

Habitat Restoration Plan for the

# Alta Vicente Ecological Reserve in the Portuguese Bend Nature Preserve



FEBRUARY 2016

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**HABITAT RESTORATION PLAN**  
**for the**  
**Alta Vicente Reserve**  
**in the**  
**Palos Verdes Nature Preserve**

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# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

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## 1 INTRODUCTION

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

This HRP discusses implementing approximately 12.9 acres of restoration, consisting of 10.4 acres of coastal sage scrub, 1.0 acre of cactus scrub, 1.0 acre of Palos Verdes blue butterfly habitat, and 0.5 acre of wildflower field in a disturbed area of the Alta Vicente Reserve currently dominated by non-native plant species. The HRP addresses restoration design, planting recommendations, installation procedures, maintenance requirements, monitoring methodology, and performance standards.

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**DUDEK**

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

Habitat Restoration Plan for the Alta Vicente Ecological Reserve in the Portuguese Bend Nature Preserve

**FIGURE 2**  
**Vicinity Map**

## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

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## 2 EXISTING CONDITIONS

### 2.1 Site Description

The Alta Vicente Reserve is located on the southwestern portion of the Palos Verdes Peninsula near the Rancho Palos Verdes City Administration building (City Hall). The entire Alta Vicente Reserve is approximately 55 acres and is located along the coast of the peninsula. The Reserve is north and east of Palos Verdes Drive West opposite from the Point Vicente Lighthouse. The proposed restoration area is located just north of the City Hall, bounded on the west by Palos Verdes Drive West and on the east by Hawthorn Boulevard (Figures 1 and 2).

### 2.2 Vegetation Communities

Plant communities and land covers within the Alta Vicente Reserve are typical of plant communities found in this region, exhibiting some level of prior disturbance, but containing some relictual elements of the native plant communities. Vegetation mapping of the reserve was prepared by PVPLC and the California Native Plant Society (CNPS) (PVPLC and CNPS 2010). According to the vegetation mapping conducted by PVPLC and CNPS, the proposed restoration area consists of non-native grassland, disturbed coastal sage scrub, disturbed Saltbush scrub, and exotic woodland. The existing vegetation communities present in the restoration area are described further below.

#### 2.2.1 Non-native Grassland

Non-native grasslands, which were mapped by CNPS as fennel stands, Avena (*A. barbata*, *A. fatua*) stands, Bromus (*B. diandrus*, *B. hordeaceus*) stands, and California annual and perennial grassland macrogroup dominate the grassland habitat at Alta Vicente Reserve (PVPLC and CNPS 2010). Annual, 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 plant community is characterized by dense to sparse cover of annual grasses, often with a combination of native and non-native annual forbs (Holland, 1986). Annual grassland is a disturbance related community that may have replaced native grassland or coastal sage scrub in many localities. On site, grassland habitats generally consist of brome grasses (*Bromus diandrus*, *B. hordeaceus*, *B. rubens*), wild oat (*Avena fatua*, *A. barbata*), fennel (*Foeniculum vulgare*) and other annual grasses (PVPLC and CNPS 2010).

#### 2.2.2 Disturbed Coastal Sage Scrub

Disturbed coastal sage scrub within the Alta Vicente restoration area was mapped by CNPS as Non-native/naturalized Mediterranean scrub vegetation, and *Artemisia californica* association

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(PVPLC and CNPS 2010). Coastal Sage Scrub is composed of low, subshrubs approximately 1 meter (3 feet) high, many of which are drought-deciduous (Holland, 1986). Dominant shrub type varies across this vegetation type, depending on localized factors and levels of disturbance, but often includes California Sagebrush (*Artemisia californica*) and California Brittlebush (*Encelia californica*). In this community the shrub layer primarily forms a continuous canopy, but it contains areas with an open canopy and a fairly well-developed understory.

### 2.2.3 Disturbed Saltbrush Scrub

Saltbrush scrub is dominated by quailbush (*Atriplex lentiformis*). Shrubs are less than 3 meters (10 feet) tall with closed to open canopies (Sawyer and Keeler-Wolf, 1995). The saltbrush scrub on site, mapped by CNPS as *Atriplex lentiformis* alliance, has an open canopy and an understory consisting primarily of non-native annuals (PVPLC and CNPS 2010).

