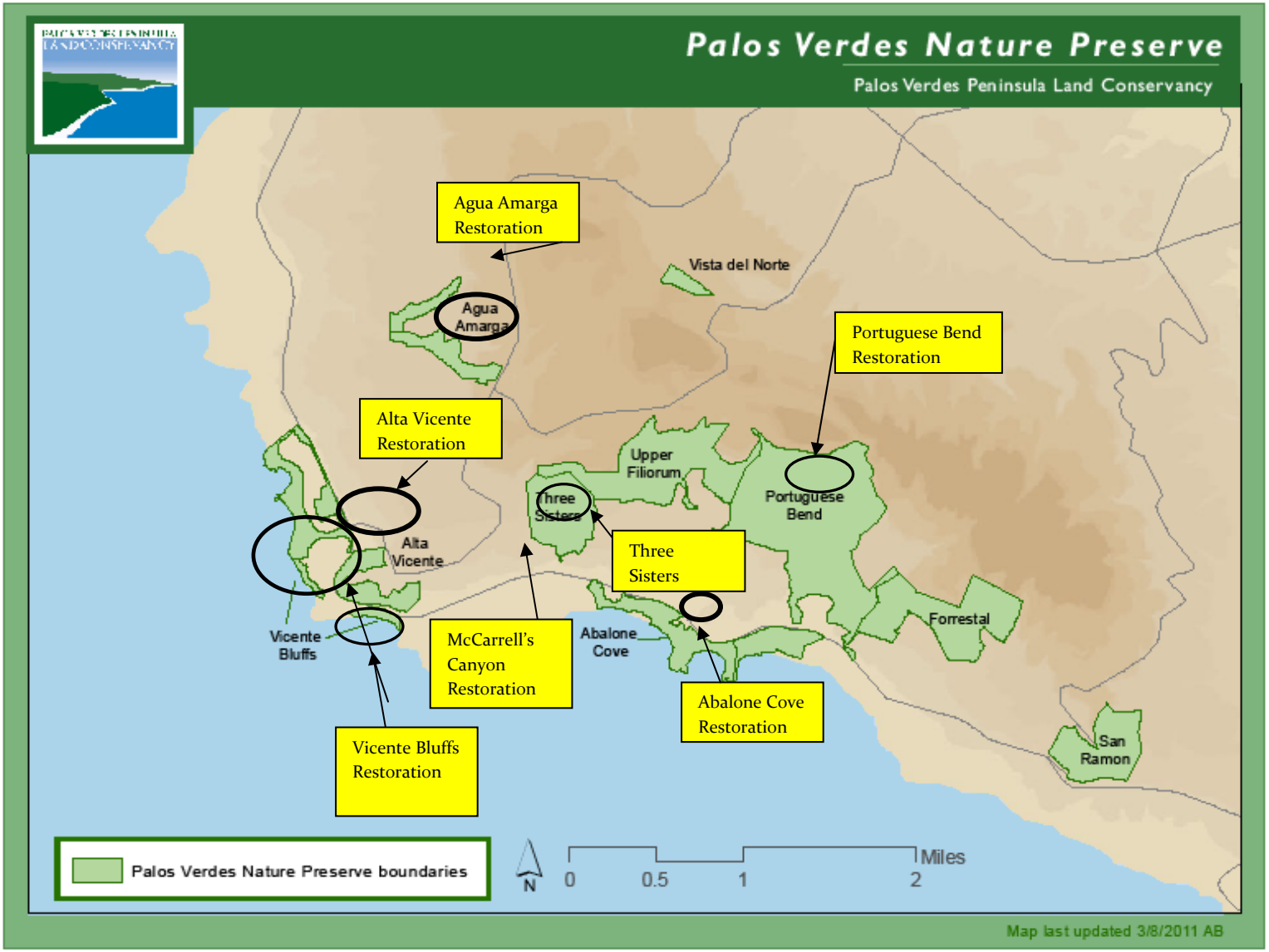


Table 4
Restoration Project Schedule for Additional Restoration in Palos Verdes Nature Preserve.

	Task	Date
Three Sisters Restoration 21 Acres	Seed collection	Winter 2008-Spring 2009 (again in second year if necessary)
	Initial site preparation/weeding	Winter 2008-Spring 2009, Fall 2009
	Final site preparation(mowing/thatch removal)	Fall 2009
	Seeding and container planting	Fall 2009
	Irrigation installation	Summer 2009
	Maintenance	Winter 2009-Spring 2010
	Remedial seeding	Fall 2010 (if needed)
	3-year monitoring (horticultural and performance)	Winter 2008-Spring 2011
McCarrell's Canyon Restoration 4 Acres	**Task**	**Date**
	Site clearing and soil preparation	Winter 2008/2009-Fall 2009
	Planting container stock	Winter 2009/2010
	Seeding application	Winter 2009/2010 (following planting)
	Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period.
	3-year monitoring and maintenance	To begin upon successful installation of restoration work
Vicente Bluffs Restoration 4 Acres	**Task**	**Date**
	Site clearing and soil preparation	Winter 2009/2010
	Planting container stock	Winter 2010/2011
	Seeding application	Winter 2010/2011 (following planting)
	Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period.
Portuguese Bend El Segundo Grant 9.5 acres	**Task**	**Date**
	Site preparation and weed control	Spring 2010-Fall 2010
	Seeding	Winter 2010/2011
	Fill-in plant installation	Winter 2013/2014
	Completion of installation/assessment of site installation	Following completion of installation and seeding and 120 day maintenance period.
	3-year monitoring and maintenance	To begin upon installation of restoration
Portuguese Bend HCF Grant (0.8 acres)	**Task**	**Date**
	Spur trail restoration: Ishibashi area	Fall 2012-Winter 2013
	Spur trail restoration: Peppertree area	Winter 2013
	Spur trail restoration: Peacock Flats	Fall 2012-Winter 2013

Table 4
Restoration Project Schedule for Additional Restoration in Palos Verdes Nature Preserve.

	Task	Date
Abalone Cove NFWF Grant (3 acres)	Remove invasive plants	Spring 2013-Fall 2013
	Install plants	Fall/Winter 2013
	Weed and maintain site	Winter 2013

5.0 MONITORING

5.1 RESTORATION

PVPLC staff performed annual photo point monitoring. The photo point records now document several years of changing site conditions, and public use. PVPLC's stewardship staff conducted a variety of surveys at the restoration sites throughout the preserves. Vegetation transect surveys were conducted using standardized methods that provide data on the cover of native and non-native plants in the habitat. In 2012, restoration monitoring as per NCCP requirements were conducted at Alta Vicente Reserve. The plants in the restoration area are healthy, but there are large gaps in native vegetation due to low seed germination. PVPLC will add plants in 2013 to increase native cover. Detailed results are in Appendix A.

5.2 COVERED SPECIES

The NCCP/HCP requires updated surveys for covered plants and animals on the Preserve every three years. Results for the 2010-2012 survey period will be covered in the Comprehensive Management and Monitoring report, in March 2013.

The draft NCCP/HCP includes a total of six covered plant species. They are aphanisma (*Aphanisma blitoides*), south coast saltscale (*Atriplex pacifica*), Catalina crossosoma (*Crossosoma californicum*), island green dudleya (*Dudleya virens* ssp. *insularis*), Santa Catalina Island desertthorn (*Lycium brevipes* var. *hassei*) and woolly seablite (*Sueda taxifolia*). In March 2011, surveys were conducted for aphanisma and south coast saltscale in the Palos Verdes Nature Preserve.

Surveys were conducted for the El Segundo blue butterfly at Vicente Bluffs and Abalone Cove Reserves in 2011 (see attached report).

Preserve-wide surveys for California gnatcatcher and coastal cactus wren were conducted in 2012 (see attached report).

6.0 TARGETED EXOTIC REMOVAL PROGRAM FOR PLANTS

The Targeted Exotic Removal Program for Plants (TERPP) is an element of the Preserve Habitat Management Plan for the Draft NCCP that requires the annual removal of exotic plant species of twenty individual populations or five acres found in the Preserve. The TERPP provides protocol for ranking the degree of threat to native vegetation, the feasibility of eradication, and the invasiveness of each exotic species found in the Preserve. Populations of exotic plant species are then targeted for removal based on the results of the ranking outcome. The 2012 TERPP Report documents PVPLC's effort during the reporting period to fulfill the requirements of the TERPP plan. 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. The complete 2012 TERPP Report can be found in Appendix B of this report.

7.0 BRUSH CLEARANCE

Brush clearance is the clearing or minimizing of vegetation in areas that occur immediately adjacent to residential structures and roads. RPV is responsible for ongoing maintenance of brush clearance within the Preserve, to provide an appropriate level of fire protection, emphasizing the protection of life, public safety, and property values in the urban-wildlife interface areas while minimizing environmental impacts of fire suppression and control. PVPLC recommends that RPV develop clear protocols to ensure that all BMPs associated with fuel modification activities are consistently followed. In 2012, RPV staff successfully collaborated with PVPLC to ensure that bird surveys were completed prior to fuel modification activities. In 2012, goats used for fuel modification at Ocean Trails Reserve escaped, leading to habitat damage. PVPLC recommends that prior to the 2014 fuel modification, RPV write protocols to ensure that contractors are aware of the Preserve boundaries and BMPs associated with their activities.

A portion of the Agua Amarga Reserve is owned by PVPLC and falls under their responsibilities to maintain brush clearance requirements. All of these requirements were met in May and June 2012. No other fuel modification areas within the Preserve fall under the responsibility of PVPLC.

8.0 SCIENTIFIC RESEARCH AND WILDLIFE MONITORING

The Preserve is an ideal setting for an outdoor laboratory, because it provides scientists and students with access to a variety of habitat. A report of 2012 research is located in Appendix E. Two studies requiring scientific permits took place in the Prserve. Barbara Kus with the USGS Western Ecological Research Station requested a permit to study the genetics of cactus wrens and california gnatcatchers on the Prserve. Gregory Paula from the Natural History Museum of Los Angeles requested permission to survey reptiles in the Preserve.

9.0 TRAIL MANAGEMENT AND MONITORING

9.1 PRESERVE TRAILS PLAN

Preserve trails fall under the City's Public Use Master Plan (PUMP), which is a NCCP-covered activity, and must follow certain avoidance 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 2011 "State of the Trails" workshop and public comments.

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

9.2 TRAIL MANAGEMENT

PVPLC created new trail maps based on the Preserve Trails Plan, and continues to place maps at major trailheads, and post them on PVPLC's website. PVPLC has placed QR codes at major trailheads for people to access maps via smart phones. In 2012, PVPLC collaborated with the City to develop standardized signage, including a Preserve Rules sign, which will be finalized and installed in 2013.

9.3 UNAUTHORIZED TRAIL CLOSURES

Implementing the Preserve Trails Plan involves closing many trails that were previously in use and no longer authorized. PVPLC focused its attention on these at Portuguese Bend Reserve in 2012, primarily thanks to an HCF grant that provided funding to assist with these. With the approval of the Preserve Trails Plan for Filiorum, PVPLC's plan in 2013 and 2014 is to install initial signage on closed trails and placing brush to make them less noticeable.

PVPLC's primary focus is on closing newly created unauthorized trails, before they become established and damage habitat. This is very intensive work, that requires continuously closing down the trail as signage, branches, and plants are removed. Problem areas include the Peppertree trail area and Fire Station Trail areas of Portuguese Bend. At Peppertree trail, new trails are created to bypass newly closed trails. PVPLC continues to close these trails on an ongoing basis. In 2012, a loop on private property between Fire Station and Rim Trail was closed by the landowner, and since then people have been vandalizing signs and destroying habitat trying to create a new connection through a very steep canyon. PVPLC has discussed the possibility of a new connector with contractors but the canyon is too steep to create a sustainable trail. Support from the City of RPV will be crucial to the success of trail closure activities, because of its ability to enforce regulations. Citations by rangers, and prosecution of acts of vandalism will be important components.

9.4 TRAIL MONITORING

PVPLC stewardship staff or volunteers from the Keeping an Extra Eye on the Preserve for Environmental Review and Stewardship (Keepers) Program conducted all trail monitoring during the reporting period. The Keepers program is described in detail in the Volunteer Involvement section of the report (Appendix D). Monitoring was typically limited to overall trail conditions such as erosion, hazards, and vegetation overgrowth.

9.5 TRAIL MARKERS AND DECALS

In 2012, staff installed 245 decals and 20 carsonite sign posts in the Filiorum Reserve, based on the newly approved Preserve Trails Plan for the Reserve. In addition, staff replaced 168 decals that were vandalized in the Preserve. Staff also removed graffiti on signs throughout the Preserve.

9.6 TRAIL REPAIR

A PVPLC volunteer trail crew assists in much of the trail work on the Preserve. A complete summary of the PVPLC Volunteer Trail Crew Program can be found in the Community Involvement section of the report (Appendix D). PVPLC staff or RPV Public Works department were also involved in trail enhancements.

Two grants have permitted additional trail work on the Preserve. A grant from the Coastal Conservancy is funding development of the California Coastal Trail through the City of Rancho Palos Verdes, including a section through the Preserve. A grant from the California Trails and Greenways Foundation will fund native plants along the Coastal Trail at Abalone Cove to help better delineate the trail. A Habitat Conservation Fund grant provided funding for trail restoration, spur trail closure, and improved signage at Portuguese Bend Reserve.

The following lists the trail projects that were conducted in 2012.

Abalone Cove

- The Volunteer Trail Crew helped define the Coastal Trail at Portuguese Point
- The Volunteer Trail Crew did rock work on the Sea Dahlia Trail

Alta Vicente

- Eagle Scouts closed a network of spur trails in the eastern portion of the Reserve.

Forrestal

- Eagle Scouts installed post-and-rope trail closures
- The Volunteer Trail Crew repaired posts and grade dips on Flying Mane Trail

- The Volunteer Trail Crew closed spurs at Flying Mane Trail
- The Volunteer Trail Crew installed wire cable on Flying Mane and Mariposa Trails
- The Volunteer Trail Crew removed old fencing on the Mariposa Trail

Portuguese Bend

- PVPLC staff closed 3,200 feet of unauthorized trails near Ishibashi Trail with HCF funding
- PVPLC staff closed 1,200 feet of unauthorized trails near Peppertree Trail with HCF funding
- PVPLC staff closed 1,200 feet of unauthorized trails at Rim Trail with HCF funding
- PVPLC staff closed 3,500 feet of unauthorized trails at Peacock Flats with HCF funding
- PVPLC realigned the Rim trail and installed a bridge with HCF funding
- The Volunteer Trail Crew weed whacked Ailor, Rim, Grapevine, Ishibashi, and Peacock Flats Trails
- The Volunteer Trail Crew closed spur trails in Peppertree Trail area
- The Volunteer Trail Crew created drainage dips on the Rim Trail
- The Volunteer Trail Crew realigned Archery and Bow and Arrow Trails
- The Volunteer Trail Crew removed berm on upper Ishibashi Trail
- The Volunteer Trail Crew removed trail barrier and fallen tree on Ishibashi Trail

Future Trail Projects

Future trail projects are listed in Appendix G.

Ranger Program

The PVPLC coordinated with the City of RPV on focal areas for Mountains Recreation and Conservation Authority (MRCA) rangers on the Preserve.

Volunteer Trail Watch

The PVPLC has been collaborating with the City of RPV to create a Volunteer Trail Watch. The mission of the Palos Verdes Nature Preserve Volunteer Trail Watch Program is to serve as eyes and ears of the City of Rancho Palos Verdes and the Palos Verdes Peninsula Land Conservancy with a view to 1) protect the natural resources of the Palos Verdes Nature Preserve, including the flora and fauna as well as the geology, topography and scenic landscape, and 2) enhance the safety of, and promote an enjoyable experience for all Preserve visitors.

10.0 VOLUNTEER INVOLVEMENT

PVPLC is a non-profit organization that relies heavily on the support of community involvement to perform many of the tasks necessary to manage the Preserve. The Volunteer Annual Report for January 1, 2012 through December 31, 2012 is located in Appendix F.

2012 Officers

Bruce Biesman-Simons, President
Joe Platnick, Exec. Vice President
Pam Westoff, Secretary
Marc Crawford, Treasurer

2012 Board of Directors

Bill Ailor, President Emeritus
Bob Ford
Allen Franz
Cassie Jones
Henry Jurgens
Elizabeth Kennedy
Mike Kilroy
Susan McKenna
John Spielman
William Swank
Ken Swenson
Grace Wallace

2012 Staff

Executive Director

Andrea Vona

Office Administration

Jill Wittman, Administrative Assistant

Sue Cody, Accountant

Land Stewardship

Danielle LeFer, Conservation Director

Cristian Sarabia, Stewardship Manager

Adrienne Mohan, Stewardship Associate

Ann Dalkey, Stewardship Associate (Research)

Damian Morando, Stewardship Technician

Hugo Moralez, Stewardship Technician

Humberto Calderon, Stewardship Technician

Ruben Villagomez, Stewardship Technician

Trent Houston, Stewardship Technician

Johnny Perez, Stewardship Technician

Ray Vought, Stewardship Technician

Neli Gonzalez, Nursery Technician

Education Program

Siegrun Storer, Education Director

John Nieto, Education Manager

Development

Nancy Young, Development Director

Louise Olfarnes, Communications Manager

Mary Lopes, Donor Relations

George F. Canyon Nature Center

Loretta Rose, Manager/Naturalist

Laurie Morgan, Assistant Naturalist

White Point Nature Education Center

Roxanne Roberts, Naturalist

Jessy Melowicz, Naturalist

APPENDIX A

2012 RESTORATION MONITORING REPORT

Monitoring at restoration sites took place at Alta Vicente on May 31, 2012. Transects were conducted at Phase 1 restoration sites, and photo point monitoring was completed at Phase 2 sites. Locations of transects and photo points are on Figure 1. Results of the Alta Vicente surveys are provided below.

1.0 SURVEY RESULTS

1.1 PHASE 1TRANSECT SURVEY RESULTS (YEAR 3)

Coastal Sage Scrub (CSS)

The number of individual native plants counted in the CSS in 2012 was 7 (Table 1). Native plant cover in the CSS site was 14%, and consisted of an even mix of *Eriogonum cinereum*, *Eriogonum parvifolium*, and *Leymus condensatus* , but no *Artemisia* (Table 2, Table 3). Percent non-native cover was 80%, and bare ground/litter 8% (Table 2). Shrub height ranged from 1.4 feet to 1.6 feet (Table 4). Overall native cover in the CSS based on the CNPS Rapid Vegetation Assessment protocol was 49% (Table 6). The discrepancy between the CNPS assessment and transect data is due gaps in vegetation created by low seed germination, which increased the likelihood of hitting non-native vegetation or bare soil along transects.

Photo points indicate that many plants have grown and are healthy (Appendix I, AV1). Gaps in vegetation and high numbers of weeds are present due to low seed germination.

Based on the CNPS protocol, Phase 1 meets the CSS success goals of 40% or greater native cover after 3 years. Weed control over time will reduce non-native cover and allow seedling recruitment. However, to decrease the amount of bare ground in Phase 1, PVPLC will fill-in plant and seed focal areas in fall 2013.

PVB Butterfly Habitat

In the butterfly habitat, the number of native plants counted in the transect was 4. Native cover was 8%, evenly distributed among *Artemisia californica, Eriogonum cinereum*, and *Eriogonum parvifolium* (Table 2, Table 3). Percent non-native cover was 28%, and bare ground/litter 27% (Table 2). Shrub height ranged from 0.3 feet to 3.2 feet (Table 4). Percent cover in the butterfly habitat based on the CNPS Rapid Vegetation Assessment protocol was 32% (Table 6). Both survey techniques indicate low PVB host plant cover.

Photo points show that native plants are healthy, but recruitment from seed was very low (Appendix I, AV2). The second PVB host plant, deerweed, included in the seed mix, did not germinate at the site.

Based on the CNPS protocol, the site meets the PVB success goals for native plant cover (30%-70%) after 3 years. The transect data shows that some areas still need attention. The percent bare ground with the transect method (54%) is higher than the 30% success criteria, but the amount of bare ground in the CNPS survey (32%) meets the success goal. In fall 2012, PVPLC added *Astragalus* to the restoration site to increase host plant numbers. Weed control over time will reduce non-native cover and allow seedling recruitment.

1.2 PHASE 2 (YEAR 2)

Cactus Scrub

Native plant cover in the cactus scrub site (AV3) in 2012 was approximately 15% (Appendix 1). The container plants were healthy, and cactus pads were increasing in size. Recruitment from seed was observed. Weed control over time will reduce non-native cover and allow seedling recruitment.

Palos Verdes Blue Butterfly Habitat (PVB)

Native plant cover in the PVB habitat (AV5) in 2012 was approximately 40% (Appendix I). The container plants were healthy. Ocean locoweed seedlings were present, but no deerweed recruitment was observed. Weed control over time will reduce non-native cover and allow seedling recruitment.

Coastal Sage Scrub (CSS)

Native plant cover in the CSS site (AV6) in 2012 was approximately 20% (Appendix I). The container plants were healthy. Recruitment from seed was observed. Weed control over time will reduce non-native cover and allow seedling recruitment.

1.3 PLANT INVENTORY

A plant inventory conducted in Phase I and Phase 2 during the 2012 surveys identified 18 native species (Table 5). Plants were identified on either side (within one meter) of a 50 meter transect in Phase 1 and Phase 2.

1.4 CONCLUSIONS AND RECOMMENDATIONS

Container plants in the Phase 1 restoration area are growing. However, recruitment from seed has been low. In fall 2013 PVPLC will fill-in plant in areas of CSS and PVB habitat to increase native plant cover.

The Phase 2 restoration is meeting success criteria for year 1, and native plant cover will continue to increase as container plants mature, and seedlings germinating from seed increase in size.

2.0 2012 ALTA VICENTE TRANSECT MONITORING, MAY 31, 2012

Table 1
Number of plants per 50 m transect with line intercept method, 1 m intervals.

Species	CSS: AV1	PVB: AV2
Artemisia californica		2
Eriogonum cinereum	2	1
Eriogonum parvifolium	3	1
Leymus condensatus	2	
Total Native Cover	7	4
Non-native annual grasses	11	7
Non-native plants	29	21
Total Non-Native Cover	40	28
Bare and Litter	4	27

Table 2
Percent cover along 50 m line transects with line intercept method, 1 m intervals.

Species	CSS: AV1	PVB: AV2
Artemisia californica		4
Eriogonum cinereum	4	2
Eriogonum parvifolium	6	2
Leymus condensatus	4	
Total Native Cover	14	8
Non-native annual grasses	22	14
Non-native plants	58	34
Total Non-native cover	80	56
Bare and Litter	8	54

Table 3
Relative percent cover along 50 m line transects with line intercept method, 1 m intervals.

Species	CSS: AV1	PVB: AV2
Artemisia californica		3
Eriogonum cinereum	4	2
Eriogonum parvifolium	6	2
Leymus condensatus	4	
Total Native Cover	14	7
Non-native annual grasses	22	12
Non-native plants	57	36
Total Non-native cover	78	47
Bare and Litter	8	46

Table 4
Average plant height (ft) at each transect.

Species	CSS: AV1	PVB: AV2
Artemisia californica		3.2
Eriogonum cinereum	1.6	1.1
Eriogonum parvifolium	1.5	0.3
Leymus condensatus	1.4	

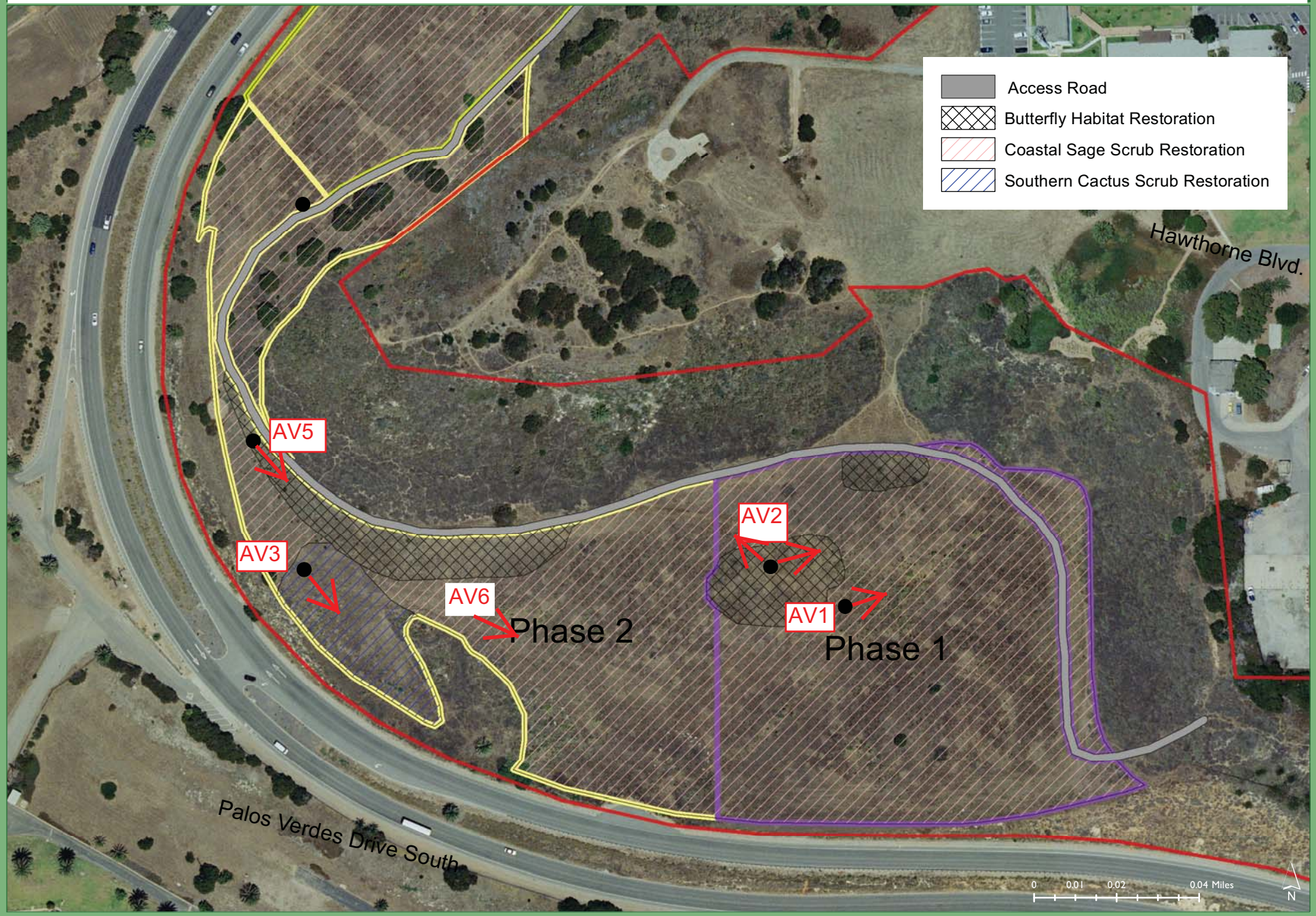
Table 5
Plant inventory at restoration site.

Native Species
Artemisia californica
Astragalus trichopodus
Baccharis salicifolia
Cylindropuntia prolifera
Dudleya lanceolata
Eriogonum cinereum
Eriogonum parvifolium
Eriophyllum confertiflorum
Galium angustifolium
Heteromeles arbutifolia
Isomeris arborea
Leymus condensatus
Malosma laurina
Opuntia littoralis
Phacelia ramosissima
Rhus integrifolia
Salvia leucophylla
Salvia mellifera

Table 6
Vegetation percent cover based on CNPS Rapid Vegetation Assessment protocol.

Species	CSS: AV1	PVB: AV2
Artemisia californica	12	13
Astragalus trichopodus		2
Baccharis salicifolia	1	
Cylindropuntia prolifera	1	
Dudleya lanceolata		1
Eriogonum cinereum	7	3
Eriogonum parvifolium	5	2
Eriophyllum confertiflorum		1
Galium angustifolium	1	
Heteromeles arbutifolia	2	
Isomeris arborea	1	1
Leymus condensatus	2	1
Malosma laurina	2	
Opuntia littoralis	3	2
Phacelia ramosissima		1
Rhus integrifolia	7	1
Salvia leucophylla	1	3
Salvia mellifera	4	1
Total Native Cover	49	32
Non-native annual grasses	2	3
Non-native plants	27	41
Total Non-native Cover	29	44
Bare	23	27

Figure 1. Alta Vicente Restoration Monitoring Map.



Phase I (YR 3) CSS: AV1 Start

Phase I (YR 3) CSS: AV1 End

Phase I PVB (YR 3): AV2 Start

Phase I PVB (YR 3): AV2 Mid

Phase I PVB (YR 3): AV2 End

Phase II (YR 2) Cactus Scrub: AV3

Phase II (YR 2) PVB: AV5

Phase II (YR 2) CSS: AV6

APPENDIX B

ANNUAL REPORT FOR THE TARGETED EXOTIC REMOVAL PROGRAM FOR PLANTS (TERPP)

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 exotic 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 (Appendix B-G). The 2012 TERPP Report documents PVPLC's effort over the past year 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.

As of the writing of this report, the NCCP is still in draft format and the regulatory agencies have not yet signed the final plan. However, the City of Rancho Palos Verdes and PVPLC currently perform the responsibilities outlined in the draft NCCP, including fulfillment of the TERPP requirements.

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 PVNP exotic species 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 exotic species control across the entire NCCP area.

To more effectively collect baseline data and track invasive species within the Preserve, PVPLC is currently developing a new methodology for collecting TERPP information. A new TERPP form is in Appendix A. 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. 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.

Each TERPP site is tracked via GIS, a tool that aids planning and monitoring efforts. Since 2006, PVPLC has treated 88 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. 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 mapping system to map all TERPP sites over time, with plans to implement for the 2013 report. In 2012, interns started mapping invasive species locations in the Preserve. These maps will assist in selecting sites for invasive species eradication. While the most common approach to managing invasions of exotic species may be to target individual species, a more comprehensive approach is to identify major pathways for invasion that will influence more efficient and economic management of the exotic species.

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 2012 TERPP

In 2012, PVPLC treated 15 populations of *Euphorbia terracina* (Geraldton spurge, Euphorbia), in addition to treating approximately 0.5 acre of Euphorbia at the San Ramon Reserve (Table 1). 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 inferior habitat quality compared to un-invaded areas. Continued spread of this species throughout California seems possible and even likely if action is not taken immediately. Euphorbia shows a broad habitat tolerance in southern California, invading both cool coastal areas and hot, dry, interior areas.

PVPLC treated a population of *Ricinus communis* (castor bean) along the Rim Trail in Portuguese Bend, by cutting the plant and applying herbicide to the stump. This population has been spreading downward throughout the canyon, which is otherwise healthy. This will prevent its continued spread through Portuguese Bend.

PVPLC removed 4 populations of *Acacia cyclops* (acacia) at Vicente Bluffs (Pelican Cove, northern Vicente Bluffs (bluff top and lower bluffs), and the restoration site within Ocean Front Estates.

PVPLC treated with herbicide (drill and kill) but did not remove the snags of one population of 12 *Acacia cyclops* (acacia) at Three Sisters Reserve, in the area burned by the 2012 fire.

Site #	Species	Date	Location	Population size/acres	Method	Outcome
1	*E. terracina*	4/4/2012	Abalone Cove and PV Drive south	10	pull and herbicide	ongoing
2	*E. terracina*	4/4/2012	Abalone Cove Canyon	1000	pull and herbicide	ongoing
3	*E. terracina*	4/4/2012	Abalone Cove Olmstead trail	150	pull and herbicide	ongoing
4	*E. terracina*	5/12/2012	Forrestal at Forrestal Drive	25	pull and herbicide	ongoing
5	*E. terracina*	5/12/2012	Forrestal at Quarry Trail	30	pull and herbicide	ongoing
6	*E. terracina*	5/12/2012	Forrestal Pirate trailhead	15	pull and herbicide	ongoing
7	*E. terracina*	8/15/2012	Portuguese Bend at Ishibashi trail	40	pull and herbicide	ongoing
8	*E. terracina*	8/15/2012	Portuguese Bend NCCP site	100	pull and herbicide	ongoing
9	*E. terracina*	8/15/2012	Portuguese Bend, Kubota	20	pull and herbicide	ongoing
10	*E. terracina*	8/15/2012	Portuguese Bend Peppertree trail	170	pull and herbicide	ongoing
11	*E. terracina*	8/15/2012	Portuguese Bend at PV Drive south	100	pull and herbicide	ongoing
12	*E. terracina*	8/15/2012	Portuguese Bend Ishibashi Farm Trail	500	pull and herbicide	ongoing
13	*E. terracina*	8/15/2012	Portuguese Bend Sandbox 1	200	pull and herbicide	ongoing
14	*E. terracina*	8/15/2012	Portuguese Bend Sandbox2	200	pull and herbicide	ongoing
15	*E. terracina*	Aug.-Dec. 2012	San Ramon	0.5 acre	mulch	ongoing
16	*Ricinus communis*	Mar-12	Portuguese Bend along Rim Trail	20 plants/ 0.5 acre	cut and herbicide	successful
17	*Acacia cyclops*	Jan-12	Northern Vicente Bluffs*	8	cut and salt	successful
18	*Acacia cyclops*	Jan-12	Pelican Cove*	20	cut and salt	successful
19	*Acacia cyclops*	Jan-12	Ocean Front Estates*	6	cut and salt	successful
20	*Acacia cyclops*	Jan. 2012	Northern Vicente, base of bluffs*	5	cut and salt	successful
21	*Acacia cyclops*	May 2012	Three Sisters Reserve	12	Cut and herbicide	successful
1	*E. terracina*	8/15/2012	Abalone Cove and PV Drive south	10	pull and herbicide	ongoing
2	*E. terracina*	8/15/2012	Abalone Cove Canyon	1000	pull and herbicide	ongoing
3	*E. terracina*	8/15/2012	Abalone Cove Olmstead trail	150	pull and herbicide	ongoing
*Do not count toward NCCP permit obligations.						

5.0 REFERENCES

California Invasive Plant Council 2006. California Invasive Plant Inventory. February. California Invasive Plant Council: Berkley, CA.

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State of California 2007. Department of Food and Agriculture Division of Plant Health & Prevention Services Noxious Weed Ratings. Retrieved September 2007, from: <http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/pdfs/noxiousweed_ratings.pdf>.

URS 2006. City of Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan. June 9.

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APPENDIX A: SAMPLE TERPP FORM

Invasive Weed Mapping Field Datasheet

Survey Type New Infestation Assesment 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	
No. Individuals 1-10 10-50 50-100 100-200 200-500 500-1000 >1000	**Stand Comments:**
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	**Treatment Comments:**
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	
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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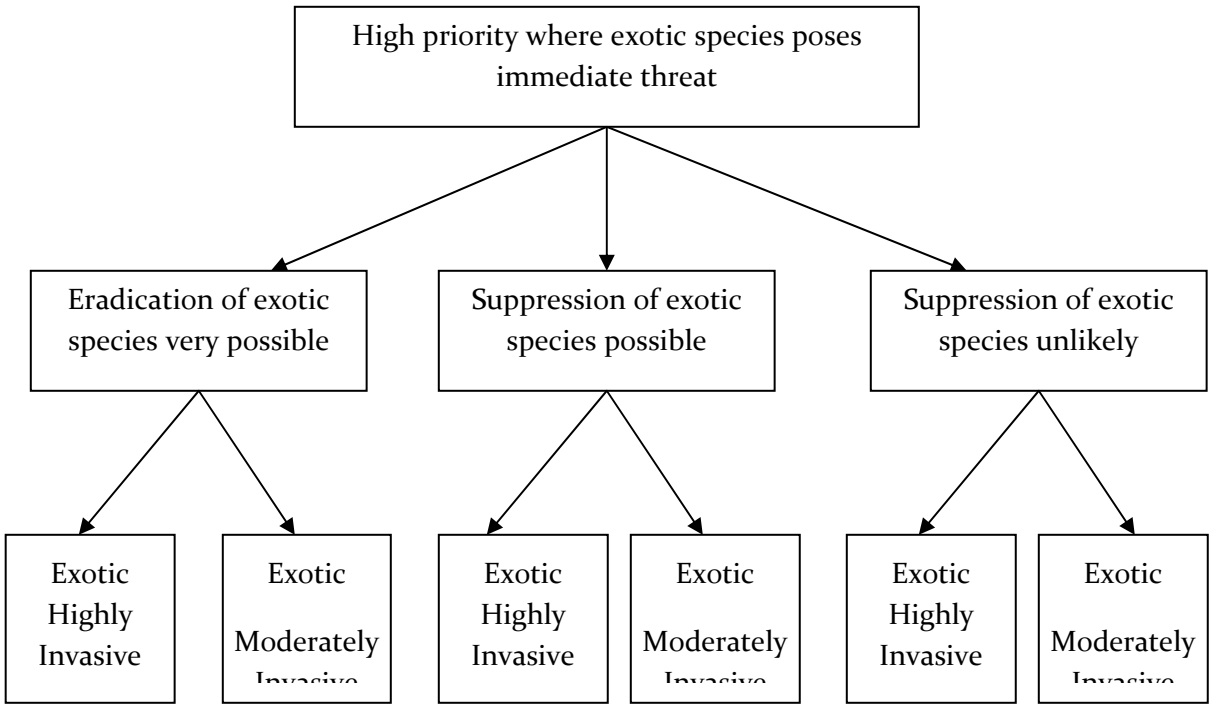
APPENDIX B: FLOWCHART FOR HIGH PRIORITY THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

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

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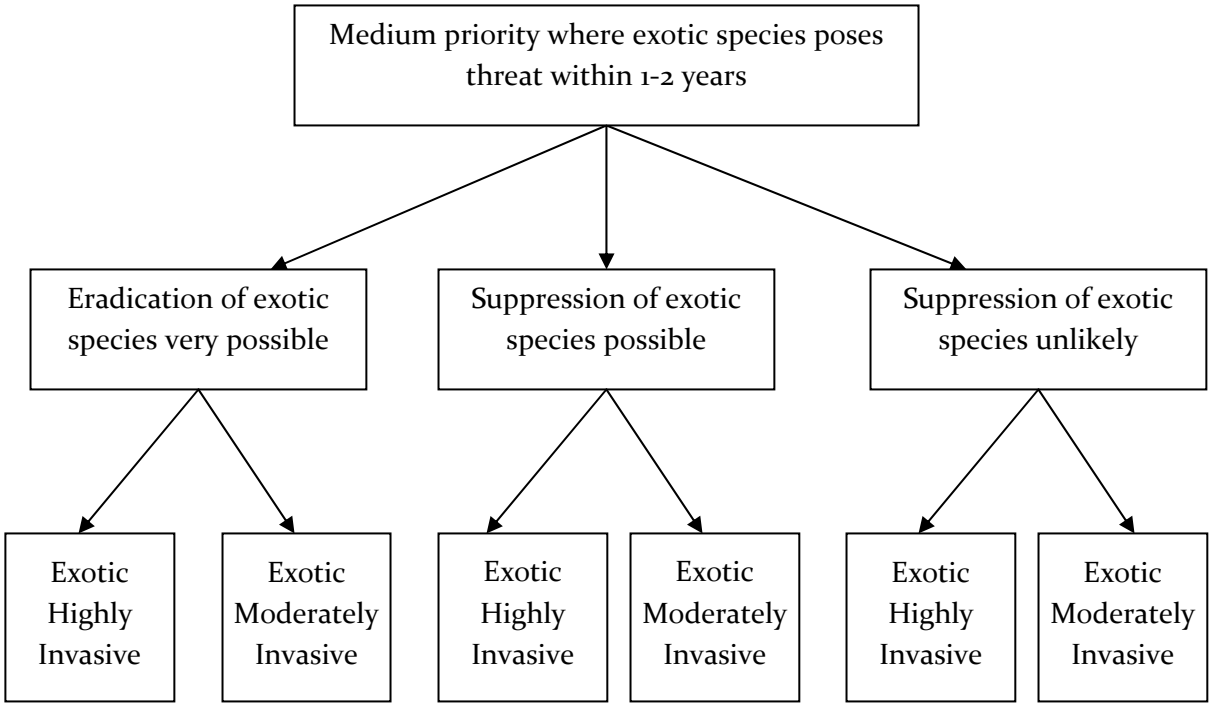
APPENDIX C: FLOWCHART FOR MEDIUM PRIORITY DEGREE OF THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

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

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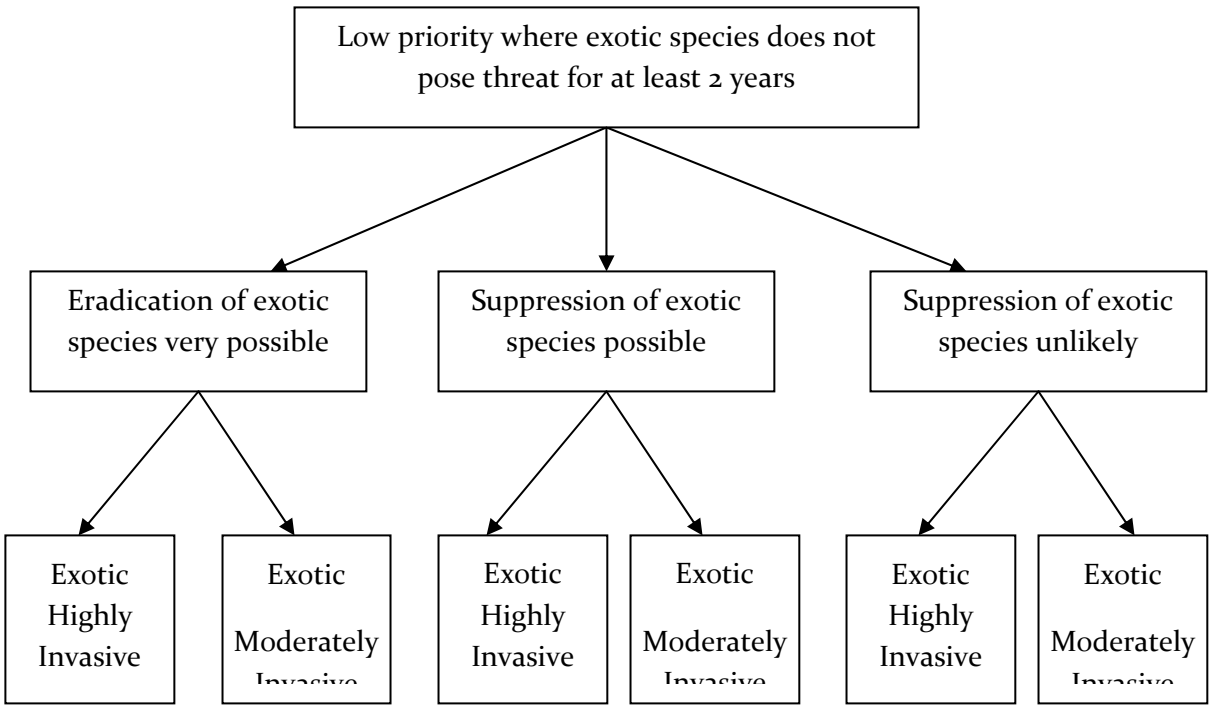
APPENDIX D: FLOWCHART FOR LOW PRIORITY DEGREE OF THREAT TO NATIVE VEGETATION



Priority Ranking For Control of Exotic Species

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

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APPENDIX E: HIGHLY INVASIVE SPECIES

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

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

APPENDIX F: MODERATELY INVASIVE SPECIES

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

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

APPENDIX G: EXOTIC, NON-INVASIVE SPECIES

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

Veronica anagallis-aquatica speedwell	Water	*Yucca species*	Spanish bayonet

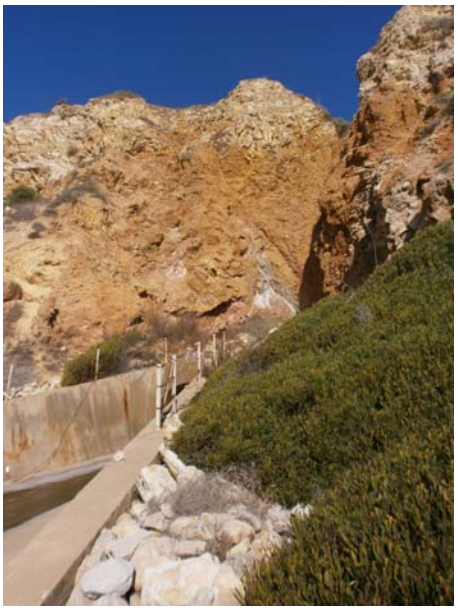
LACC removed invasive Acacia from Vicente Bluff
Pre-acacia removal