### 2.2.4 Exotic Woodland

The exotic woodland in the restoration area is composed of non-native, and in some cases invasive, tree species. CNPS mapped these areas as acacia cyclops, but they include the additional exotic species Brazilian pepper (*Schinus terebinthifolius*), gum tree (*Eucalyptus* sp.), and Phoenix palm (*Phoenix canariensis*) among others (PVPLC and CNPS 2010).

## 2.3 Geology and Soils

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

According to the Report and General Soil Map for Los Angeles County (USDA 1969), the soils within the Alta Vicente Reserve are composed of the Altamont-Diablo association (30–50% slopes) and the Diablo-Altamont association (2%-9% slopes). Soils of the Altamont-Diablo association occur on gently sloping to rolling foothills throughout the Los Angeles basin as far north as Point Dume. Altamont soils are described to be 24–36 inches deep, are well drained, and have slow subsoil permeability. Diablo soils are described to be 22–52 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 Altamont-Diablo association is comprised of approximately 60% Altamont soils and 30% Diablo soils, while the Diablo-Altamont association is composed of approximately 60% Diablo soils and 30% Altamont soils.



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Three site specific soil samples were collected from the proposed restoration area (Figure 5). The soil samples consisted of composite samples representative of the general soil conditions at various locations on site. The composite samples were submitted to Wallace Laboratories for analysis of standard soil constituents, agricultural suitability, texture, and cation exchange capacity. Based on the results of the analysis, the soils are clay, with a slow infiltration rate and fair organic matter (Appendix A). The soils on site are slightly alkaline (pH = 7.87 - 7.95) and the salinity is low (ECe = 0.40 – 0.55 mho/cm). However, sodium is very high at soil sample site 1 with 536 mg/kg soil. The sodium adsorption ratio (SAR) is also high (6.8) at soil sample site 1 (increasing problems start at 3) but low at soil sample sites 2 and 3 (2.0 – 2.4). Additionally, major nutrients (nitrogen and phosphorus) are low.

The soil chemistry found in the restoration site is generally what is expected given the location and site characteristics. The soils appear to be suitable for establishment of the target habitats without soil remediation or extensive soil amendments. Seed germination may be limited by elevated sodium and the moderately high SAR at sample site 1, but many species of native plants should be able to tolerate the elevated sodium if planted as container plants.

While the soils on site pose no significant problems to establishment of native habitat, as native soils they have low levels of major nutrients. Native species are adapted to lower nutrient soils, but will benefit from some supplemental nutrient augmentation during planting to initiate establishment (e.g., slow-release fertilizer packet).

### 2.4 Special-Status Species

Two special-status wildlife species have been documented within the Alta Vicente Reserve, though not in the specific area identified for restoration. Coastal California gnatcatcher (*Poliophtila californica californica*) (CAGN) has been observed just south of the restoration area (Dudek and PVPLC 2007). Additionally, cactus wren (*Campylorhynchus brunneicapillus*) (CAWR) has been observed south of the restoration area (PVPLC 2012) (Figure 3). Additionally, Catalina mariposa lily (*Calochortus catalinae*), which is included on the CNPS Inventory of Rare and Endangered Plants list as a rank 4.2 species, exists on the boundaries (south and east) of the proposed restoration area (CNPS 2015; PVPLC and CNPS 2010) (Figure 3).

In addition to special-status species, the host plant coastal buckwheat (*Eriogonum parvifolium*) for the federally listed, endangered, El Segundo blue butterfly (*Euphilotes battoides allyni*) is known to occur in the vicinity of the proposed restoration area and was observed at Alta Vicente in 2015 (A. Dalkey [PVPLC] personal communication). The host plant, locoweed (*Astragalus trichopodus* var. *lonchus*) for the federally listed, endangered, Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*) also occurs within the Alta Vicente Reserve.

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## 2.5 Non-Native Invasive Species

Non-native species are abundant within the areas identified for restoration, and compose the majority of the existing vegetative cover. Controlling non-native species during the plant establishment phase will present a significant challenge, and should be prioritized as the most critical aspect of the maintenance program. The most predominant non-native species include non-native annual grasses, coastal wattle (*Acacia cyclops*), and fennel. These species, as well as additional non-native species observed or expected on site, are provided in Table 1 with their associated rating in the California Invasive Plant Council's (Cal-IPC) Inventory of Invasive Plant Species (2015).