Acacia were removed from Vicente Bluff
pre-Acacia removal

Vicente Bluffs pre-clearing

Vicente Bluffs post-clearing

Lower bluff with invasive acacia choking existing El Segundo blue butterfly host plants



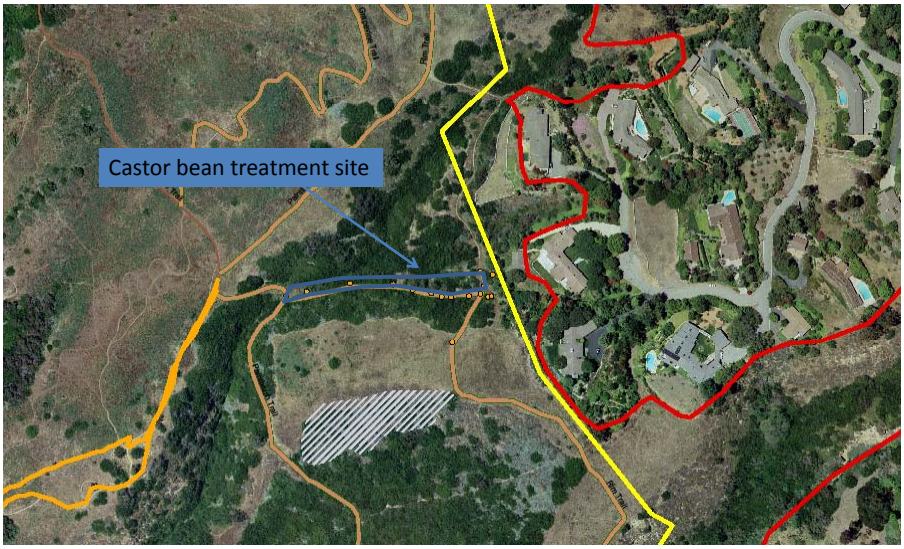
Lower bluff after clearing by LACC

San Ramon Euphorbia Control with Mulch

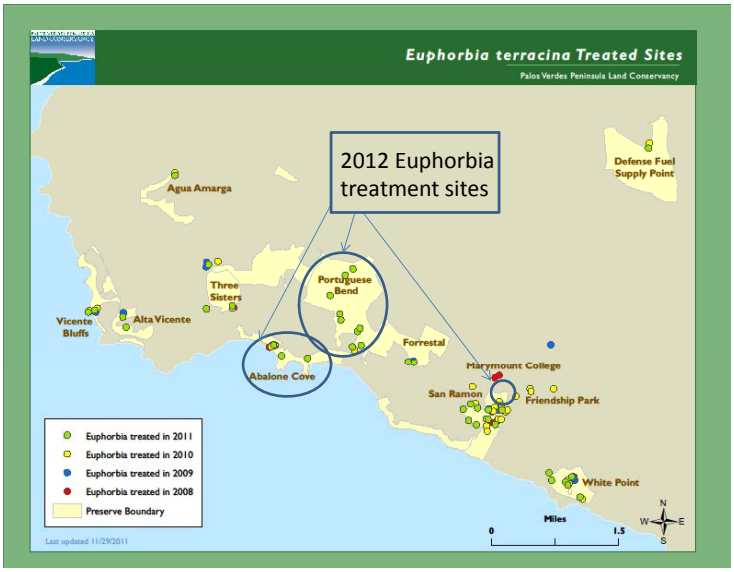
Three Sisters *Acacia cyclops* pre-treatment

Three Sisters *Acacia cyclops* post-treatment

Castor Bean Treatment Sites along Rim Trail at Portuguese Bend



Euphorbia Treatment Sites 2012



THREE SISTERS RESERVE FIRE RECOVERY PLAN

Prepared by:
Palos Verdes Peninsula Land Conservancy
Danielle LeFer

JULY 2012

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1. INTRODUCTION

The January 9, 2012, Crest Fire burned approximately 12.7 acres of the 99-acre Three Sisters Reserve, as well as some habitat in McCarrell's canyon, outside of the Preserve. The wildfire burned native and non-native vegetation and known habitat of the threatened coastal California gnatcatcher (*Polioptila californica californica*) and the special status cactus wren (*Campylorhynchus brunneicapillus*).

This report addresses the management and recovery of habitat and trails in the fire-affected area of the Three Sisters Reserve. The recommendations in the report are based on the management of the PVNP under a draft Natural Community Conservation Plan to "maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes." Under the plan, the Palos Verdes Peninsula Land Conservancy (PVPLC) serves as the habitat management agency for the PVNP, for the land owners (the City of Rancho Palos Verdes). This report does not offer post-fire recommendations for public safety, enforcement or other responsibilities outside of the scope of habitat management.

Section 2 of the fire recovery plan documents existing, pre-fire conditions and management of the Reserve. Section 3 provides restoration and monitoring recommendations, based on available funding for expected burns, as outlined in the draft NCCP. Section 4 is a Summary of Recommended Actions.

2. PRE-FIRE CONDITIONS

In Spring 2009, vegetation mapping using California Native Plant Society's Rapid Vegetation Assessment Protocol was completed. This information describes the Reserve's pre-fire habitat types with both native and introduced vegetation stands (*Figure 1*). In addition, cactus scrub, cactus wrens and California gnatcatchers mapped during surveys in 2009 are shown in *Figure 2*.

Of the 12.7 acres that burned at Three Sisters Reserve, California sunflower (*Encelia californica*) and lemonadeberry (*Rhus integrifolia*) were the dominant native vegetation types (*Table 1, Figure 1*). Other native vegetation found in the burn area pre-fire were large patches of cactus scrub habitat dominated by prickly pear cactus (*Opuntia littoralis*) (*Figure 2*). The dominant introduced vegetation type pre-fire was Russian thistle (*Salsola tragus*).

TABLE 1: Pre-fire vegetation types and associated acreages

Vegetation Type	Acres	Native
S. tragus	2.0	N
R. integrifolia	0.2	Y
E. californica	10.5	Y
Total	***12.7***	

Figure 1. Three Sisters 2012 Fire Boundary and Pre-Fire Vegetation.

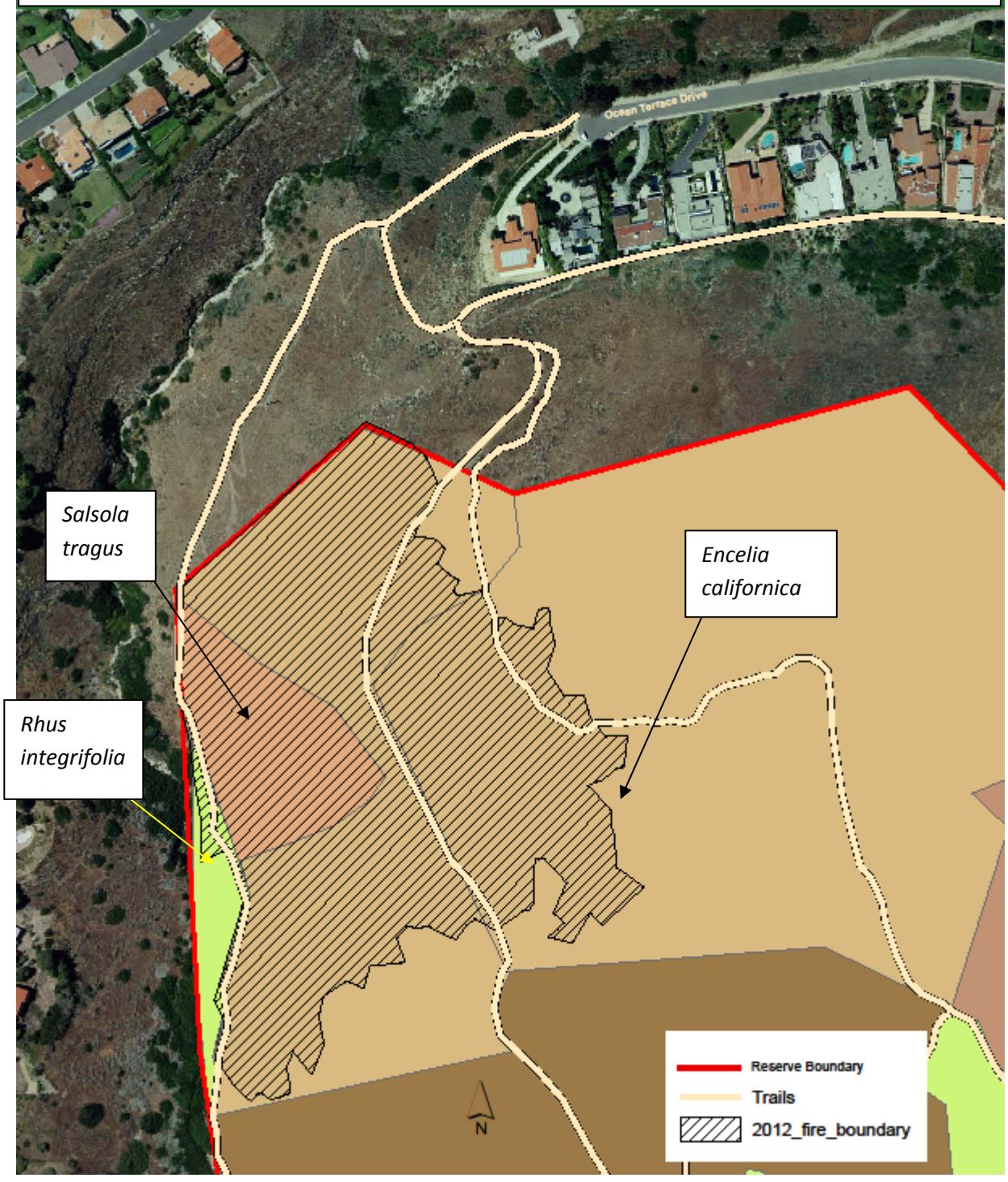
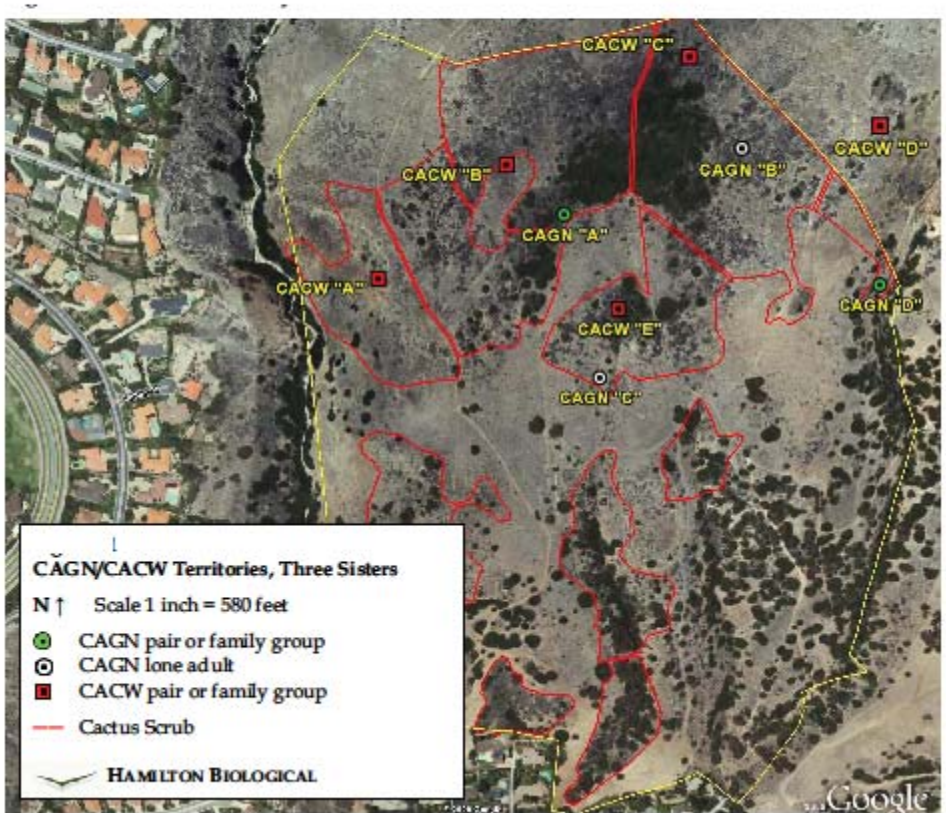


Figure 2. Cactus Scrub, Cactus Wrens and California Gnatcatchers Identified in 2009 Surveys.



3 RESTORATION AND MONITORING RECOMMENDATIONS

3.1 EROSION AND TRAILS

Increased surface erosion of hillsides, canyons and trails may occur in the burn area until the area stabilizes, especially during storm events. Stabilization of the area will come over time but permanent native vegetation is the best long-term solution for soil stabilization and erosion control. Some targeted replanting of mature native vegetation in combination with native seeding is a possible method to counteract erosion and mudflow. However, it is important to understand that soil movement and erosion are natural occurrences in a post-fire environment.

PVPLC recommends that erosion control efforts in the Reserve be focused on the re-vegetation of native plants. These erosion control strategies may be implemented on an as needed basis, depending on storm frequency and rain events.

The trail system was not affected by the fire. Water run-off from fire response exacerbated some pre-existing ruts along McCarrell's Canyon Trail. In addition, measures should be put in place to reduce the likelihood of use of the fire-fighter's perimeter boundary as a trail, and the creation of new trails in the fire area. Off-trail and unauthorized trail usage results in trampling of native seedlings and soil disturbance which encourages fast growing non-native plants. PVPLC will monitor to determine if unauthorized trails are being created and need to be closed. Along with Reserve rule enforcement, techniques to minimize off-trail use include: trail signs designating official trails, areas closed for restoration, and directional signs pointing away from unauthorized and closed trails.

3.2 INVASIVE SPECIES CONTROL

Successful recovery of the Reserve burn area is dependent on the establishment of native plants. For this to occur, an invasive species control program must be implemented within the burn area. Pre-fire vegetation data suggests 16% cover of non-native species in the burn area (Table 1). Similarly, pre-fire native vegetation stands may be exposed to post-fire invasion in the Reserve from adjacent patches of invasive plants (Figure 1). PVPLC recommends closely monitoring the fire area during the first year after the fire, to determine whether native vegetation is recovering, and control weeds as necessary.

Invasive species should be targeted in areas that were previously composed of native vegetation. Based on limited funding, priority areas for weed control are known stands of pre-fire dominant native vegetation (Figure 1). Species priority will be based on PVPLC's Targeted Exotic Removal Plant Program guidelines, which use a synthesized rating system drawn from plant invasiveness rankings from both the California Invasive Plant Council and the California Department of Food and Agriculture. Removal methodologies will include, but are not limited to: herbicide, hand removal, mechanical weeding.

3.3 HABITAT RESTORATION AND ENHANCEMENT

The purpose of this habitat restoration plan is to establish ecologically appropriate native habitats in areas disturbed by fire. The following general goals were determined for the habitat restoration after evaluating the post-fire conditions of the Reserve:

Primary Goal
Increase successful native plant species diversity and structural diversity of the site by restoring native cactus scrub.

Additional Goals
Establish native habitats that will be self-sustaining in the long-term by encouraging conditions that will allow natural processes to proceed, including soil development, nutrient cycling, plant succession, natural regeneration, and resistance to perturbation.

Figure 3 references the recommended areas and methodologies for habitat restoration in the burn site. As previously described, the goals of restoration are to increase the success of native plant establishment by limiting competition from non-native weeds and ensuring natural regeneration. This approach to restoration would be two-fold, through: 1) weed control throughout the site; 2) supplemental mature species planting.

In pre-fire stands of cactus scrub (Figure 2) historically occupied by covered species under the NCCP, it is recommended that mature container plants be planted to speed up the recovery and increase potential cactus wren habitat. Container plants should be grown from locally collected seed and cutting sources. Planting should be implemented in the early fall to take advantage of the entire rainy season.

The following cactus scrub species are recommended for planting based on pre-fire vegetation maps: *Cylindropuntia prolifera, Opuntia littoralis.*

3.4 MONITORING

Monitoring should be limited to visual inspections on a quarterly basis, to document invasive weed growth and weed control needs. Planted areas should be visited monthly for the first 6 months, then quarterly, to determine the success of the restoration, and management needs. Annual vegetation assessments (the California Native Plant Society's Rapid Vegetation Assessment protocol), will be conducted in the first three years following the fire, to assess fire recovery. The success criteria listed below for the two pre-fire habitat types will indicate successful fire recovery. Other sources of funding may be sought if vegetation recovery is not approaching minimum success criteria.

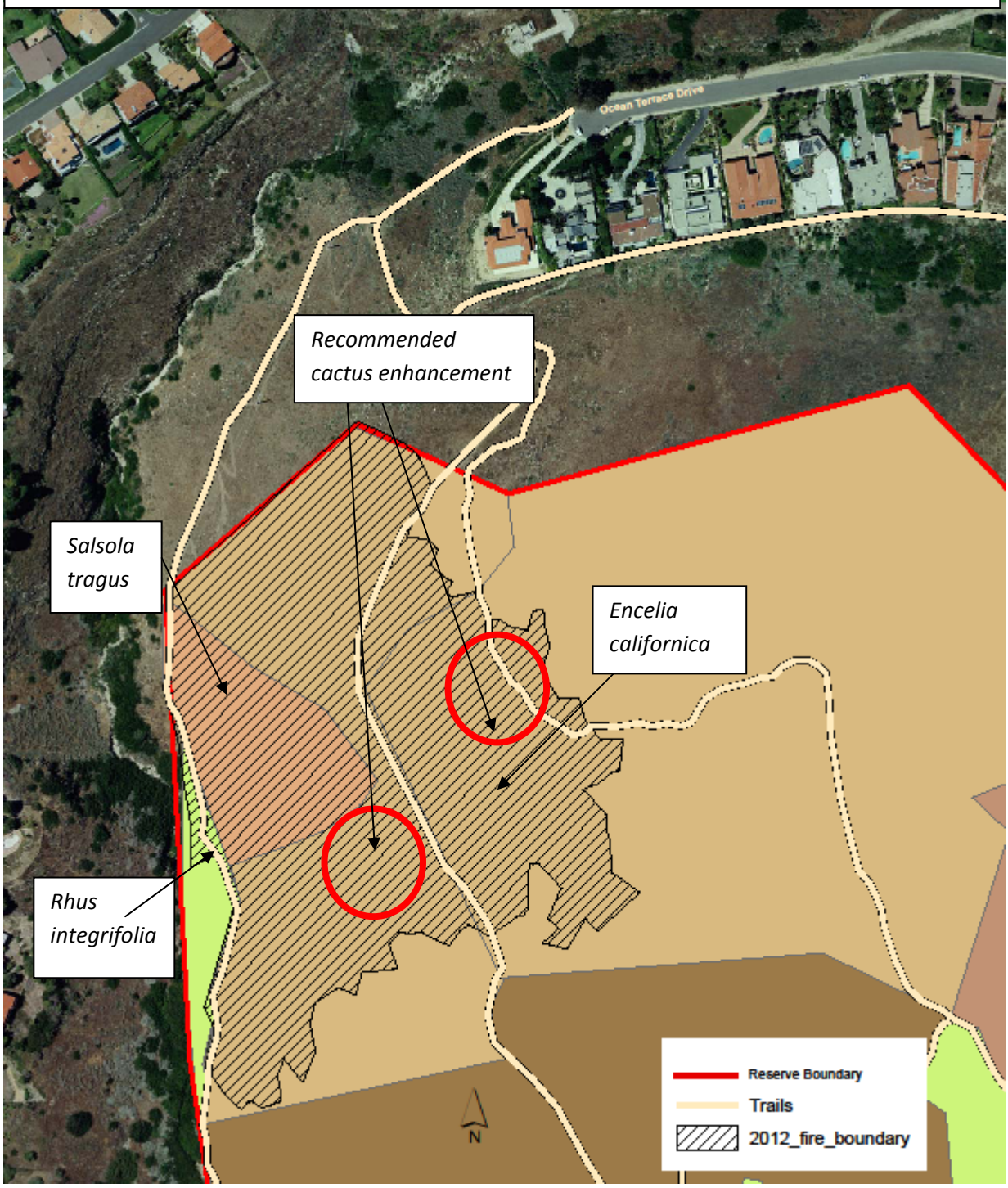
Coastal Sage Scrub

- After the third year, non-native plant cover less than 30%
- Native plant cover after the third year in the CSS community greater than 40%

Cactus Scrub

- After the third year, non-native plant cover less than 30%
- Native plant cover after three years in the cactus scrub community greater than 30%.

Figure 3. Three Sisters Recommended Recovery Actions.



4 SUMMARY OF RECOVERY ACTIONS

The following actions are a summary of the recommendations outlined in the above Section 3 of this report:

Task 1: Targeted Invasive Species Removal

Implement invasive plant species removal within the burn area as needed. Priority will be based on PVPLC's NCCP Targeted Exotic Removal Plant Program guidelines, which use a synthesized rating system drawn from plant invasiveness rankings from both the California Invasive Plant Council and the California Department of Food and Agriculture. Removal methodologies will include, but are not limited to: herbicide, hand removal, mechanical weeding.

Task 2: Supplemental Native Planting

Mature cactus scrub container plants, grown from local seed stock, will be planted in areas historically occupied by cactus wrens, a covered species under the NCCP. In other areas, passive recovery will be monitored.

Based on NCCP, for repetitive fires (less than 56 acres in size): Available funds, shared by the City of RPV and PVPLC, are $1,300 per acre. Therefore, total funds available for fire response are $16,510.

Table 2. Recommended Actions.

		Cost	Timeline
Task 1	Monitor and weed as necessary	$8,510	Summer 2012-Spring 2015
Task 2	Enhance cactus scrub (2 acres)	$8,000	Fall 2012
Total		**$16,510**	

APPENDIX I: PHOTOGRAPHS OF THREE SISTERS BURN.

Photo 1: Overview of Burned Area.

Photo 2: Burned Cactus Patch (1).

Photo 3: Burned Cactus Patch (2).

Photo 4. Burned cactus patch (3). Photo by Linda Wedemeyer.

NARCISSA FIRE (MAY 25, 2012) AT PORTUGUESE BEND RESERVE: FIRE RECOVERY PLAN

Prepared by:

PALOS VERDES PENINSULA LAND CONSERVANCY

Danielle LeFer

1. INTRODUCTION

The May 25, 2012, the Narcissa fire burned approximately 0.2 acres of the 399-acre Portuguese Bend Reserve (Figure 1). The area burned had previously burned during the August 2009 fire. The fire was on a slope along the side of Burma Road. Since the area had previously burned, the vegetation was sparse. Several shrubs were partially burned during this fire.

The recommendations in this report are based on the management of the PVNP under a draft Natural Community Conservation Plan to "maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes." Under the plan, the Palos Verdes Peninsula Land Conservancy (PVPLC) serves as the habitat management agency for the PVNP, for the land owners (the City of Rancho Palos Verdes). This report does not offer post-fire recommendations for public safety, enforcement or other responsibilities outside of the scope of habitat management.

2. RESTORATION AND MONITORING RECOMMENDATIONS

2.1 EROSION CONTROL

Although the fire occurred on a slope, the slope is rocky, and was already exposed. No additional erosion is expected to occur due to exposed soil. PVPLC will monitor the site and implement erosion control strategies if they become necessary.

2.2 INVASIVE SPECIES CONTROL

PVPLC will monitor the site during the first year after the fire, and control invasive species that may appear.

2.3 HABITAT RESTORATION AND ENHANCEMENT

The native plants at the site were partially burned, and are expected to recover and stump sprout, therefore no additional planting is necessary.

2.4 MONITORING

Monitoring should be limited to visual inspections on a quarterly basis, to document invasive weed growth and weed control needs.

2.5 COSTS

Based on NCCP, for repetitive fires (less than 56 acres in size): Available funds, shared by the City of RPV and PVPLC, are $1,300 per acre. Therefore, total funds available for fire response are $260.

Table 1. Recommended Actions.

		Cost	Timeline
Task 1	Monitor and weed as necessary	$260	Fall 2012-Fall 2013
Total		**$260**	

Figure 1. Extent of Narcissa Burn (May 25, 2012) on Portuguese Bend Reserve.

APPENDIX I: PHOTOGRAPHS of May 25, 2012 Portuguese Bend Burn

PALOS VERDES PENINSULA LAND CONSERVANCY

PRESERVING LAND AND RESTORING HABITAT FOR THE EDUCATION AND ENJOYMENT OF ALL

Subject: Request for Approval of Revised 2010 Habitat Restoration Plan for the Portuguese Bend Reserve in the Palos Verdes Nature Preserve

PVPLC previously requested additional year of weed control, and Phase I and II will be planted in Fall 2012 (Figure 1).

Since the 2010 Restoration Plan was written, the City of RPV has approved a request for irrigation at the restoration site. Irrigation will allow PVPLC to plant container plants rather than only seeding the site. This will help to more quickly achieve habitat criteria. Enclosed is the proposed revised Restoration Plan.

In addition, the total acreage covered by the Portuguese Bend Restoration Plan is 21 acres, sufficient acreage for four years of restoration at 5 acres per year. Therefore, we have included a map indicating the proposed restoration in four phases (4 years) (Figure 2). We propose therefore to create a new Restoration Plan for a future site in 2013, for implementation in 2015.

Please feel free to contact me with questions regarding this request.

Sincerely,

Danielle LeFer, Ph.D.
Conservation Director
Palos Verdes Peninsula Land Conservancy
916 Silver Spur Road, Rolling Hills Estates, CA 90274
dlefer@pvplc.org
310-541-7613 X 203

Portuguese Bend NCCP Site Proposed Revised Restoration Plan April 25, 2012

3.5 SEEDING AND PLANTING SPECIFICATIONS

The following methods will be used to seed and plant during the restoration of coastal sage scrub and cactus scrub habitats within the Portuguese Bend Reserve. Seeding and planting should be implemented in October 2012 to take advantage of the entire rain season.

3.5.1 Seeding

Seed shall be applied by hand with a belly grinder in the areas between container plant groupings as well as in between the plants among the container plant groups in all restoration areas. The seed will be mixed together as specified for the seed mix. Specified VAM will be spread by hand with a belly grinder over the seeding area prior to seeding. The seed shall be broadcast and raked, where practical, into the ground to no more than a quarter of an inch to incorporate the seed into the soil to increase germination success. The seed palettes are the same as in the 2010 Restoration Plan (see Table 2, 4, 6).

3.5.2 Planting

Container plant palettes were based on the seed palette in the 2010 Restoration plan (Tables 1, 3, 5).

Container plants consist of dominant shrubs and 40 to 60 plants will be planted in groups of mixed species throughout the restoration area. However, cactus species will be planted in the 2 acre restoration area with no other species planted within the group. The layout for container plants will be determined for each area based on micro topographic features and planting sites will be marked on the site using different colored pin flags under the supervision of the restoration ecologist or PVPLC biologist. Spacing of plants within the groups will follow the specifications presented in the tables for container plant palettes. Groups of container plants will be spaced in a natural looking mosaic in each area.

All container plants are to be planted to the following specifications:

- Planting holes shall be made with the minimum disturbance to accommodate the containers.
- Prior to planting, the planting hole shall be filled with water, and allowed to drain.
- Plants shall be set in the planting hole so that the crown of the root ball is approximately 0.25 inch above finish grade. Under no circumstance should the plant crown be buried.
- A watering basin shall be provided around each plant from 18 – 24 inches in diameter.
- Watering basins shall be filled with water after planting, at least twice.
- The irrigation system should be tested to ensure that all emitters are functioning.

3.6 IRRIGATION SYSTEM

A temporary above ground irrigation system is specified for the groups of container plants within the coastal sage scrub restoration areas. The irrigation system will be used, as necessary to supplement the annual rainfall during the establishment period. The temporary irrigation system will be installed in Spring prior to planting to permit “grow and kill” weed treatments.

The temporary above ground irrigation system will be used in the early fall and late spring seasons. The irrigation system will slightly lengthen the growing season to maximize the development of the habitat. Depending on rainfall, irrigation likely will be required for the first two growing seasons for establishment.

3.7 SITE MAINTENANCE

One of the goals for the restoration is to provide self-sustaining habitats. However, initially, maintenance of the restoration area will be necessary to establish the newly planted and seeded areas. Maintenance will include any activities required to meet the performance standards set forth in this plan, in the estimation of the restoration specialist or PVPLC biologist. For the Three Sisters Reserve, these include the following:

- Weed control, at a minimum for fennel, acacia, mustards, wild oats and purple false brome;
- Irrigation for the container plants;
- Replacement hand seeding in areas of more than 200 sq. ft where target seed germination failed after one good season of rainfall;
- Replacement of container plants in areas with less than 80 percent survival in years two and three, based on visual observations of substantial mortality; and
- Pest and disease control, if necessary.

The establishment maintenance period is generally three years duration with the most intense maintenance in the first and second year, and only seasonal weeding activities in the third year. The amount of maintenance each year will depend on weather conditions and how well the site develops. The following specifications for maintenance may require adjustments as determined by the restoration specialist or PVPLC biologist over the three-year maintenance period.

3.7.1 Weed Control

During the active maintenance period, the target cover from exotic weed species will be generally 10 percent or less. Control of the wild oats and purple false brome is especially important because annual grasses have been shown to compete with shrub species in restoration (Eliason and Allen 1997; Corbin and D’Antonio 2004). Purple false brome is a relatively recent invader to southern California, and the habitat of this species is relative dense growth.

Weeds will be controlled during late winter through early summer, as necessary, before they set seed and/or before they reach approximately 12 inches in height. Three weeding events should be estimated for a normal rainfall season, with more or less as dictated by rainfall. Weeds, such

as purple false brome will be removed from the site if seeds have set prior to weeding. Since removal of weeded material is expensive, weeded material may be left on site as organic mulch material if seeds have not yet set. Removal of herbicide treated material is not an issue.

Weed control will mainly employ hand pulling, mechanical methods, and spot spraying of herbicides for certain species such as fennel and acacia as described in Section 3.2.1.

3.7.2 Irrigation of Container Plants

Temporary irrigation will only be used in the areas where groups of container plants are to be planted. Irrigation will be used in the first two seasons from planting to extend the rainy season and establish the shrubs, as necessary. The timing of irrigation events will depend on evapotranspiration between irrigation events and soil moisture. The following management scheme is anticipated as a guideline for water management of native trees and shrubs:

- Irrigate soil to full field capacity to the desired depth (approximately 18 inches after planting; and 18–24 inches during plant establishment).
- Allow soil to dry down to approximately 50-60 percent of field capacity in the top 6-12 inches before the next irrigation cycle. Depth of soil dry down between irrigation events will depend on development of container plants.

Wetting of the full root zone and drying of the soil between irrigation events is essential to the maintenance of the plants and the promotion of a deep root zone that will support the vegetation in the years after establishment. A soil probe or shovel should be used to examine soil moisture and rooting depth directly.

3.7.3 Seeding and Plant Replacement

Target values for relative cover of the native vegetation, including nurse and erosion control species, will be as follows with at least 20 percent cover in Year 1, 30 percent in Year 2, and 40 percent in Year 3. Actual cover values will depend mainly on weather conditions (seasonal rainfall and temperature) during the establishment period.

Areas of significant erosion shall be repaired and re-seeded in the first fall season after damage. Re-seeding will occur in areas if coverage is less than 20 percent of native species over any contiguous area of 200 sq ft.

Survival of the container plants within the first growing season should be 80 percent. Plants shall be replaced if survivorship falls below 80 percent in the first season. Replacements will be planted as previously specified and maintained for one growing season, as necessary. As sites develop, it is impractical to implement direct counts of all the container plants. Replacement planting after the first season shall only be specified if the visual estimate indicates substantial mortality and the function of these species has not been replaced by seeded material and natural recruitment.

Table 1. Northerly Facing Slope Coastal Sage Scrub Container Plant Palette.

Species	Spacing	# of plants per acre
Artemisia californica	5’	148
Encelia californica	4’	111
Eriogonum cinereum	4’	148
Eriogonum fasciculatum	4’	222
Hazardia squarrosa	4’	37
Heteromeles arbutifolia	5’	7
Leymus condensatus	5’	74
Isocoma menziessi	5’	111
Lotus scoparius	4’	74
Malosma laurina	15’	7
Melica imperfecta	4’	148
Rhus integrifolia	15’	7
Salvia leucophylla	5’	111

Table 2. Northerly Facing Slope Coastal Sage Scrub Seed Mix.

Species	Lbs. Per Acre
Artemisia californica	2
Castilleja exserta	0.5
Deinandra fasciculata	1.5
Encelia californica	1.5
Eriogonum cinereum	2
Eriogonum fasciculatum	3
Eschscholzia californica var. maritima	1.5
Hazardia squarrosa	0.5
Gnaphalium californicum	0.5
Heteromeles arbutifolia	0.1
Leymus condensatus	1
Isocoma menziessi	1.5
Lotus strigosus	1
Lotus scoparius	1
Lupinus succulentus	1
Lupinus bicolor	1

Malosma laurina	0.1
Melica imperfecta	2
Nassella lepida	1
N. pulchra	1
Phacelia cicutaria	0.4
Plantago insularis	20
Rhus integrifolia	0.1
Salvia leucophylla	1.5
Vulpia microstachys	1
Bloomeria crocea	as available
Dichelostemma capitatum	as available
Calochortus catalinae	as available
Total Lbs./Grams per Acre	**46.7**

Table 3. Southerly and Westerly Facing Slope Coastal Sage Scrub Plant Palette.

Species	**Spacing**	**# of plants per acre**
Artemisia californica	5’	125
Encelia californica	4’	125
Eriogonum cinereum	4’	125
Eriogonum fasciculata	4’	375
Heteromeles arbutifolia	5’	19
Isocoma menziessi	5’	94
Lotus scoparius	4’	94
Malosma laurina	15’	6
Melica imperfecta	5’	63
Rhus integrifolia	15’	6
Salvia mellifera	5’	94

Table 4. Southerly and Westerly Facing Slope Coastal Sage Scrub Seed Mix.

Species	**Lbs. Per Acre**
Artemisia californica	2

Castilleja exserta	0.5
Deinandra fasciculata	1.5
Encelia californica	2
Eriogonum cinereum	2
Eriogonum fasciculata	6
Eschscholzia californica var. maritima	1.5
Gnaphalium californicum	0.5
Heteromeles arbutifolia	0.3
Isocoma menziessi	1.5
Lotus strigosus	1.5
Lotus scoparius	1.5
Lupinus succulentus	1
Lupinus bicolor	1.5
Malosma laurina	0.1
Melica imperfecta	1
Nassella lepida	3.5
N. pulchra	1.5
Phacelia cicutaria	0.4
Plantago insularis	20
Rhus integrifolia	0.1
Salvia mellifera	1.5
Sisyrinchium bellum	0.5
Vulpia microstachys	2
Bloomeria crocea	as available
Dichelostemma capitatum	as available
Calochortus catalinae	as available
Total Lbs./Grams per Acre	**53.9**

Table 5. Cactus Scrub Container Plant Palette.

Scientific Name	Common Name	Container Size[1]	Container Plant Spacing[2]	Plants per Acre[3]
Cylindropuntia prolifera	coastal cholla	1-gallon	3’	40
Opuntia littoralis	coast prickly pear	1-gallon	3’	120
			TOTAL	160

[1] A combination of pads, 1-gallon, and 5-gallon cactus can be used.
[2] Spacing = feet on-center distance from other cactus within planting groups. Spacing of 5-gallon cactus should be 6’ from next closest cactus.
[3] Cactus should be planted in groups of 30. Planting groups can consist of a combination of cactus pads, 1-gallon, and 5-gallon plants at the specified number of plants per acre.

Table 6. Cactus scrub seed mix.

Scientific Name	Common Name	Pounds of bulk seed per acre
Artemisia californica	California sagebrush	2.0
Deinandra fasciculata	fascicled tarweed	1.5
Encelia californica	California encelia	1.5
Eriogonum cinereum	ashyleaf buckwheat	2.0
Eriogonum fasciculatum	California buckwheat	6.0
Gnaphalium californicum	California everlasting	0.5
Isocoma menziesii	coast goldenbush	1.5
Lotus scoparius	deerweed	6.0
Lotus strigosus	strigose lotus	1.5
Lupinus bicolor	miniature lupine	3.0
Lupinus succulentus	arroyo lupine	1.0
Melica imperfecta	melic grass	2.0
Nassella lepida[3]	foothill needlegrass	2.5
Phacelia ramosissima	branching phacelia	0.4
Plantago insularis[4]	wooly plantain	20.0
Rhus integrifolia	lemonadeberry	0.1
Salvia mellifera	black sage	0.5
Sambucus Mexicana	Mexican elderberry	0.5
Sisyrinchium bellum	blue-eyed grass	0.5
Vulpia microstachys[4]	small fescue	6.0

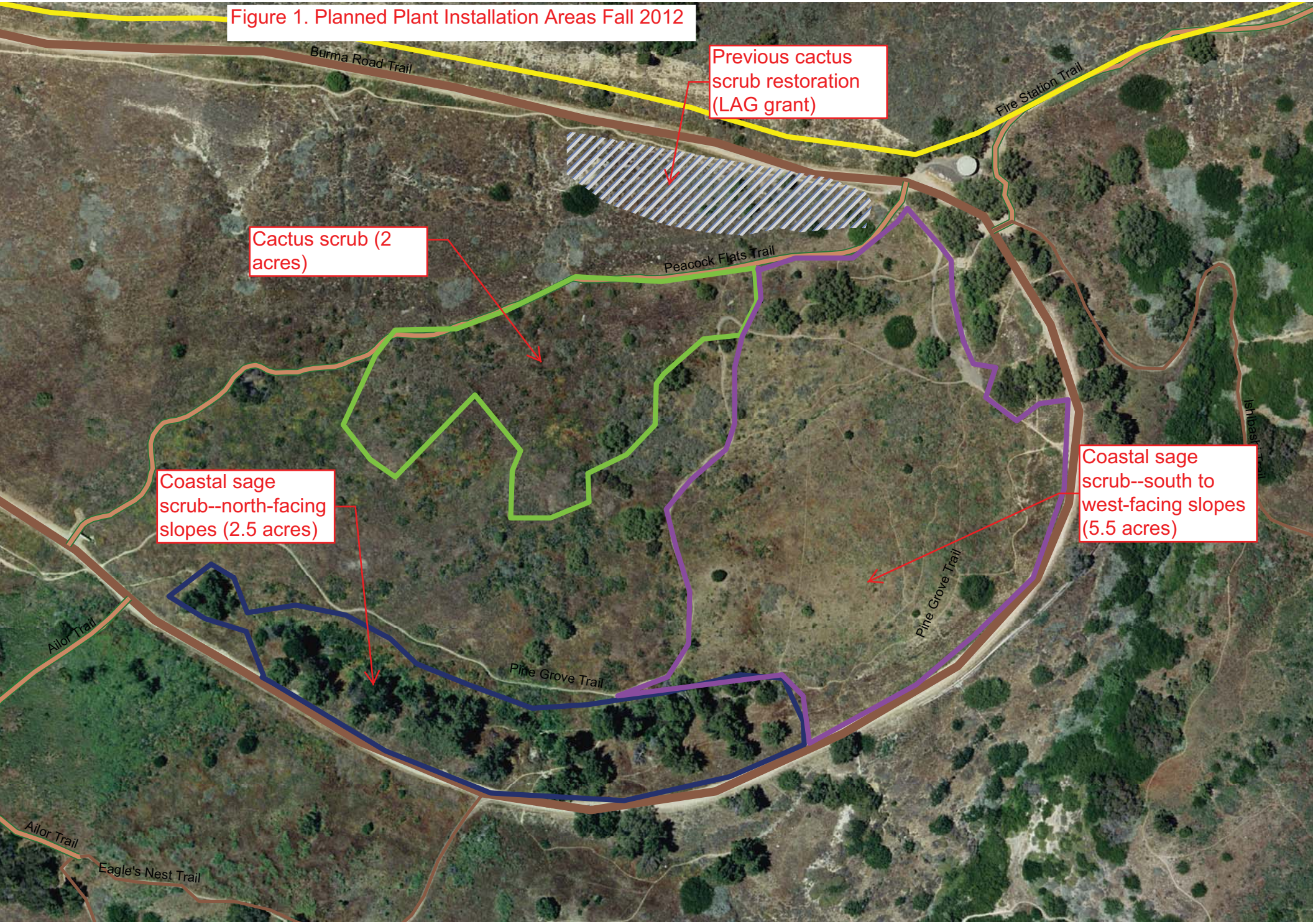


Figure 1. Planned Plant Installation Areas Fall 2012
Burma Road Trail
Previous cactus scrub restoration (LAG grant)
Fire Station Trail
Cactus scrub (2 acres)
Peacock Flats Trail
Coastal sage scrub--north-facing slopes (2.5 acres)
Coastal sage scrub--south to west-facing slopes (5.5 acres)
Pine Grove Trail
Ailor Trail
Pine Grove Trail
Ailor Trail
Eagle's Nest Trail

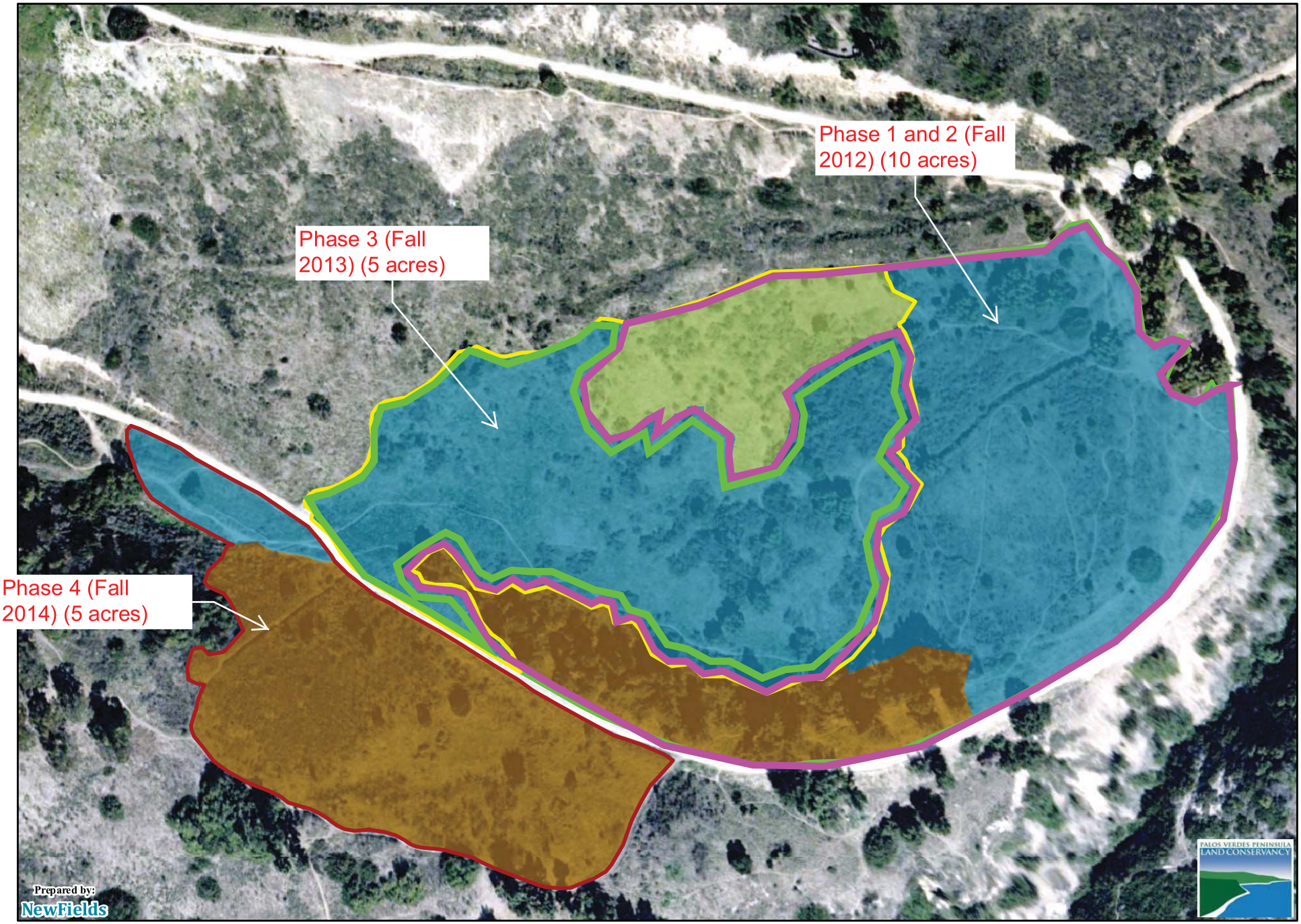


Figure 2.
Proposed Restoration Habitats
Portuguese Bend Proposed Restoration Area
Palos Verdes Nature Preserve

APPENDIX E

RESEARCH AND EDUCATION PROGRAM

1.0 INTRODUCTION

The Research and Education Program at the Palos Verdes Peninsula Land Conservancy (PVPLC) began in 2006 with a generous two-year grant from Alcoa Foundation and Alcoa Fastening Systems. The grant funded the Research, Education, and Community Involvement Program for the Environment (RECIPE), was renewed for two more years in 2008 and concluded in May 2010. Alcoa's support enabled PVPLC to develop a robust research program centered on improving our conservation efforts while extending learning opportunities within our community.