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

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



# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

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

None
* <i>Acacia cyclops</i> —coastal wattle
* <i>Malva parviflora</i> —cheeseweed mallow
* <i>Mellilotus indicus</i> —annual yellow sweetclover
** <i>Pinus</i> sp.—pine
* <i>Tropaeolum majus</i> —nasturtium

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

\*\* Note that some of these mature non-native ornamental trees that are not presenting a significant threat of invasion will be left in place and not removed in order to retain avian habitat and the general character of the site. Seedlings and young saplings less than 5 feet tall will be removed.

## 2.6 Additional Considerations

A fifteen foot wide sewer easement currently bisects the restoration area, from north to south, along the visible access road (Alta Vicente Trail). The City of Rancho Palos Verdes granted a perpetual easement to the County Sanitation District No. 5 of Los Angeles County, allowing right-of-way for sewer purposes, with the requirement to repair and replace the surface of the ground and its improvements if damaged during operation. No buffers for restoration are required but it is suggested that restoration activities do not impede access to the man holes along the access road.

In addition, one or more electric utility poles intersect the restoration area on the southwestern border. Restoration activities should allow a 15-foot buffer around utility poles, with these areas being monitored and managed for only particularly weeds identified as highly invasive by Cal IPC, that threaten to spread into the restoration areas. Fuel modification areas on the periphery of the reserve, adjacent to built areas, will be managed in a similar manner.

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## 3 RESTORATION PROGRAM

This HRP outlines the restoration implementation strategy for upland habitat at the Alta Vicente Reserve and proposes to provide for the restoration of approximately 12.9 acres of habitat restoration. The approach to restoration in this HRP is to assist the recovery of the degraded ecosystem through planting and seeding in order to re-establish or enhance biological functions and services within portions of the Alta Vicente Reserve.

### 3.1 Restoration Site Goals and Objectives

The disturbed habitat that exists in the proposed restoration location has limited wildlife value and provides opportunity for the spread and establishment of invasive weed species to native habitat and previously restored areas within the Alta Vicente Reserve. The planting of native habitat is intended to improve habitat contiguity and provide increased nesting, cover, and foraging opportunities for wildlife. In particular, the overarching goal of this restoration plan is to provide habitat for coastal California gnatcatcher, coastal cactus wren and the Palos Verdes blue butterfly.

The habitat restoration program will focus on the establishment of habitat for the covered species listed in the NCCP/HCP with the objective of increasing the overall habitat carrying capacity for the target species populations. Coastal scrub restoration is intended to provide improved foraging habitat for resident and migrating wildlife species, and potential nesting and foraging habitat for target species such as the coastal California gnatcatcher, southern California rufous-crowned sparrow, and other sensitive wildlife species. Palos Verdes blue butterfly habitat restoration is meant to provide improved habitat and increased numbers of larval host plants for the Palos Verdes blue butterfly. Cactus scrub restoration is meant to provide habitat for the coastal cactus wren. Achievement of the performance standards described herein would create suitable habitat for these species. However, occupation of the site by these species is not a requirement for successful project completion.

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

- Avoid additional or unplanned disturbance to existing native habitats during implementation of the project construction and long-term maintenance activities;
- Prevent any impacts to sensitive plant or wildlife species during implementation of the project construction and long-term maintenance activities;

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- Control non-native invasive weed species considered to be highly or moderately invasive on the Cal-IPC Invasive Plant Inventory (2015), and others identified by PVPLC as locally invasive (PVPLC 2013);
- Utilize erosion control measures in the form of “Best Management Practices” (BMPs) on the site as conditions necessitate;
- Reintroduce special-status plant species listed in the NCCP/HCP as components of the planting plans where feasible and as appropriate.

### **3.2 Habitats to be Established**

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

The habitat restoration area is currently dominated by non-native species. The existing grasslands in the western and central portions of the restoration area are composed largely of non-native annual herbs, including fennel, brome grasses, Russian thistle, and wild oat grasses (Figure 4). A number of non-native perennials, such as coastal wattle, Phoenix palm, and Brazilian pepper are also common within the restoration area.