Since the conclusion of the Alcoa Grant, PVPLC has worked toward insuring continuity of the program. Identified needs include strengthening collaborative relationships with universities and organizations, and seeking new funding sources. It was equally important to continue integrating young students and researchers to maintain the spirit of RECIPE. In 2012, the Long Family Foundation Conservation Research Scholarship provided funds for a CSULB student to conduct field research on coastal cactus wrens.

University professors are crucial for the success of research, because they provide expertise and technical guidance, including managing several research projects. Land Conservancy staff provides access to the preserves as well as technical support to participants. Over 30 scientists participate in PVPLC's Science Advisory Panel which supports the research by providing their expertise as needed for research projects on the preserves. The Science Advisory Panel meets annually to offer feedback on restoration projects and covered plant and animal questions in the Preserve.

This report covers the Research and Education Program's activities via the major categories:

- High School Research
- University Research, and
- Community Researchers.

1. List of ongoing research projects in the Preserve.

Research Managed by PVPLC

Three Sisters Bird Survey – A bi-monthly survey to study the bird community's response to a 21-acre restoration effort within the Palos Verdes Nature Preserve.

Wild Animal Surveys – College students track coyote and fox use of the preserves and their diets.

Managed by University Researchers

Archeology at Abalone Cove – CSU Fullerton students, under their professor's guidance, conduct a professional dig at the preserve for Native American artifacts.

Biomass of Encelia californica, Eriogonum cinereum, and Salvia leucophylla – The fourth year for a project to develop a measure of plant material (biomass) contained within an acre of coastal sage scrub utilizing high school and university students.

Multi-Agency Rocky Intertidal Network (MARINe) – A long-term monitoring site was added to the nationally-run MARINe program, managed by a CSU Long Beach marine biology professor and his students.

Microclimate on the Preserves – The fourth and final year of this program involving high school and college students for monitoring habitat temperature and humidity trends for different plant species.

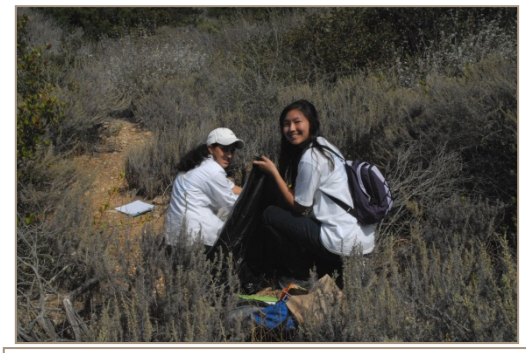
2. 2012 Science Fair Results

PVPLC High School Researchers

Student	Award	Project Title
Christine Chen	Third Place at PV Science Fair, Third Place California State Fair	Assessing Polioptila californica population in differing Artemisia californica habitats
Rachel Dokko Shreya Ramayya	First Place at PV Science Fair, Second Place California State Fair	Biomass analysis of Encelia californica and Salvia leucophylla for carbon sequestration
Dawool Huh	Second Place	Water sources for the Kelvin Canyon Spring
Ashley Yin	First Place	Correlation between Kelvin Canyon Spring water flow and well groundwater level
Albert Liu	Honorable Mention	Effectiveness of volunteer restoration for the Palos Verdes blue butterfly

2.0 HIGH SCHOOL RESEARCH

High school and college students are important elements in PVPLC's field research. By participating in PVPLC's research program with professionals and university researchers, students obtain field and analytical skills in the natural science fields. Additionally, students increase their appreciation of nature while expanding their awareness of opportunities that the natural science fields have to offer. As a result, PVPLC students often win top honors in science fairs and are able to leverage their experience for gaining entrance into top universities, satisfying course credits, or obtaining paid internships (Boxes 2 and 3).



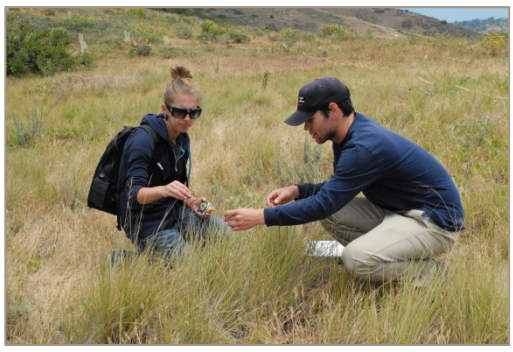
3. High school research
High school researcher Shreya Ramayya and Rachel Dokko collect plant samples for their research project investigating biomass within the habitat on the preserves under the direction of UCLA Research Dr. Rasoul Sharifi.

3.0 UNIVERSITY STUDENTS

College students from local universities participate in research under the umbrella of the Conservancy's Intern program. They participate in programs that are integral with habitat restoration, which provides the students valuable hands-on experience.

PVPLC's stewardship staff conducts a variety of surveys throughout the preserves for assessing habitat quality as well as documenting the progress of our restoration efforts *(Box 4)*. The Conservancy's Interns participated in all the vegetation assessment surveys as well as entered the resulting data into the database. They also developed data tables for reports and conducted the initial stages of the report writing.

In addition to gaining work experience, many students leverage their internships for entrance into a professional job or graduate school. While the Conservancy benefits from their work, the students benefit from experience and training that will benefit them in future careers.



4. University Students
Simone Boudreau (left) and Harrison Kirner identify grass species along a vegetation transect at Three Sisters. Both Interns directly benefitted from their experience: Simone was accepted to graduate school and Harrison is now working for a consulting firm.

4.0 COMMUNITY RESEARCHER

Volunteers are important for PVPLC, not only helping with growing plants, habitat restoration, guiding walks, and special events, but also with science research and education. Our volunteers are terrific and travel from throughout the Peninsula and surrounding areas to help out.

The 5-year Three Sisters Bird Survey, conducted in conjunction with the Palos Verdes/South Bay Audubon Chapter, has been a highly successful effort. Starting in July 2008, volunteers have participated in bimonthly surveys designed to monitor the bird community's response to the Land Conservancy's 21-acre restoration effort at the site *(Box 6)*. During the summer in 2012, following three years of restoration work, we found that the diversity and abundance of birds increased within the restoration area. Also, California gnatcatchers were more regularly seen in the new habitat, and western meadowlarks were seen in the open, grassland areas.

5. List of monitoring programs in 2012.

Vegetation Surveys

Alta Vicente Reserve – On-going surveys on 10 acres of habitat restoration
Defense Fuel Supply Point – Palos Verdes blue butterfly habitat surveys
Three Sisters Reserve – Habitat surveys on a 21-acre habitat restoration
Three Sisters and Alta Vicente Reserves – Study of habitat use by coastal cactus wren funded by the Long Family Foundation Conservation Research Scholarship

Endangered Butterfly Survey

Linden H. Chandler Preserve – Surveys were conducted for the Palos Verdes blue butterfly where progeny from the 2009 - 2011 releases were observed.

6. Community research

Volunteers for the bimonthly Three Sisters Bird Survey hike to an observation site in the restoration area. Although the plants have been in the ground for only two years, many birds are using the new habitat, including California gnatcatchers.

APPENDIX F

Volunteer Program

1.0 INTRODUCTION AND SUMMARY

1.1 VOLUNTEER PROGRAMS

This Annual Report describes each of the individual programs included within the larger Volunteer Program as well as plans for the future. Specific activities are detailed for the reporting period January 1, 2012 to December 31, 2012. The PVPLC continues to work to implement grants geared toward improving this program.

Since 1988, volunteers have played an essential role in fulfilling the Palos Verdes Peninsula Land Conservancy's (PVPLC) mission to preserve land and restore habitat for the education and enjoyment of all. PVPLC is a non-profit organization that relies heavily on the support of community involvement to perform many of the tasks necessary to manage the Nature Preserves. Volunteers donate thousands of hours each year to help with office assistance, event planning, community education, habitat restoration, trail maintenance, and much more. This report divides the various volunteer programs into two categories: Community Involvement Volunteers and Stewardship Volunteers.

The first category, Community Involvement Volunteers, supports volunteer activities that focus on friend making, fundraising, and recommendations to staff on a variety of topics. This category is further divided into four sections which are detailed within the report:

Board of Directors
Committees and Advisory Boards
Special Events and Office Assistance
Education Docents and Nature Walk Leaders

The second category, Stewardship Volunteers, supports activities that are performed on the land to assist with management of the Preserves. In all, there are six programs within this category that are described in more detail in the Stewardship Volunteer section of this report. The backbone of the program is our regularly scheduled Saturday outdoor workdays that are open to participation by all and require no long-term commitment. Periodically, there are also individuals or groups that contact the PVPLC and arrange to complete stewardship projects outside of the normally scheduled outdoor workdays. Boy Scouts and Girls Scouts interested in obtaining their final awards are two such groups. There are also several Stewardship Volunteer opportunities that require long term commitments. The six programs are listed below:

- Outdoor Volunteer Workdays
- Team Leaders
- Habitat and Ecological Restoration Organization (HERO) Club
- Scout Awards

- Trail Crew
- Keeping an Extra Eye on the Preserve for Environmental Review and Stewardship (KEEPERS)

In 2012, volunteers provided a grand total of **13,569** hours of service (Table 1). According to the Independent Sector, volunteer time in California is valued at $24.18 per hour (based on Dollar Value of a Volunteer Hour, by State: 2010, Independent Sector), thus generating a total of **$328,108** of in-kind services. The amount of volunteer hours donated at each Nature Preserve or for a specific volunteer category depends on the size of property or specific projects that transpired during the reporting period.

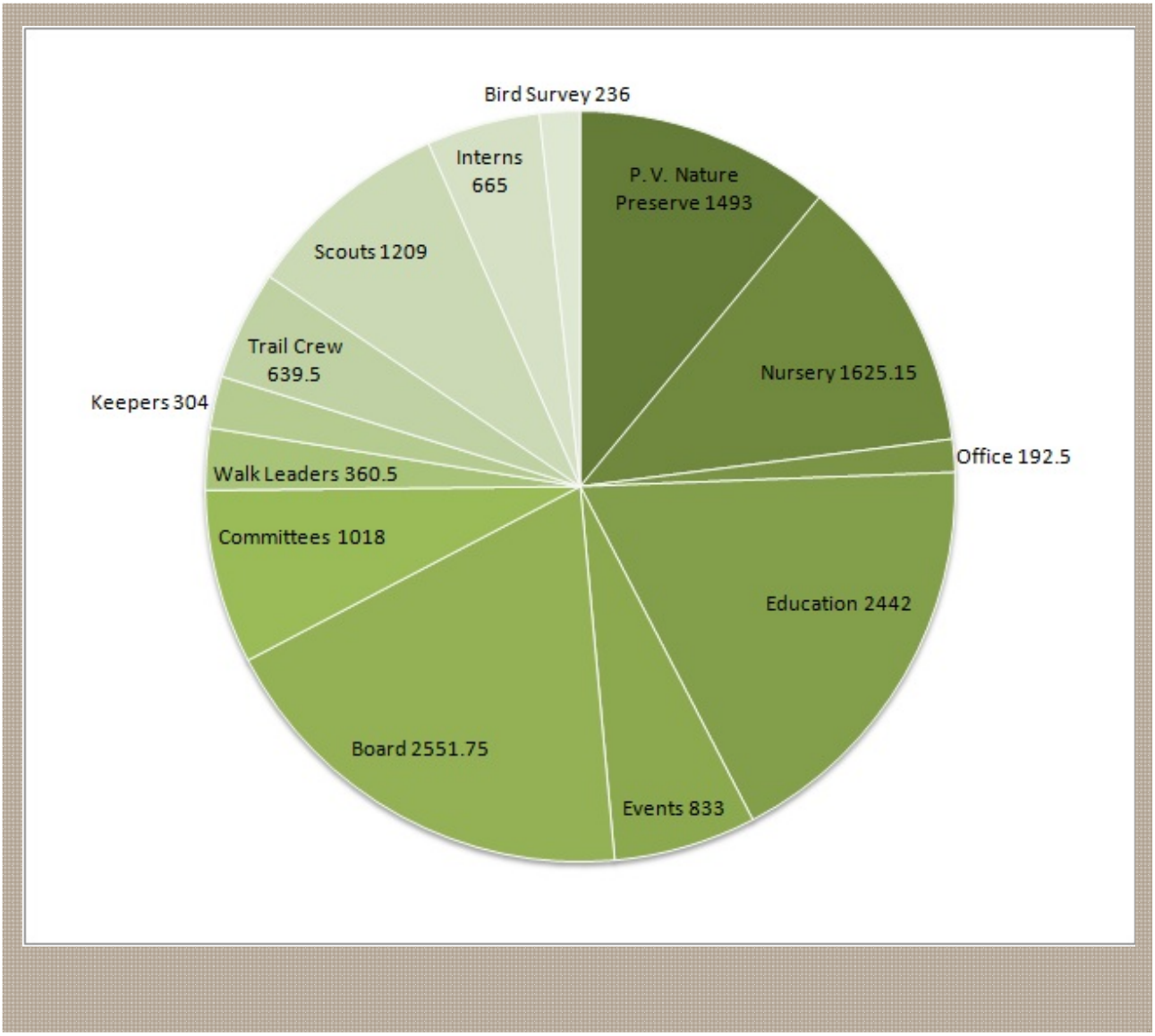


Figure 1. Number of Volunteer Hours Completed by Volunteers for PVNP Support in 2012.

2.0 COMMUNITY INVOLVEMENT

2.1 BOARD OF DIRECTORS

PVPLC is driven and supported by a seventeen-member volunteer board, which meets on a regular basis to strategize and direct the organization's mission. This year, the board contributed about 2370 hours in serving the Land Conservancy's mission.

2.2 COMMITTEES AND ADVISORY BOARDS

The PVPLC maintains numerous committees and advisory boards for the following purposes:

- To provide review and recommendations regarding organizational plans and policies
- To provide assistance with the operations of the organization
- To provide community input for PVPLC activities
- To provide a training and evaluation ground for potential members of the Board of Directors

Committee volunteers donated a total of 1018 hours, with many committees meeting on a quarterly basis. Hours for committee-involved board members are compiled with their board volunteer time. The committees that were active during the reporting period are listed below:

- Audit Committee
- Finance Committee
- Fundraising Committee
- Investment Committee
- Science Advisory Panel
- Personnel/Human Resources Committee
- Special Events Committee(s)

2.3 SPECIAL EVENTS AND OFFICE ASSISTANCE VOLUNTEERS

The PVPLC relies on individual volunteers and organized groups, such as the National Charity League (NCL), Los Hermanos, and Assisteens, to assist PVPLC staff with all major fundraising and friend-raising events. We have built very strong and fulfilling relationships with these groups and strive to provide an environment that lets volunteers know they are indispensable and an integral part of our organization.

One of the largest special events is the annual White Point Home Tour, organized by members of the White Point Steering Committee and community members. The funds raised make it possible to complete the transformation of the White Point property into a functioning nature

preserve. It includes local home tour, an evening reception with great food provided by San Pedro restaurants, live music and silent auction. Volunteer tasks include event planning, soliciting donations for the auctions and food, setup and cleanup, and staffing the event. Other special events supported by committees and volunteers this year included the Edge of LA, PV Pastoral, Trump Wine and Beer Festival, and more.

In the office, volunteers handle routine tasks such as labeling newsletters, stuffing envelopes, assembling event materials, planning and preparation for special events, and much more. During the 2012 reporting year, office volunteers and special event volunteers, donated 1026 hours of assistance.

2.4 EDUCATIONAL PROGRAMS

Volunteers assist with education-based programs to inform community members of all ages about natural spaces on the peninsula. Education is provided to the public through Third Grade Docents Program and monthly Nature Walks.

Third Grade Docents

The Third Grade Docents volunteered a total of 738 hours in 2012. Since the start of the program, the docents have served nearly 25,000 students. The docent group is comprised of a diverse group of retired professionals and active volunteers from all over the Peninsula with backgrounds range from law and engineering to nursing, chemistry and education. This team of dedicated people is trained by Third Grade Program Manager, John Nieto, who began running the program in 2000. He is directly responsible for the management and coordination of the entire program. While John Nieto and the docents are paid for their time in the classroom, they donate many additional hours to make the program a success.

In addition to learning the academic information required to give lessons in the classroom, docent's also volunteer extra time to developing techniques for the trail by attending various training hikes and observing other docents teaching the program.

Prior to the field trip, each docent visits his or her school's third grade classrooms and conducts four weekly lessons covering such topics as birds, invertebrates, geology, Tongva indigenous culture, reptiles, mammals and plants. One of the main goals embedded in this standards-based curriculum is to help students understand the difference between native and non-native species present in the coastal sage scrub community of the Palos Verdes Peninsula. The docents meet yearly at the end of the semester to discuss accomplishments of the year and possible new activities for the upcoming school year.

Nature Walks

Nature Walk Leaders donated a total of 307 hours in 2012. Former PVPLC Board of Directors member Anke Raue coordinates this group of dedicated volunteers and each prospective walk leader must have a high level of knowledge the local ecosystem, particularly the native and non-native plants found on the Peninsula. Leaders must go through extensive training and be willing to research and learn about local history, geology, flora and fauna. Continued research and exploration serves to add to a walk leader's knowledge base, preparing them to give accurate and in-depth presentations to the public.

Walks are held all over the Peninsula, from the edge of the coast to deep within the canyons. Each leader designs his or her presentation to include special attributes and stories particular to a site. Nature walks occur once a month every month throughout the year, featuring a different location every time (in Appendix).

2.5 STEWARDSHIP VOLUNTEERS

Stewardship volunteers play an integral part in helping PVPLC staff exceed our goals for restoring all managed open spaces. Outdoor volunteer workdays provide an opportunity for public volunteers to contribute to habitat and trail restoration efforts lead by Team Leaders, the Trail Crew class builds skills for volunteers to maintain the trail system, and KEEPERS help "keep an eye" on the Reserves on a monthly basis. Scout projects, local HERO Club chapters and nursery volunteers are also Stewardship volunteers that support Conservancy restoration efforts. These restoration efforts take place within the Palos Verdes Nature Preserve, Chandler Reserve, George F Canyon, White Point Nature Preserve and Navy Fuel Defense Support Point.

Stewardship volunteer highlights in 2012:

- 7064 hours of outdoor stewardship volunteer time
- $15,000 REI grant to support volunteer programs and trails development
- Reinforced a patch-habitat restoration effort for the Palos Verdes blue butterfly with 3 groups: CSU Domiguez Hills, Audubon YES! Club and the HERO Club
- Facilitated the volunteering effort of several organizations and corporate give-back events

2.6 OUTDOOR VOLUNTEER WORKDAYS

The PVPLC holds outdoor volunteer days nearly every Saturday of the year, held from 9am-12pm, excluding holiday weekends and during the month of August. The focus of these events is to restore native habitat, maintain the trail system, and do general clean-ups. The intended demographic is focused on individuals of all ages, organized groups such as Boy Scouts and the National Charity League, and employee volunteer days for corporations. All age groups are encouraged to participate. There is a particular focus on getting young people involved as a

mechanism to ensure education and stewardship on the Preserves in perpetuity. We work with local schools and colleges to have teachers bring groups of students or give incentives such as extra credit and service-learning hours for students who participate on the Saturday workdays.

A detailed account of workdays found below. Events are listed chronologically by Preserve with the Palos Verdes Nature Preserve (PVNP) further separated by Reserve.

Figure A

Above: Lunada Canyon full of fennel before current restoration efforts. Yellow circle indicates the work area of photo below (August 2011).

Below: Volunteers removing fennel and clean the slate for new shrubs to be planted (March 2012).

Palos Verdes Nature Preserve (PVNP)

Abalone Cove Reserve

- *September 15* – 230 volunteers removed marine debris and invasive iceplant as a part of the annual Coastal Cleanup Day in partnership with the Los Serenos and City of Rancho Palos Verdes.

Agua Amarga Reserve

- *February 25* – 32 volunteers used loppers to cut fennel from the canyon.
- *March 3* – 23 volunteers removed fennel with loppers.
- *March 24* – 42 volunteers removed fennel with loppers.
- *April 28* – 17 volunteers removed iceplant.
- *June 26* – Five volunteers removed fennel with loppers.
- *October 27* – 21 volunteers planted 30 shrubs in the newly-cleared area to replace fennel.

Alta Vicente Reserve

- *May 12* – Nineteen volunteers weeded non-native plants around establishing native species in the Phase 1 restoration area.

Portuguese Bend Reserve

- *February 18* – Nineteen volunteers continued to remove fennel in the "fennel forest" project initiated in 2011 along Ailor Trail.
- *March 10* – Twelve volunteers removed fennel with loppers.
- *March 31* – 22 volunteers continued to remove fennel with loppers.
- *May 19* – 44 volunteers removed fennel with loppers.
- *June 2 (National Trails Day)* – 43 volunteers from the Trail Crew and public repaired tread and removed weeds on the upper Ishibashi Trail and Ailor Trail.
- *October 6* – Eight volunteers lopped fennel.
- *October 13* – Seven volunteers planted 30 shrubs and cared for other shrubs planted in Peacock Flats area.
- *October 20* – 20 volunteers planted cholla and watered other shrubs.
- *November 10* – Ten volunteers installed t-bars and strung nylon rope to fence off the restoration area.

- *November 17* – 30 volunteers including the AmeriCorps roped off the Peacock Flats restoration area and continued to lop fennel.
- *December 8* – Fifteen volunteers planted 50 native shrubs in the Peacock Flats restoration area.

Three Sisters Reserve

- *January 28* – 50 volunteers planted 80 shrubs and removed weeds from around natives previously planted.
- *February 4* – 23 volunteers planted 50 native shrubs.

Native Plant Nursery

Activities in the Native Plant Nursery include transplanting seedlings from flats into individual containers, removing weeds from the containers. On rare occasion, groups help maintain the shade structure, build plant benches and repair the weed barrier cloth. The following dates detail the nursery's volunteer effort this year:

- *February 11* – Fourteen volunteers transplanted 365 *Encelia californica* seedlings and weeded containers.
- *March 17* – Eight volunteers made seeds balls on a rainy day.
- *April 7* – Seventeen volunteers transplanted *Rhus integrifolia* seedlings and weeded plant containers.
- *May 5* – Twelve transplanted 475 bunchgrasses into containers.
- *May 26* – Seventeen volunteers transplanted seedlings and weeded plant containers.
- *September 8* – Seven volunteers transplanted 250 *Lotus scoparius* seedlings into 1-gallon containers.
- *October 27* – Thirteen HERO Club volunteers transplanted seedlings and weeded containers.
- *December 15* – Eleven volunteers from the HERO Club transplanted 400 seedlings and weeded containers.

2.7 TEAM LEADER PROGRAM

The Team Leader program was started in 2007 in response to the growing number of volunteers that were attending the Outdoor Volunteer Workdays. Team Leaders are volunteers, sixteen years or older, who assist in supervising the Saturday outdoor volunteer activities. They ensure that volunteers have adequate instruction and the tools necessary to complete the task. They also assist in educating the public about the PVPLC.

The program requires that interested volunteers go through an application and interview process. Candidates then attend a half-day weekend workshop where they learn the skills necessary to motivate and supervise volunteers during Saturday Outdoor Volunteer Days. Training involves practicing leadership skills and communicating restoration techniques. Team Leaders commit to working at least four volunteer days within one year. The goal of the PVPLC is to hold two Team Leader workshops each year and train a minimum of six new Team Leaders at each one. In 2012, two workshops took place at White Point Nature Preserve – ten volunteers were trained on March 31 and fourteen were trained on September 22.

The Team Leader Program has helped develop leadership skills in participants and has greatly contributed to the success of our Outdoor Volunteer Workdays. The quality of work from regular volunteers has increased with the guidance of Team Leaders. In addition to local adult participants, many of the Team Leaders attend local high schools and universities. During the reporting period, the program has allowed these students to build leadership skills that they will find useful in their future.

2.8 HABITAT AND ECOLOGICAL RESTORATION ORGANIZATION (HERO) CLUB

In years past, the HERO Club participated in about eight Outdoor Volunteer Day events a year, striving to host one event every month. This year, the HERO Clubs at Peninsula High School and Palos Verdes High School joined efforts to adopt a plot at Chandler Reserve to restore habitat for the Palos Verdes Blue Butterfly with funding support from a one-year Toyota/Audubon TogetherGreen Fellowship.

HERO Club coordinators also participate in the Team Leader training program in an effort to learn more about habitat restoration and leadership to help facilitate the Outdoor Volunteer Days.

The HERO Club started at two local high schools – Peninsula High School and the Palos Verdes High School – in September 2007 when a group of students partnered with the PVPLC to help the environment through volunteering and help the PVPLC in their mission to preserve land and restore habitat. The club coordinates with PVPLC and their Outdoor Volunteer Workday schedule to recruit student volunteers during several Saturday HERO Club workday events a year. Their efforts have received much community support and praise.

2.9 SCOUT PROJECTS

The PVPLC encourages Boy Scouts and Girl Scouts who are looking for projects to complete their final awards, Eagle Awards for Boy Scouts and Gold Awards for Girl Scouts, by providing them with opportunities to complete their projects on preserves the PVPLC manages. This collaboration is beneficial to the scout groups, the PVPLC, and the public that uses the preserves. Scouts work under the mentorship of one of the PVPLC staff to complete their projects and are steered toward objectives that meet the PVPLC stewardship goals. In 2011, scout projects have accumulated over 700 hours of volunteer service and are detailed below:

- Joseph Ong – Joseph installed post-and-rope trail closures at Forrestal Reserve.
- Michael Nakahara – Michael and his troop constructed plant tables at the native plant nursery.
- Alex de Loza – Alex lead his troop in closing spur trails with post-and-rope as well as cactus plantings.
- Justin Unno – Justin worked with his troop to close a network of spur trails in east Alta Vicente Reserve.
- Matthew Goodney – Matthew worked with his troop to construct nursery benches to hold native plants.

Figure C. PVPLC partnered with the PV/South Bay Audubon on a Toyota/Audubon TogetherGreen Innovation grant with the purpose of enhancing the Team Leader training experience and develop workshop materials.

2.10 TRAIL CREW VOLUNTEER PROGRAM

This year, the volunteer Trail Crew contributed a total of 640 hours to maintaining the Preserve's trail system. These hours include the second-Saturday monthly class trainings as described below (480 hours), as well as additional trail work, such as weed whacking or spur trail closures, executed by Trail Crew members outside of the classes (160 hours).

The Volunteer Trail Crew class offered is based on the Basic Trail Maintenance class developed by Frank Padilla, Jr. (retired California State Parks Supervisor), and Kurt Loheit. Originally started in 1992, the class focused on both volunteer and agency skill building. Adopted by the Los Angeles District of California State Parks and later the Southern California Trails Coalition, it became the first step in advanced classes for crew leader training and design and construction classes, allowing a structured path for participants to build skills associated with trails from basic maintenance to highly advanced techniques. The class is a combination of classroom and hands-on training to familiarize the participants in all aspects of trail maintenance. The course emphasizes safety, assessments, basic maintenance skills, water control, erosion sources, terminology, proper tool use, basic survey skills, resource considerations, and user experience and maintenance value. Volunteers who demonstrate proficiency in each learned skill and fulfill a yearly indoctrination will maintain status as a qualified Trail Crew member.

Participants must be at least 18 years old and must first take the introductory course. The 50-hour course can be taken at the participant's own pace and it is estimated to take about a year to complete. There are scheduled Trail Crew Skills Classes that coordinate with the trail instructor's availability and the PVPLC Outdoor Volunteer Workday schedule.

To date, twelve volunteers have completed the training program and about a dozen other participants are close to completing their 50 hours of required training and could be expected to take the yearly indoctrination sometime in 2013.

Figure E. Left: Independent Trail Crew members held a work day to close spur trails off Flying Mane Trail at Forrestal Reserve. Right: Trail Crew members we trained in how to operate weed "whackers" and helped clear trails in spring 2012.

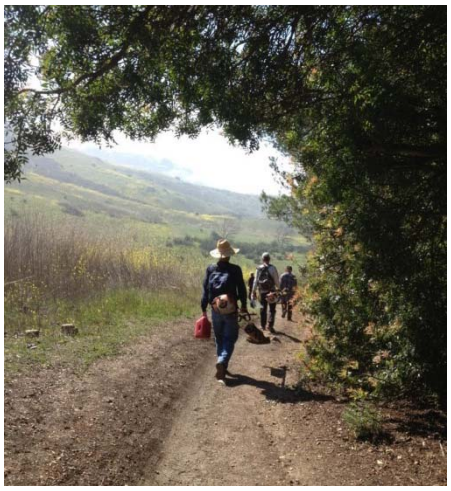


Table 2
Trail Crew Training Classes

Date	# Volunteer Hours	Location	Project/Skill Learned
January 14	35	Abalone Cove	Rock work
February 11	30	White Point	Introductory Class
March 10	30	Portuguese Bend	Water control and grade dips
April 14	0	*None*	*Cancelled due to rain*
May 12	24	Abalone Cove	Trail assessment and realignment
June 2	39	Portuguese Bend	NTD: tread repair and brushing
June 9	36	Portuguese Bend	Tread skills – Grapevine Trail
July 14	33	White Point	Introductory Class
August 10	51	Forrestal	Pruning and fence removal
September 8	51	Portuguese Bend	Survey and assessment
October 13	45	Three Sisters	Tread repair and water diversion
November 10	55.5	Abalone Cove	Trail assessment and construction
December 8	51	Portuguese Bend	Trail clearing

Participation, location and skills learned at each Trail Skills class.

2.11 KEEPING AN EXTRA EYE ON THE PRESERVES STEWARDSHIP (KEEPERS) PROGRAM

In 2012, The KEEPERS program contributed 304 hours to monitoring the Preserves. The program was developed in April of 2007 to help staff monitor the nearly 1600 acres of land that is managed by the PVPLC. Keepers are volunteers who monitor an area within a preserve and fill out monthly property review forms. These forms are reviewed by staff and consolidated into a monthly report that is sent to all of the current Keepers.

The property review form is a one page form that requires some knowledge of basic trail maintenance and plant identification. The skills needed to fill out these forms are provided in a training session with a PVPLC staff person and are continually developed with an ongoing relationship between the volunteer, the PVPLC staff, and regular visits to the preserve being monitored. This volunteer opportunity is a one year commitment (a total of 12 visits) to the chosen preserve area. Some of the properties managed by the PVPLC are large enough to require more than one Keeper to monitor them. The person or group that accepts this responsibility also helps, if necessary, to train the following year's replacement volunteer Keeper. Currently, there is no term limit.

Table 3
Number of KEEPERS in Each Reserve

Reserve	# of Keepers
Abalone Cove Reserve	4
Agua Amarga Reserve	3
Alta Vicente Reserve	1
Filiorum Reserve	3
Forrestal Reserve	2
Portuguese Bend Reserve	5
San Ramon Reserve	1
Three Sisters Reserve	1
Vicente Bluffs Reserve	1

2.12 GRANTS

In August 2012, REI awarded the PVPLC with a $15,000 grant to improve volunteer tracking methods through a database, offer event signups through the PVPLC website, to develop volunteer program recruitment materials (ie. Rack card), and to support stewardship volunteers events with supplies and tools.

PVPLC partnered with PV/South Bay Audubon for a TogetherGreen Innovation Grant to enhance the YES (Youth Environmental Service) program through development of a Team Leader program in which the Land Conservancy will act as the pilot organization. There were two Team Leader workshops facilitated by YES Club coordinator, Marcos Trinidad, which were supported by newly developed training materials.

2.13 FUTURE PLANS

Further improvements can be made in retaining, focusing and motivating Team Leaders of all ages and future recruitment may be focused toward environmentally-minded college students and active community residents, perhaps through internship opportunities. Additionally, the same goals can be applied towards the Trail Crew program's ability to motivate graduated volunteers to develop and execute trail projects independently. Leaders from the crew could be supported into leadership roles through one-on-one coaching and/or workshops.

APPENDIX

Preserving land and restoring habitat for the education and enjoyment of all

Madrona Marsh
January 14, 2012, 9-11 am

Visit an oasis for birds and other wildlife in the City of Torrance. This former oil field is now an easily accessible ecological jewel. Easy. TOR

Cabrillo Beach
February 11, 9-11 am

Visit a restored salt marsh, see a coastal native plant garden and learn about this historic area, Cabrillo Aquarium and the beachfront adjacent to Los Angeles Harbor. Moderate. LA

Abalone Cove
March 10, 3-5 pm

Enjoy this afternoon hike at beach level to see lava intrusions and explore the tidepools at low tide. Rocky terrain - wear shoes with good traction. Moderate. RPV

Chandler Preserve
April 14, 9-11 am

Admire this flourishing 28-acre Preserve featuring restored habitat for endangered Palos Verdes blue butterflies and look for special native wildflowers including golden star lilies. Easy to moderate. RHE

Forrestal Reserve
May 12, 9-11 am

This 155-acre Reserve offers some of the best wildflowers viewing in Spring. See dramatic geological formations on the cliffs at this former basalt quarry where faults, folds, sedimentary bedding and igneous intrusions are visible. Moderate to strenuous. RPV

White Point Ranger Walks

WHITE POINT NATURE EDUCATION CENTER & PRESERVE
1600 W Paseo Del Mar
San Pedro, CA 90731
Tel: (310) 561-0917
Hours: Wed, Sat & Sun 10 am - 4pm

Ranger Walks: Every second Saturday (Free - provided by City of Los Angeles) 10 am–12 noon

Three Sisters Reserve *New!*
June 9, 9-12 noon

Enjoy a challenging 3-hour hike in the Palos Verdes Nature Preserve to view the successful 21-acre habitat restoration work and both common and rare birds that are now using the new habitat. Strenuous. RPV

South Shoreline Park
July 14, 4-6 pm

Join this afternoon walk through impressively restored habitat on top of an ancient slide area with spectacular bluff-top ocean views that are well worth the visit! Moderate. RPV

Altamira Canyon
August 11, 9-11:30 am

This extensive hike will take you from the end of Crenshaw Blvd. along Burma Road and through the Conservancy's habitat restoration work at Peacock Flats, then return uphill on the Rattlesnake Trail through lovely Altamira Canyon. Strenuous. RPV

Ocean Trails Reserve
September 8, 9-11 am

Walk through mature coastal sage scrub and cactus habitat near the Trump Golf Club along the bluffs before continuing down to the rocky beach, and returning to Founders Park. Strenuous. RPV

White Point Nature Preserve
October 13, 9-11 am

Search for creepy crawlers to celebrate Halloween on this informative walk from the Nature Center to the historic military gun emplacements above to view breath-taking ocean vistas. Moderate. LA

Friendship Park
November 10, 3-5 pm

Take in some of the best harbor and Catalina views on the eastern side of the Peninsula. See habitat restored by the Conservancy for the Palos Verdes blue butterfly. Moderate. LA

Oceanfront Estates/Lighthouse
December 8, 9-11 am

Enjoy a family walk along the bluff edge, then tour the open Pt. Vicente Lighthouse and end at the Pt. Vicente Interpretive Center, a premier whale-watching site. Easy. RPV

Peck Park Canyon *New!*
January 12, 2013, 9-11 am

Walk through shaded canyon woodlands, site of the former Hernandez Ranch on the east side of the Peninsula in San Pedro. Moderate. LA

George F Canyon Walks

GEORGE F CANYON NATURE CENTER
27305 Palos Verdes Drive East
Rolling Hills Estates, CA 90274
Tel: (310) 547-0862 Hours: Friday: 1- 4 pm; Sat & Sun 10 am - 4 pm

First Saturday Bird Walks: 9 -11 am (Binoculars provided; slow, easy and quiet walk - Free)
First Saturday Walks: Guided walks through the canyon: 1-3 pm ($5 person)
Full Moon Hike: Friday or Saturdays on or near a full-moon (see back for dates)
Must be age 9 and up ($10 person. Please call for exact dates and times)

The Land Conservancy is a nonprofit 501(c)(3) organization dedicated to open space preservation and habitat restoration throughout the Peninsula.

Where indicated, walks are co-sponsored by Palos Verdes Estates (PVE), Rancho Palos Verdes (RPV), Rolling Hills Estates (RHE), City of Los Angeles (LA), or Torrance (TOR).

PALOS VERDES PENINSULA LAND CONSERVANCY
PO Box 3427, Palos Verdes Peninsula, CA 90274 Tel: (310) 541-7613
Web: WWW.PVPLC.ORG

Printing sponsored by
Wild Birds Unlimited
Nature Shop

Winter 2012

Palos Verdes Peninsula Land Conservancy
VOLUNTEER WORKDAYS

Preserving land and restoring habitat for the education and enjoyment of all

Native Plant Nursery
January 7, 9-12 pm

Remove iceplant to make way for Palos Verdes blue butterfly habitat. Reservations required.

Three Sisters Reserve
January 28, 9-12 pm

Plant natives to improve rare cactus wren and gnatcatcher bird habitat.

Portuguese Bend Reserve
February 18, 9-12 pm

Be a weed warrior and fight the battle against fennel invaders.

Portuguese Bend Reserve
March 10, 9-12 pm

Fennel is everywhere, but not for long! Help remove it from the restoration area.

Portuguese Bend Reserve
March 31, 9-12 pm

Help us win the war on fennel and eradicate it to improve wildlife habitat.

White Point Nature Preserve
January 16, 9-12 pm (Monday)

Celebrate Martin Luther King, Jr. Day of Service planting natives and repairing trails.

Three Sisters Reserve
February 4, 9-12 pm

Finish planting natives and remove competing weeds to improve habitat.

Agua Amarga Reserve
February 25, 9-12 pm

Contribute to the restoration plan by removing fennel.

Native Plant Nursery
March 17, 9-12 pm

Help us transplant seedlings and weed plant containers. Reservations required.

Pelican Cove (Fishing Access)
January 21, 9-12 pm

Beautify the coastline by removing trash and creating seed balls.

Native Plant Nursery
February 11, 9-12 pm

Help us transplant seedlings and weed plant containters. Reservations required.

Agua Amarga Reserve
March 3, 9-12 pm

Help us restore this canyon by battling the fennel.

Agua Amarga Reserve
March 24, 9-12 pm

Fennel doesn't stand a chance. Help us eradicate it from the restoration area.

Trail Crew Introductory Class

WHITE POINT NATURE PRESERVE
1600 W Paseo Del Mar
San Pedro, CA 90731
Tel: (310) 561-0917
Saturday, February 11th, 9 am - 1pm

Join the Trail Crew for monthly field practice in trail assessment and repair techniques. The Intro Class will give an overview to the program. Snacks provided. RSVP to Adrienne Bosler at: ABOSLER@PVPLC.ORG.

Scout Projects

GEORGE F CANYON NATURE CENTER
27305 Palos Verdes Drive East
Rolling Hills Estates, CA 90274
Tel: (310) 547-0862
Hours: Friday: 1- 4 pm; Sat & Sun 10 am - 4 pm

The Conservancy greatly appreciates the contributions Scouts make to our work. There are several options offered to meet badge requirements of Cub Scouts, Brownies and Junior Girl Scouts that can be fulfilled at the George F Canyon Nature Center. Please visit WWW.PVPLC.ORG to find out more.

Schedule is subect to change. Cancelled in event of rain. Closed toe shoes are required. Long pants suggested. Help support our conservation effort by bringing your own water to reduce waste during the event.

The Conservancy is a nonprofit 501(c)(3) organization dedicated to open space preservation and habitat restoration throughout the Peninsula.

Volunteer Workdays Sponsor:

REI www.rei.com

PALOS VERDES PENINSULA LAND CONSERVANCY PO Box 3427, Palos Verdes Peninsula, CA 90274 Tel: (310) 541-7613 Web: WWW.PVPLC.ORG

PALOS VERDES PENINSULA LAND CONSERVANCY

Native Plant Nursery
April 7, 9-12 pm

Remove iceplant to make way for Palos Verdes blue butterfly habitat. Reservations required.

Agua Amarga Reserve
April 28, 9-12 pm

Contribute to the restoration plan by removing fennel.

Portuguese Bend Reserve
May 19, 9-12 pm

Be a weed warrior and fight the battle against fennel invaders.

White Point Nature Preserve
June 9, 9-12 pm

Beautify the demontration gardens and trails.

Alta Vicente Reserve
June 30, 9-12 pm

Help the native plants grow by removing the competition.

White Point Nature Preserve
April 14, 9-12 pm

Beautify the demontration gardens and trails.

Native Plant Nursery
May 5, 9-12 pm

Help us transplant seedlings and weed plant containers. Reservations required.

Native Plant Nursery
May 26, 9-12 pm

Help us transplant seedlings and weed plant containers. Reservations required.

Native Plant Nursery
June 16, 9-12 pm

Help us transplant seedlings and weed plant containers. Reservations required.

White Point Nature Preserve
April 21, 9-12 pm - Earth Day

Volunteer, art and educational activities for the whole family.

Alta Vicente Reserve
May 12, 9-12 pm

Help the native plants grow by removing the competition.

Portuguese Bend Reserve
June 2, 9-12 pm - National Trails Day

Help us repair the trails that thousands of people enjoy each year.

Agua Amarga Reserve
June 23, 9-12 pm

Fennel doesn't stand a chance. Help us eradicate it from the restoration area.

Trail Crew Introductory Class

WHITE POINT NATURE PRESERVE
1600 W Paseo Del Mar
San Pedro, CA 90731
Tel: (310) 561-0917
Saturday, July 14th, 9 am - 1pm

Join the Trail Crew for monthly field practice in trail assessment and repair techniques. The Intro Class will give an overview to the program. Snacks provided. RSVP to Adrienne Bosler at: ABOSLER@PVPLC.ORG.

Scout Projects

Palos Verdes Peninsula Land Conservancy
916 Silver Spur Road, #207
Rolling Hills Estates, CA 90274
Tel: (310) 547-0862
Email: info@pvplc.org

The Conservancy greatly appreciates the contributions Scouts make to our work. There are several options offered to meet badge requirements of Cub Scouts, Brownies and Junior Girl Scouts that may be completed on the preserves or at the George F Canyon and White Point nature centers. Please visit www.pvplc.org for a list of available project and badge opportunities.

Schedule is subect to change. Cancelled in event of rain. Closed toe shoes are required. Long pants suggested. Help support our conservation effort by bringing your own water to reduce waste during the event.

The Conservancy is a nonprofit 501(c)(3) organization dedicated to open space preservation and habitat restoration throughout the Peninsula.

Volunteer Workdays Sponsor:

REI www.rei.com

PALOS VERDES PENINSULA LAND CONSERVANCY PO Box 3427, Palos Verdes Peninsula, CA 90274 Tel: (310) 541-7613 Web: WWW.PVPLC.ORG

Summer Volunteering

Help the Conservancy maintain the preserves to ensure healthy habitats for local wildlife and safe trails for visitors!

We need help at our nature centers with:

- ***trail maintenance***
- ***seed collection***
- ***planting***
- ***weeding***

White Point Nature Preserve
1600 W. Paseo del Mar in San Pedro
Wednesdays 10-12:00pm and Saturdays 10:30am-12:30pm

George F Canyon Nature Preserve
27305 Palos Verdes Drive East in Rolling Hills Estates
Fridays 2-4pm and Sundays 10:30am-12:30pm

Native Plant Nursery in San Pedro
Fridays 9-12:00pm. Reservations required!

To RSVP for groups over 5 or for more information contact: (310) 541-7613 or email: info@pvplc.org

PALOS VERDES PENINSULA LAND CONSERVANCY

Navy Defense Fuel Supply Point
September 1, 9-12 pm

Help combat invasive iceplant as we remove it from nearby PV blue butterfly habitat. Reservations required.

Team Leader Training Workshop
September 22, 9-12 pm

Applications available on our website: www.pvplc.org are due September 15.