Coastal sage scrub habitat will make up the majority of the restored habitat within the restoration area (Figure 5). Additionally, cactus scrub is planned for the slope immediately west of Hawthorne Boulevard and Palos Verdes blue butterfly habitat is planned for the gently sloping area in the eastern portion of the restoration site. A wildflower field to provide habitat for pollinators has also been planned for an approximately 0.5-acre area in the northwestern portion of the restoration area near Palos Verdes Drive West. Each specific habitat type to be restored is described below. It is expected that all planting will be installed to mimic the natural distribution and vegetation mosaic of adjacent healthy habitats.





**Photo 1:** Representative view of lower restoration area (facing north)



**Photo 2:** Non-native plants in the lower restoration area (black mustard, brome grasses, coastal wattle)



**Photo 3:** Trail on the southern side of the restoration area



**Photo 4:** Northern border of the restoration area (facing south-west)



**Photo 5:** Invasive perennial weeds in the eastern section of the restoration area (Coastal wattle, Phoenix palm)

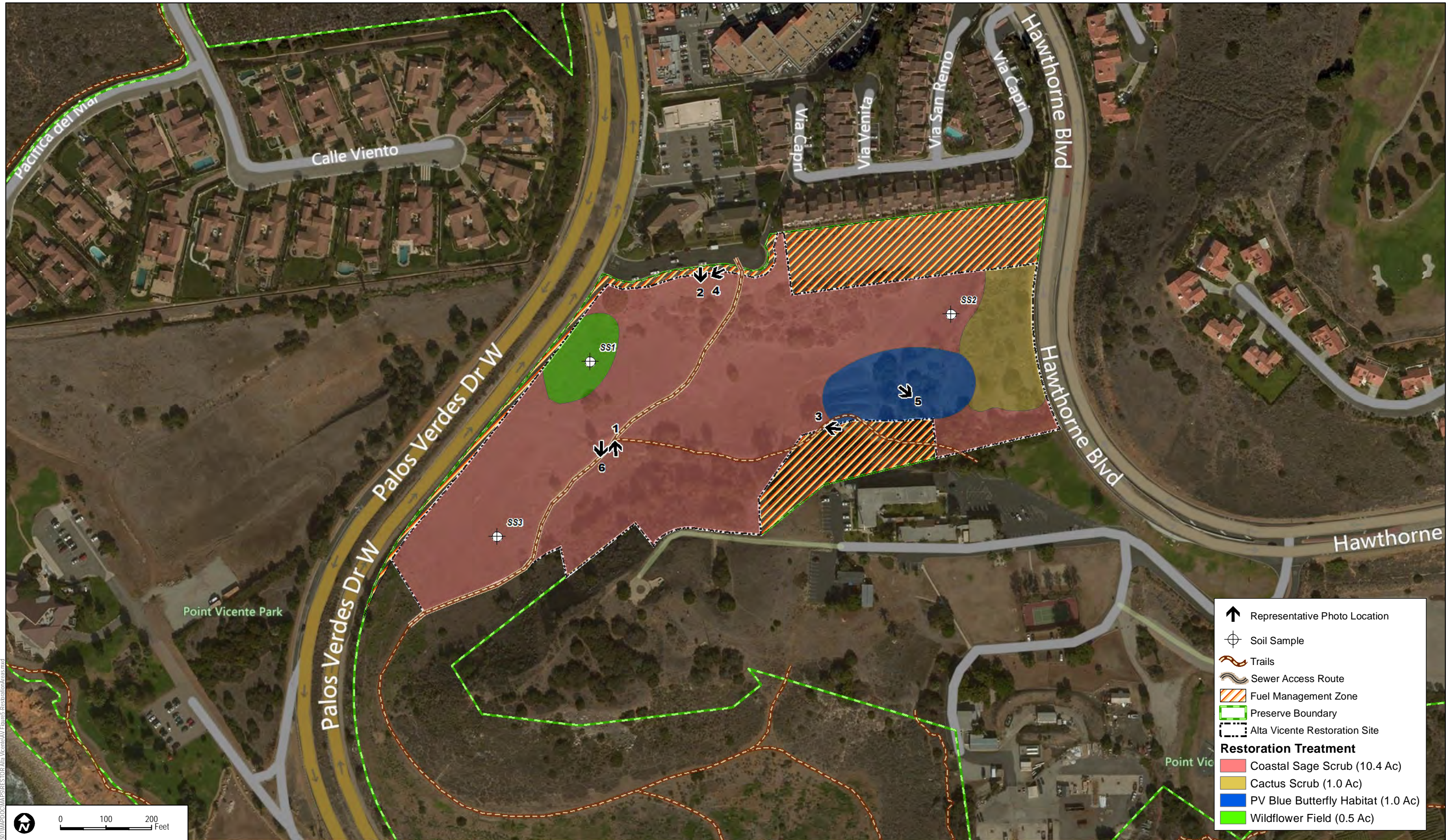


**Photo 6:** Invasive annual weeds in the restoration site (Fennel, black mustard, wild oat)



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**FIGURE 5**  
**Alta Vicente Restoration Area**



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## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

### 3.2.1 Coastal Sage Scrub

The restoration strategy for coastal sage scrub habitat on the Alta Vicente Reserve restoration site includes reintroducing locally appropriate native coastal sage scrub species that are currently present in adjacent native habitats. The plant palette includes a container plant and seed mix composition (Table 2) that has been designed to replicate the native composition of a healthy coastal sage scrub plant community similar to existing coastal sage scrub habitat present on the Alta