Portuguese Bend Reserve
October 13, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Native Plant Nursery
November 3, 9-12 pm

Help us transplant seedlings and weed plant containters. Reservations required.

White Point Nature Preserve
December 1, 9-12 pm

Plant natives and beautify the demonstration garden surrounding the Nature Education Center.

Due to holidays, there are no volunteer days on November 24th and December 22nd and 29th.

Native Plant Nursery
September 8, 9-12 pm

The Nursery is in need of transplanting seedlings and weed plant containers. Reservations required.

White Point Nature Preserve
September 29, 9-12 pm

NATIONAL PUBLIC LANDS DAY! Sponsors Toyota and REI will host volunteers of all ages to plant native habitat.

Portuguese Bend Reserve
October 20, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Portuguese Bend Reserve
November 10, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Portuguese Bend Reserve
December 8, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Abalone Cove Reserve
September 15, 9-12 pm

COASTAL CLEAN-UP DAY! Collect trash in partnership with the City of RPV and Los Serenos de Pt.Vicente.

Portuguese Bend Reserve
October 6, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Agua Amarga Reserve
October 27, 9-12 pm

Help remove invasive plants and plant native shrubs at the restoration site.

Portuguese Bend Reserve
November 17, 9-12 pm

Help us restore habitat by planting native shrubs and remove invasive plants.

Native Plant Nursery
December 15, 9-12 pm

Help us transplant seedlings and weed plant containters. Reservations required.

Scout Projects

The Conservancy greatly appreciates the contributions Scouts make to our work. There are several options offered to meet badge requirements of Eagle Scout, Cub Scouts, Brownies and Junior Girl Scouts that may be completed on the preserves or at the George F Canyon and White Point nature centers.

PLEASE VISIT WWW.PVPLC.ORG FOR MORE INFO.

Team Leader Training Workshop

WHITE POINT NATURE PRESERVE
1600 W. Paseo del Mar
San Pedro, CA 90731
Tel: (310) 561-0917
Saturday, September 22, 9am - 12pm

Take your volunteering to the next level and become a Team Leader. This workshop will train you how to lead volunteers in the restoration of habitat critical to our local wildlife on volunteer days. Lunch and fun are included! All current Team Leaders are welcome to attend. Applications available on WWW.PVPLC.ORG are due September 15th.

Schedule is subect to change. Cancelled in event of rain. Closed toe shoes are required. Long pants suggested. Help support our conservation effort by bringing your own water to reduce waste during the event.

The Conservancy is a nonprofit 501(c)(3) organization dedicated to open space preservation and habitat restoration throughout the Peninsula.

Volunteer Workdays Sponsors:

REI
www.rei.com

PALOS VERDES PENINSULA LAND CONSERVANCY PO Box 3427, Palos Verdes Peninsula, CA 90274 Tel: (310) 541-7613 Web: WWW.PVPLC.ORG

PALOS VERDES PENINSULA LAND CONSERVANCY

A Palos Verdes Peninsula Land Conservancy Volunteer Program

KEEPERS

KEEPING AN EXTRA EYE ON THE PRESERVES FOR ENVIRONMENTAL REVIEW AND STEWARDSHIP

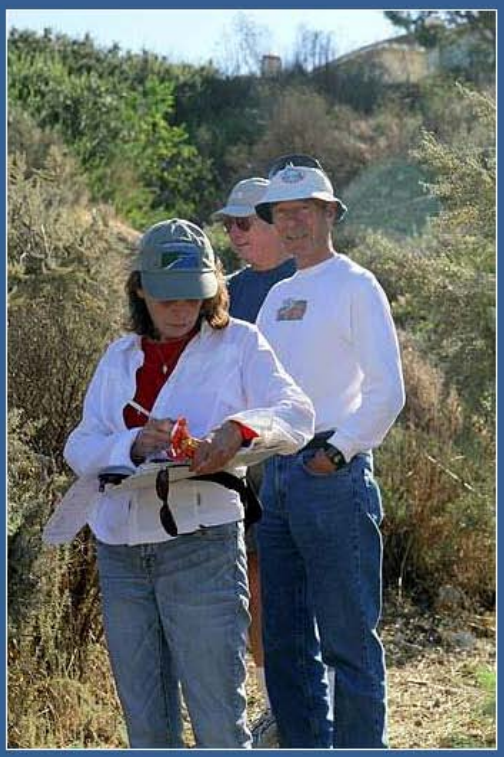
Volunteers are needed to help PVPLC monitor the following areas:

- **Alta Vicente Reserve**
- **George F Canyon**
- **Linden H Chandler Preserve**
- **Vicente Bluffs Reserve**

No experience necessary.

Tasks involve hiking a beautiful area to observe and record the reserve's condition.

A one year commitment of 12 monthly visits to an assigned preserve area is required.



Contact Ann Dalkey to learn more
(310) 541-7613 or adalkey@pvplc.org

For more info go to: www.pvplc.org/volunteers

TEAM LEADER

Volunteer Program

TRAINING WORKSHOP

March 31st from 9am-1pm

White Point Nature Preserve in San Pedro

Help the Palos Verdes Peninsula Land Conservancy lead groups of volunteers on outdoor workdays. Learn skills associated with habitat restoration, native plant propagation, and trail maintenance.

- Must have attended 2 or more PVPLC Volunteer Events
- You must be at least 16 years old to participate
- You must be committed to help at 4+ volunteer days during the year ahead
- Opportunity to earn service-learning hours
- Lunch will be provided during the workshop

Application available online and must be submitted by **March 21st**

Email: info@pvplc.org Phone: (310) 541-7613 Fax: (310) 541-7623

916 Silver Spur Road #207, Rolling Hills Estates, CA, 90274

Thank you to REI for your support of our Stewardship Volunteer Programs

PALOS VERDES PENINSULA LAND CONSERVANCY

REI www.rei.com

APPENDIX G - 2013 TRAILS PROJECT LIST

The following is a list of trail projects planned for 2014 based on priority and funding opportunities. This list is intended to outline potential projects but may be amended. Projects not completed will carry over to the following year. In addition to the list below, smaller-scale projects may be accomplished by the Volunteer Trail Crew on an as-needed basis.

Reserve Name	Trail Name	Project Type	Priority
Abalone Cove	Cave Trail	Trail delineation and work to reduce erosion; signage at start of trail	Medium
	Smuggler's Cove Trail	Reroute: Create a connector trail between Portuguese Bend Loop trail to Sacred Cove View trail by delineating current foot path to Palos Verdes Drive South	High
	Sacred Cove (to beach)	Erosion repair	Low
	Bow and Arrow	Erosion repair on eastern portion	Low
	Sea Dahlia trail	Erosion control and closure of unauthorized spur trails with signage and fill-in planting	High
Agua Amarga	Lunada Canyon trail	Trail Delineation with vegetation trimming and signage	Low
Forrestal	Conqueror Trail	Erosion Repair	Medium
	Crystal Trail	Delineation and signage	Low
	Quarry	Closure of unauthorized spur trails with signage and fill-in planting	Low
	Cool Overlook	Closure of unauthorized spur trail with post-and-cable and fill-in planting	Medium
	Dauntless	Closure of unauthorized spur trails with signage and fill-in planting	Low
	Mariposa	Bridge and trail repair	Medium
	Vista	Closure of unauthorized spur trails with signage and fill-in planting	Medium
	Intrepid	Closure of unauthorized spur trails with signage and fill	Low
	Exultant	Closure of unauthorized spur trails with signage and fill-in planting	Low
	Cristo	Closure of unauthorized spur trails with signage and fill	Medium
	Packsaddle	Closure of unauthorized spur trails with signage and fill-in planting	Medium
	Flying Mane (west)	Fill sinkholes along trail	High

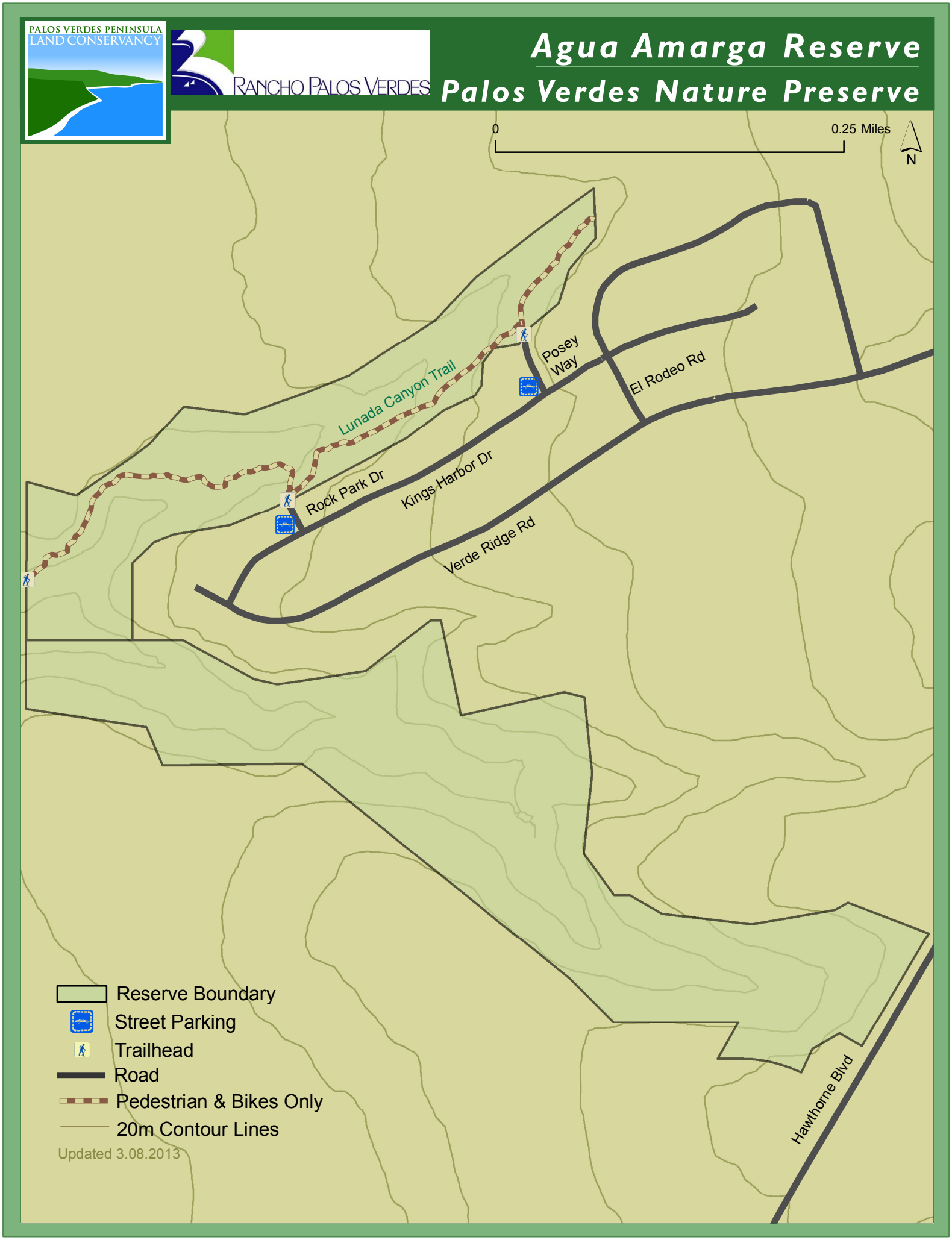
Reserve Name	Trail Name	Project Type	Priority
Portuguese Bend	Burma at Panorama	Install grades and dips to decrease water flow onto Panorama Trail	High
	North Sandbox	Trail Repair	Medium
	Ishibashi Trail	Closure of unauthorized spur trails with signage and fill-in planting; bicycle jump closure	Ongoing
	Peppertree Trail	Trail erosion repair	Medium
	Barn owl trail	Trail erosion repair	Medium
	Fire Station Trail	Closure or reroute	Medium
San Ramon	Switchback trail	Install bridge over gully	Medium
	Marymount trail	Delineate trail	Medium
	Connector trail to Friendship park	Trail delineation and creation	Low
Three Sisters	Sunshine Trail	Delineation in fuel mod area	Low
	Barkentine Trail	Closure of unauthorized spur trails with signage and fill-in planting	Medium
	Jack's Hat Trail	Trail delineation and erosion control	High
	McCarrell's Trail	Erosion control	Medium
Vista del Norte	Indian peak loop trail	Trail Delineation with vegetation trimming and signage	Low

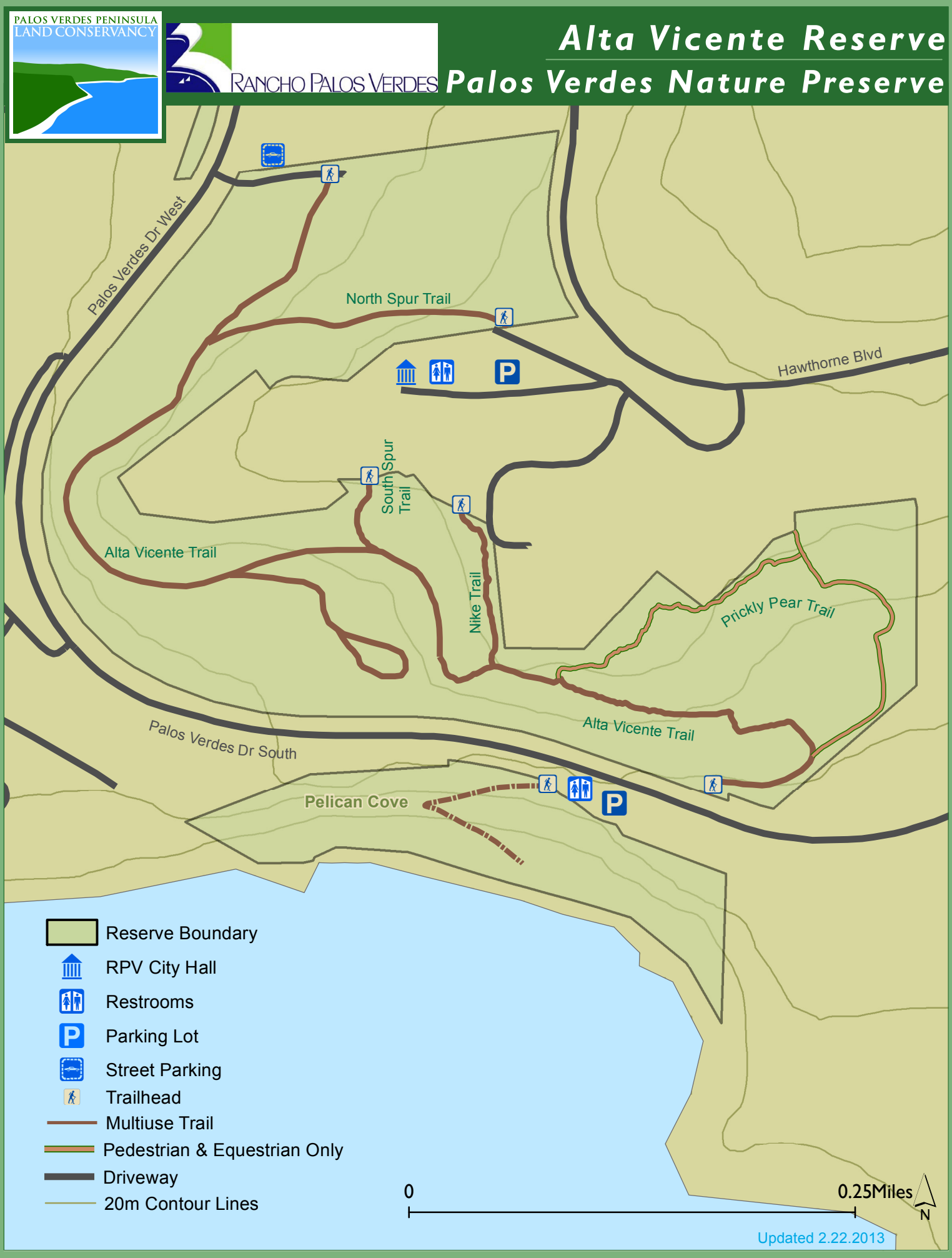
PALOS VERDES PENINSULA LAND CONSERVANCY

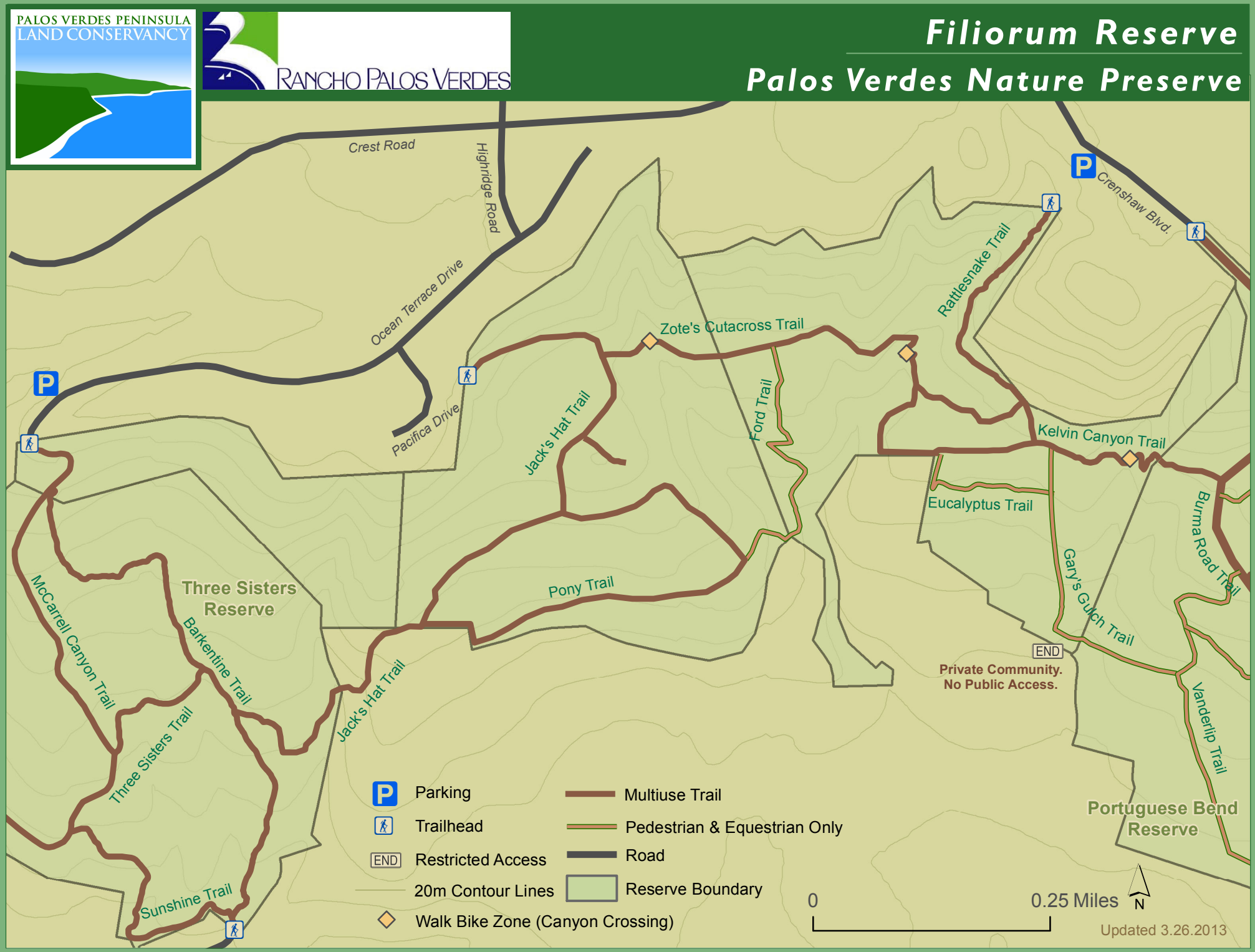
RANCHO PALOS VERDES

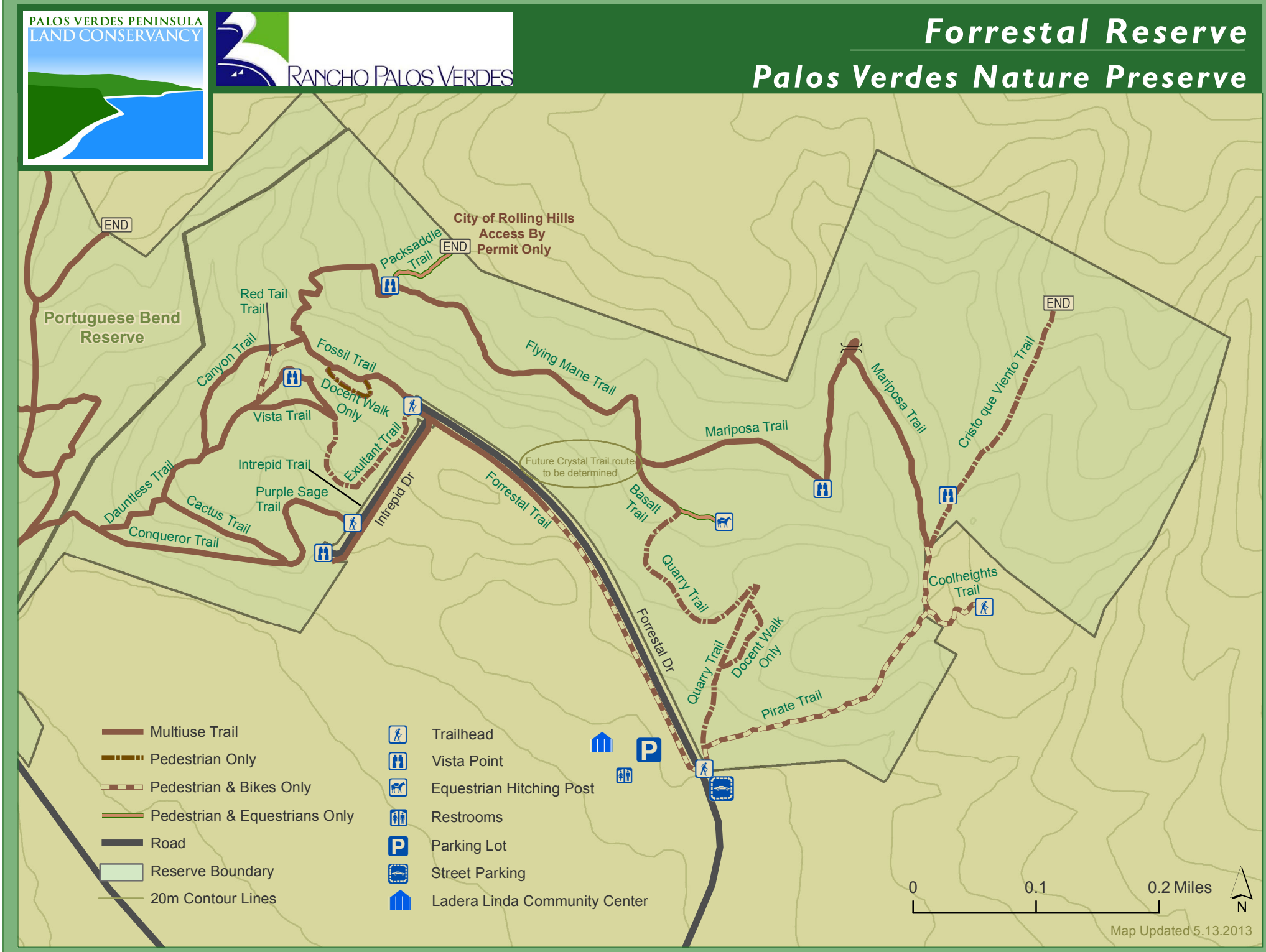
Abalone Cove Reserve
Palos Verdes Nature Preserve

Updated 3.05.2013


PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Agua Amarga Reserve
Palos Verdes Nature Preserve
0
0.25 Miles
N
Lunada Canyon Trail
Posey Way
El Rodeo Rd
Rock Park Dr
Kings Harbor Dr
Verde Ridge Rd
Hawthorne Blvd
Reserve Boundary
Street Parking
Trailhead
Road
Pedestrian & Bikes Only
20m Contour Lines
Updated 3.08.2013


PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Alta Vicente Reserve
Palos Verdes Nature Preserve
Palos Verdes Dr West
North Spur Trail
Hawthorne Blvd
South Spur Trail
Alta Vicente Trail
Nike Trail
Prickly Pear Trail
Palos Verdes Dr South
Alta Vicente Trail
Pelican Cove
Reserve Boundary
RPV City Hall
Restrooms
Parking Lot
Street Parking
Trailhead
Multiuse Trail
Pedestrian & Equestrian Only
Driveway
20m Contour Lines
0
0.25Miles
N
Updated 2.22.2013

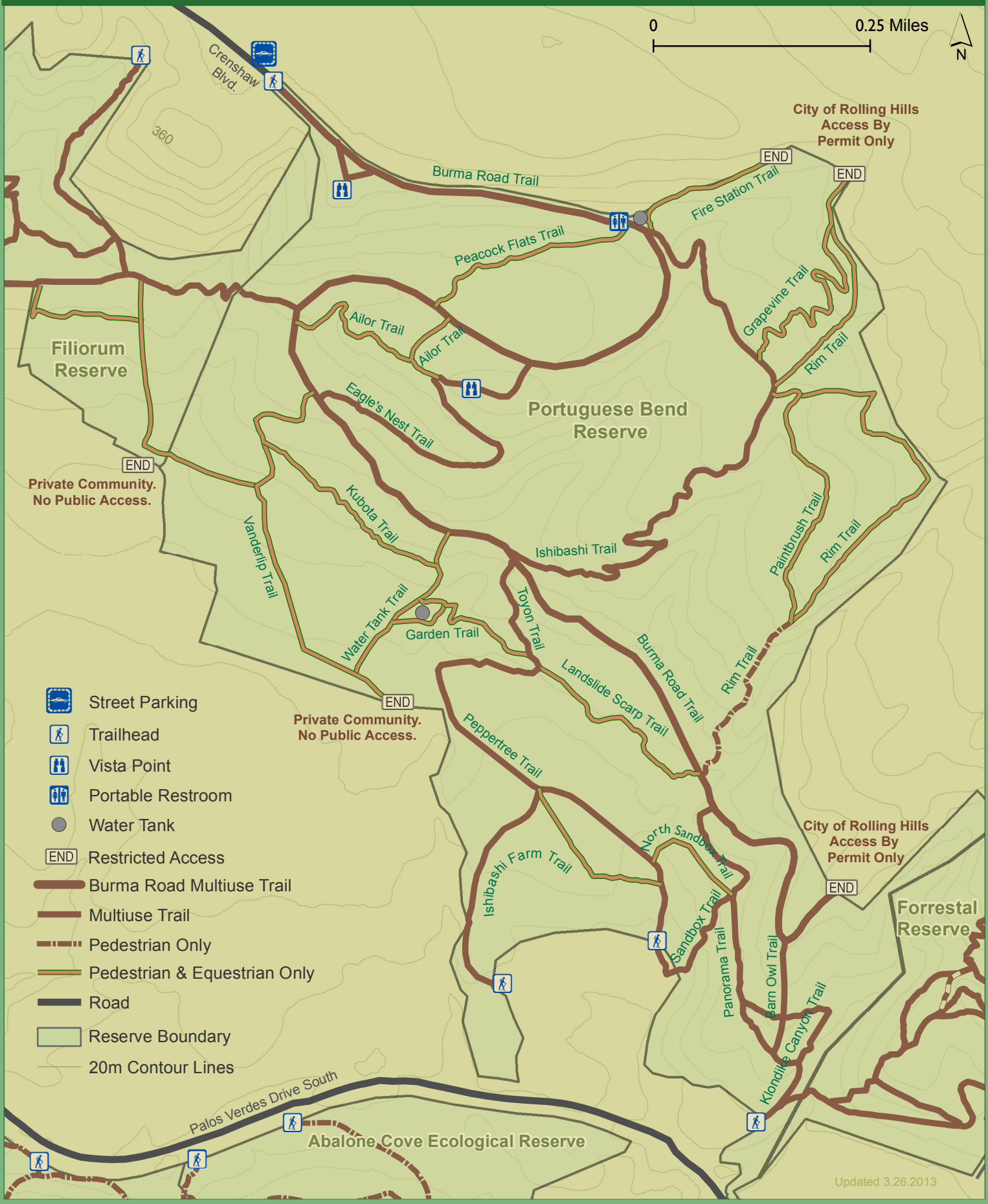

PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Filiorum Reserve
Palos Verdes Nature Preserve
Crest Road
Highridge Road
Ocean Terrace Drive
Pacifica Drive
Crenshaw Blvd.
Rattlesnake Trail
Zote's Cutacross Trail
Jack's Hat Trail
Ford Trail
Kelvin Canyon Trail
Eucalyptus Trail
Burma Road Trail
Gary's Gulch Trail
Vanderlip Trail
Pony Trail
Three Sisters Reserve
McCarrell Canyon Trail
Barkentine Trail
Three Sisters Trail
Sunshine Trail
Jack's Hat Trail
END
Private Community.
No Public Access.
Portuguese Bend Reserve
Parking
Trailhead
Restricted Access
20m Contour Lines
Walk Bike Zone (Canyon Crossing)
Multiuse Trail
Pedestrian & Equestrian Only
Road
Reserve Boundary
0
0.25 Miles
N
Updated 3.26.2013

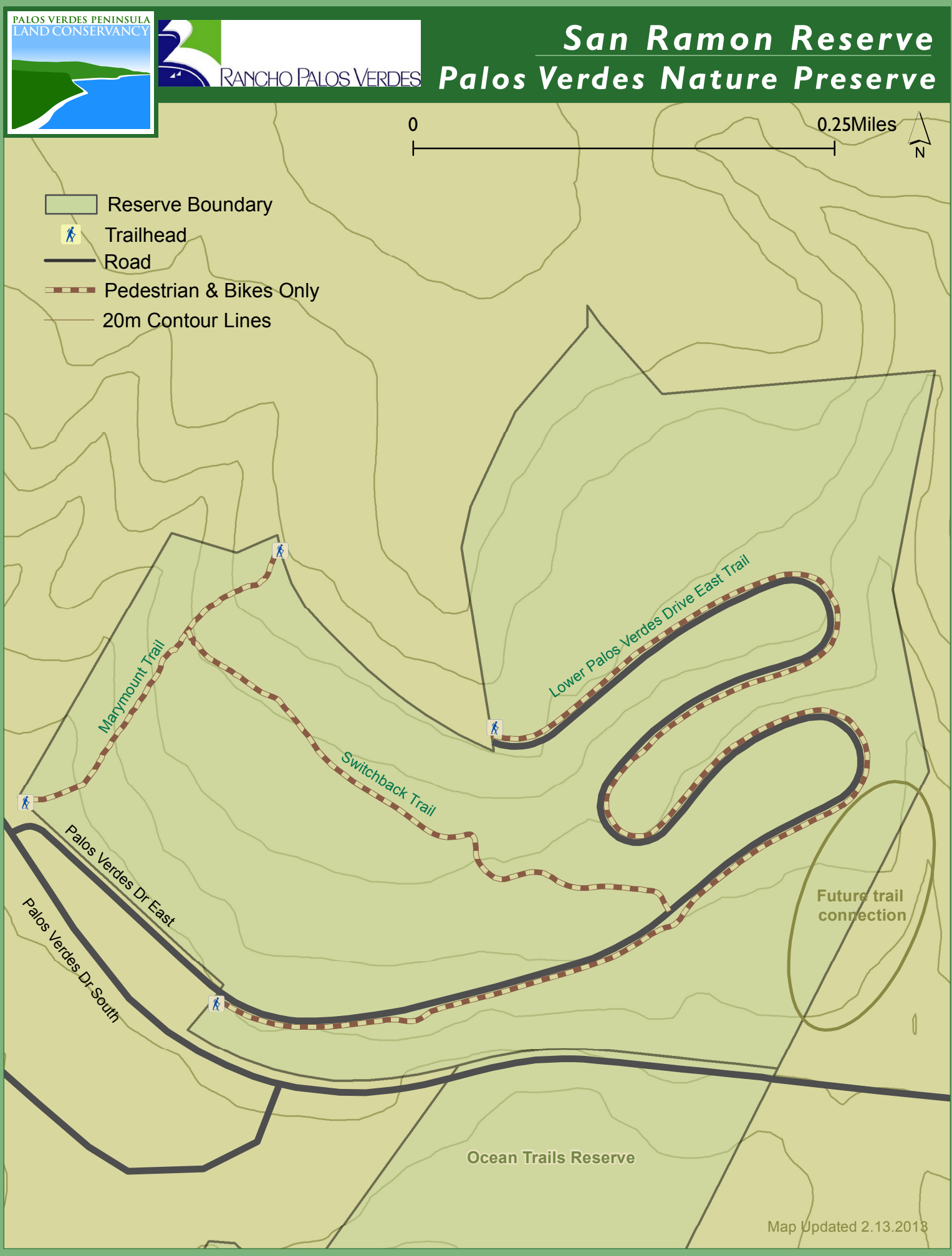

PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Forrestal Reserve
Palos Verdes Nature Preserve
Portuguese Bend Reserve
City of Rolling Hills Access By Permit Only
END
Packsaddle Trail
Red Tail Trail
Canyon Trail
Fossil Trail
Docent Walk Only
Vista Trail
Exultant Trail
Intrepid Trail
Purple Sage Trail
Dauntless Trail
Cactus Trail
Conqueror Trail
Intrepid Dr
Flying Mane Trail
Future Crystal Trail route to be determined
Forrestal Trail
Basalt Trail
Mariposa Trail
Quarry Trail
Forrestal Dr
Docent Walk Only
Pirate Trail
Coolheights Trail
Cristo que Viento Trail
Multiuse Trail
Pedestrian Only
Pedestrian & Bikes Only
Pedestrian & Equestrians Only
Road
Reserve Boundary
20m Contour Lines
Trailhead
Vista Point
Equestrian Hitching Post
Restrooms
Parking Lot
Street Parking
Ladera Linda Community Center
0
0.1
0.2 Miles
N
Map Updated 5.13.2013

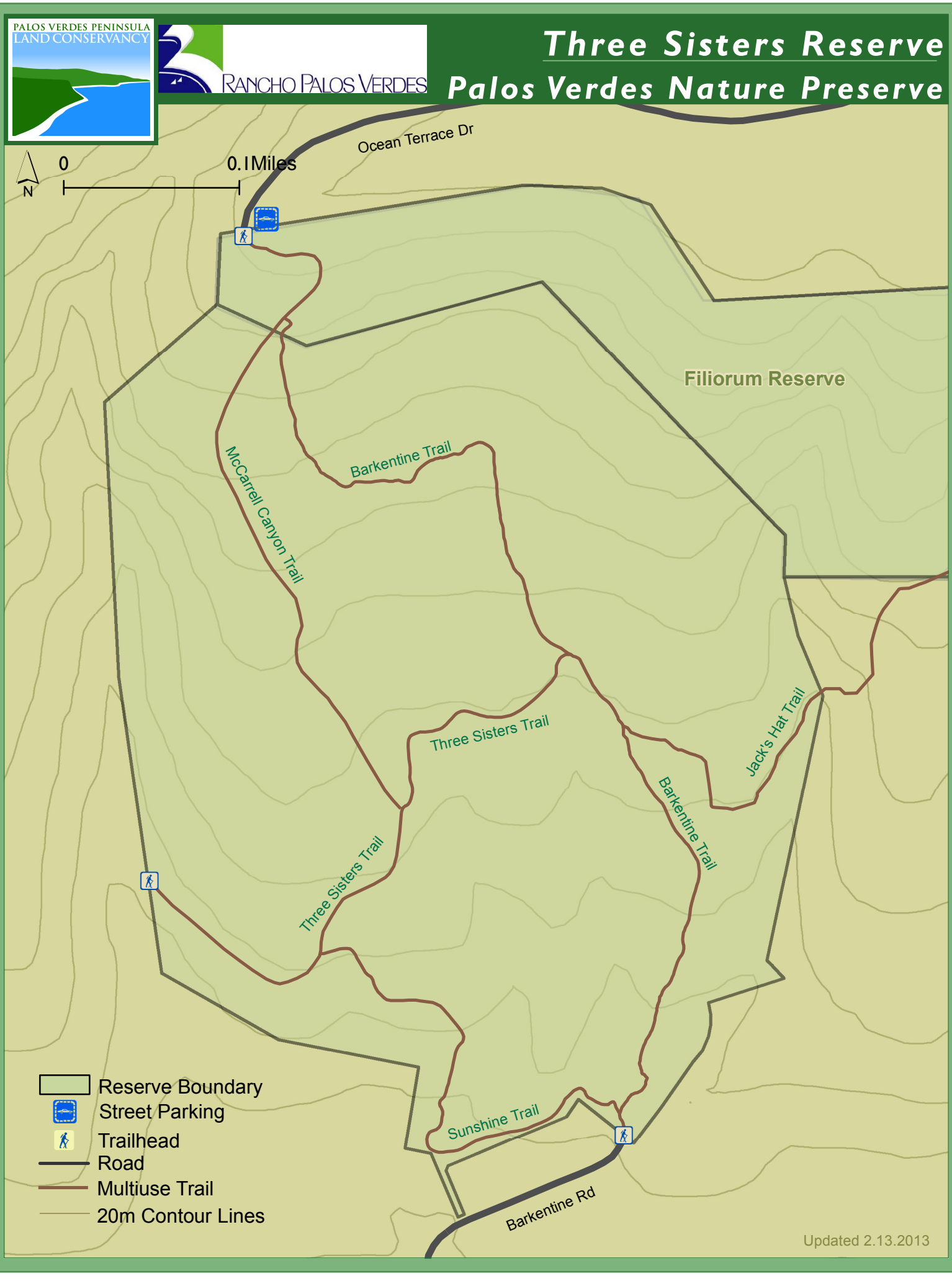

PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Ocean Trails Reserve
Palos Verdes Nature Preserve
Forrestal Dr
Palos Verdes Dr South
Palos Verdes Dr East
Ocean Trails Dr
La Rotonda Dr
West Portal Trail
West Bluff Trail
Sunset Trail
Sunrise Trail
Dudleya Trail
Catalina Trail
Coastal Switchback Trail
Gnatcatcher Trail
Shoreline Park Trail
East Boundary Trail
Sagebrush Walk Trail
Southshore Coastal Trail
San Ramon Reserve
Reserve Boundary
Trump National Golf Club
Parking Lot
Restrooms
Club House
Trailhead
Pedestrian Only
Pedestrian & Bike Only
Road
20m Contour Lines
0
0.25 Miles
N
Updated 2.13.2013

Portuguese Bend Reserve

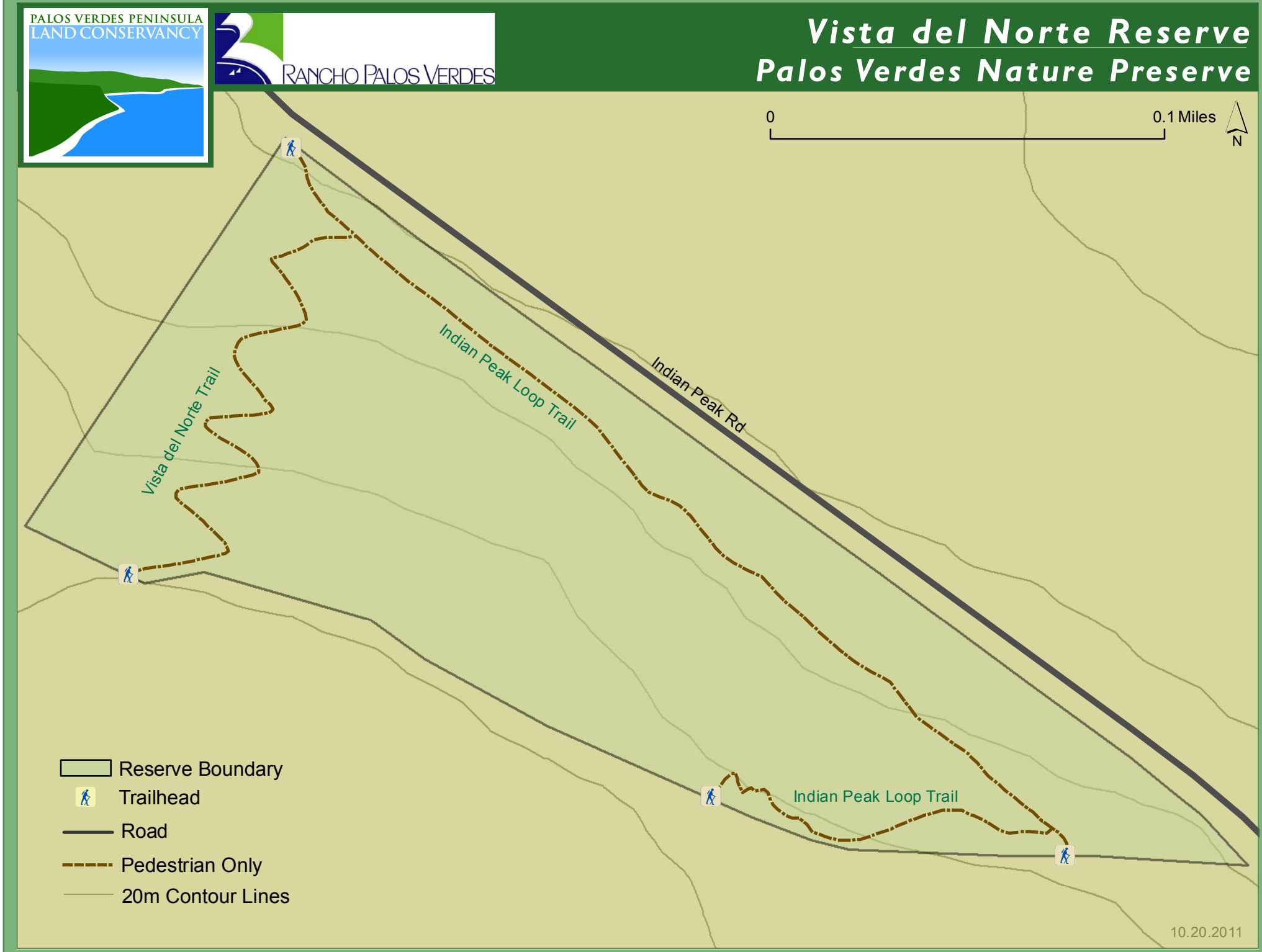
Palos Verdes Nature Preserve




PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
San Ramon Reserve
Palos Verdes Nature Preserve
0
0.25Miles
N
Reserve Boundary
Trailhead
Road
Pedestrian & Bikes Only
20m Contour Lines
Marymount Trail
Lower Palos Verdes Drive East Trail
Switchback Trail
Palos Verdes Dr East
Palos Verdes Dr South
Future trail connection
Ocean Trails Reserve
Map Updated 2.13.2013


PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Three Sisters Reserve
Palos Verdes Nature Preserve
N
0
0.1 Miles
Ocean Terrace Dr
Filiorum Reserve
McCarrell Canyon Trail
Barkentine Trail
Three Sisters Trail
Three Sisters Trail
Barkentine Trail
Jack's Hat Trail
Sunshine Trail
Barkentine Rd
Reserve Boundary
Street Parking
Trailhead
Road
Multiuse Trail
20m Contour Lines
Updated 2.13.2013


PALOS VERDES PENINSULA LAND CONSERVANCY
RANCHO PALOS VERDES
Vicente Bluffs Reserve
Palos Verdes Nature Preserve
0
0.25Miles
N
Point Vicente Interpretive Center
Point Vicente Lighthouse
Parking Lot
Restrooms
Street Parking
Trailhead
Vista Point
Pedestrian Trail
Road
Reserve Boundary
20m Contour Lines
Palos Verdes Dr West
Golden Cove Trail
Calle Entradero
Seascape Trail
Via Vicente
Hawthorne Blvd
Terrace Trail
Calle Viento
Pacifica del Mar
Interpretive Trail
Alta Vicente Reserve
Tovemore Trail
Palos Verdes Dr South
Pelican Cove
Updated 12.04.2012


PALOS VERDES PENINSULA
LAND CONSERVANCY
RANCHO PALOS VERDES
Vista del Norte Reserve
Palos Verdes Nature Preserve
0
0.1 Miles
N
Indian Peak Rd
Indian Peak Loop Trail
Vista del Norte Trail
Indian Peak Loop Trail
Reserve Boundary
Trailhead
Road
Pedestrian Only
20m Contour Lines
10.20.2011