Vicente Reserve site, and with the specific intent to provide habitat suitable for occupation by coastal California gnatcatcher. The planting palette has thus been designed to contain a composition of shrub species that are dominant in coastal sage scrub habitat occupied by coastal California gnatcatcher (Atwood et al. 1994). On the Palos Verdes Peninsula, the primary coastal sage scrub dominants include California sagebrush, California brittlebush, and coastal buckwheat, with coast goldenbush, common deerweed, lemonadeberry, California buckwheat, sages, bladderpod, coast prickly-pear, and wishbone bush as common constituents. The plant palette assumes 100% coverage of container plants. The seed mix is provided for erosion control and species diversity, and will be applied as a supplemental measure as needed, and as determined by PVPLC.

**Table 2**  
**Proposed Coastal Sage Scrub Planting Palette (Approximately 10.4 Acres)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Container Plants</i>						
<i>Artemisia californica</i>	California sagebrush	D40	5	5	659	6,852
<i>Astragalus trichopodus</i> var. <i>lonchus</i>	Ocean locoweed	D40	2	7	54	566
<i>Brickellia californica</i>	California bricklebrush	D40	5	3	87	906
<i>Corethrogyne filaginifolia</i>	Common sandaster	D40	3	3	24	252
<i>Cylindropuntia prolifera</i> **	Coastal cholla	1-gallon	4	5	27	283
<i>*Dudleya lanceolata</i>	Lanceleaf liveforever	1-gallon	2	3	11	113
<i>Elymus condensatus</i>	Giant wildrye	D40	5	3	42	435
<i>Encelia californica</i>	California brittlebush	D40	4	5	350	3,640
<i>Eriogonum cinereum</i>	Coastal buckwheat	D40	5	5	87	906
<i>Eriogonum fasciculatum</i>	California buckwheat	D40	5	5	232	2412
<i>Eriophyllum confertiflorum</i>	Golden yarrow	D40	2	3	54	566
<i>Heteromeles arbutifolia</i>	Toyon	D40	8	1	14	142
<i>Isocoma menziesii</i>	Coast goldenbush	D40	5	3	87	906
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	5	82	849
<i>Opuntia littoralis/oricola</i> **	Prickly-pear cactus	1-gallon	6	3	12	126
<i>Peritoma arborea</i>	Bladderpod	D40	6	5	36	378

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

**Table 2**  
**Proposed Coastal Sage Scrub Planting Palette (Approximately 10.4 Acres)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Rhus integrifolia</i>	Lemonadeberry	D40	12	1	3	31
<i>Salvia leucophylla</i>	Purple sage	D40	6	5	61	629
<i>Salvia mellifera</i>	Black sage	D40	5	3	87	906
<b>Total Container Plants</b>					<b>2,009</b>	<b>20,898</b>
Seed Mix						
Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre		Total Lbs.	
<i>Asclepias fascicularis</i>	narrow leaved milkweed	50	1.0		10.4	
<i>Castilleja exserta</i>	purple owl's clover	25	0.5		5.2	
<i>Clarkia purpurea</i>	winecup clarkia	80	0.5		5.2	
<i>Deinandra fasciculata</i>	fascicled tarplant	3	1.0		10.4	
<i>Eschscholzia californica</i> <i>var maritima</i>	California poppy	74	2.0		20.8	
<i>Lupinus bicolor</i>	pygmy lupine	78	2.0		20.8	
<i>Lupinus succulentus</i>	arroyo lupine	81	4.0		41.6	
<i>Melica imperfecta</i>	coast melic grass	54	0.5		5.2	
<i>Pseudognaphalium californicum</i>	California everlasting	3	0.5		5.2	
<i>Stipa lepida</i>	foothill needlegrass	54	2.0		20.8	
<i>Stipa pulchra</i>	Purple needlegrass	42	8.0		83.2	
<b>Total Lbs.</b>			<b>22.0</b>		<b>228.8</b>	

\* Lanceleaf liveforever (*Dudleya lanceolata*) should be planted in rock outcrops.

\*\* Larger (5 or 10 gallon) container size plants will be installed as available.

### 3.2.2 Cactus Scrub

The restoration strategy for cactus scrub is comparable to that described for coastal sage scrub, except that the composition of species has been modified to allow coast prickly-pear cactus (*Opuntia littoralis*) and coast cholla (*Cylindropuntia prolifera*) to dominate. The plant palette includes a container plant and seed mix composition (Table 3) that has been designed to replicate the native composition of a healthy cactus scrub plant community, and with the specific intent to provide habitat suitable for occupation by cactus wren.

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

**Table 3**  
**Proposed Cactus Scrub Planting Palette (1.0 Acre)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Container Plants</i>						
<i>Artemisia californica</i>	California sagebrush	D40	5	5	313	313
<i>Astragalus trichopodus</i> var. <i>lonchus</i>	Ocean locoweed	D40	3	7	24	24
<i>Baccharis pilularis</i>	Coyote brush	D40	6	5	12	12
<i>Brickellia californica</i>	California bricklebrush	D40	5	5	17	17
<i>Corethrogyne filaginifolia</i>	Common sandaster	D40	3	3	24	24
<i>Cylindropuntia prolifera</i> **	Coastal cholla	1-gallon	4	10	408	408
<i>Encelia californica</i>	California brittlebush	D40	5	3	87	87
<i>Eriogonum fasciculatum</i>	California buckwheat	D40	5	5	174	174
<i>Isocoma menziesii</i>	Coast goldenbush	D40	5	5	17	17
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	5	27	27
<i>Opuntia littoralis/oricola</i> **	Coast prickly-pear	1-gallon	6	25	523	523
<i>Peritoma arborea</i>	Bladderpod	D40	6	5	12	12
<i>Rhus integrifolia</i>	Lemonadeberry	D40	15	1	2	2
<i>Salvia mellifera</i>	Black sage	D40	5	3	87	87
<b>Total Container Plants</b>					<b>1,727</b>	<b>1,727</b>
<i>Seed Mix</i>						
<i>Botanical Name</i>	<i>Common Name</i>	<i>Pure Live Seed</i>	<i>Lbs. Per Acre</i>		<i>Total Lbs.</i>	
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	74	3.0		3.0	
<i>Lupinus bicolor</i>	Miniature lupine	78	2.0		2.0	
<i>Phacelia cicutaria</i>	Caterpillar phacelia	80	1.0		1.0	
<i>Salvia columbariae</i>	Chia	54	1.0		1.0	
<i>Stipa lepida</i>	Foothill needlegrass	54	2.0		2.0	
<i>Stipa pulchra</i>	Purple needle-grass	42	8.0		8.0	
<b>Total Lbs. Per Acre</b>			<b>17.0</b>		<b>17.0</b>	

\*\* Larger (5 or 10 gallon) container size plants will be installed as available.

### 3.2.3 Palos Verdes Blue Butterfly Habitat

The restoration strategy for Palos Verdes blue butterfly habitat is comparable to that described for coastal sage scrub, except that the composition of species was modified to be dominated by locoweed, the Palos Verdes blue butterfly host plant that was historically present at the site (Table 4). This plant species is considered early successional and is often found in the open areas of coastal sage scrub communities.

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

Historically this host plant species was associated with natural occurrences such 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 ocean locoweed 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 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 which provide the open areas necessary for the host plant to persist. Since fire, in the form of controlled burns, is not an option at the Alta Vicente site, open areas may require regular through mechanical means.

The shrub spacing provided in the planting palette is slightly greater than in the CSS restoration areas and the planting palette is designed for only 50% coverage (including 30% coverage of ocean locoweed and 20% coverage of other shrubs) to allow for more openings in the habitat.

**Table 4**  
**Proposed Palos Verdes Blue Butterfly Habitat Planting Palette (1.0 Acre)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Container Plants</i>						
<i>Artemisia californica</i>	California sagebrush	D40	6	5	61	61
<i>Astragalus trichopodus</i> var. <i>lonchus</i>	Ocean locoweed	D40	2	7	1,634	1,634
<i>Corethrogyne filaginifolia</i>	Common sandaster	D40	3	3	145	145
* <i>Dudleya lanceolata</i>	Lanceleaf liveforever	1-gallon	2	3	54	54
<i>Elymus condensatus</i>	Giant wildrye	D40	6	3	6	6
<i>Encelia californica</i>	California brittlebush	D40	6	3	12	12
<i>Eriogonum fasciculatum</i>	California buckwheat	D40	6	5	24	24
<i>Eriogonum parvifolium</i>	Coast buckwheat	D40	6	5	12	12
<i>Eriophyllum confertiflorum</i>	Golden yarrow	D40	3	3	97	97
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	5	54	54
<i>Peritoma arborea</i>	Bladderpod	D40	6	5	12	12
<i>Salvia leucophylla</i>	Purple sage	D40	6	5	12	12
<i>Salvia mellifera</i>	Black sage	D40	6	3	12	12
<b>Total Container Plants</b>					<b>2,135</b>	<b>2,135</b>

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

**Table 4**  
**Proposed Palos Verdes Blue Butterfly Habitat Planting Palette (1.0 Acre)**

Seed Mix				
Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre	Total Lbs.
<i>Asclepias fascicularis</i>	narrow leaved milkweed	50	1.0	1.0
<i>Castilleja exserta</i>	purple owl clover	25	0.5	0.5
<i>Clarkia purpurea</i>	winecup clarkia	80	0.5	0.5
<i>Deinandra fasciculata</i>	fascicled tarplant	3	1.0	1.0
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	74	2.0	2.0
<i>Lasthenia californica</i>	California goldfields	30	1.0	1.0
<i>Layia platyglossa</i>	tidy tips	60	1.0	1.0
<i>Lupinus bicolor</i>	pygmy lupine	78	2.0	2.0
<i>Lupinus succulentus</i>	arroyo lupine	81	4.0	4.0
<i>Stipa lepida</i>	foothill needlegrass	54	2.0	2.0
<i>Stipa pulchra</i>	purple needlegrass	42	8.0	8.0
		<b>Total Lbs.</b>	<b>23.0</b>	<b>23.0</b>

\* Lanceleaf liveforever (*Dudleya lanceolata*) should be planted in rock outcrops.

### 3.2.4 Wildflower Field

The wildflower field planting is included in the HRP by request of the Palos Verdes Peninsula Land Conservancy. The location for the wildflower field was selected because the high clay content soil creates favorable conditions for the establishment of annual wildflower habitat (Table 5). Showy native wildflower species have been selected for this planting area. Additionally, a few shrubs have been included in the planting palette to develop a patchy structure to the planting, and provide for perimeter perennial plants along the roadway. A few bulb species are also included in the planting palette to be incorporated by PVPLC as available.

**Table 5**  
**Proposed wildflower field Planting Palette (Approximately 0.5 Acre)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
Container Plants						
<i>Bloomeria crocea</i> <sup>1</sup>	Goldenstar	Bulb	1	1	as available	TBD
<i>Brodiaea jolonensis</i> <sup>1</sup>	Jolon brodiaea	Bulb	1	1	as available	TBD
<i>Calochortus catalinae</i> <sup>1</sup>	Catalina mariposa lily	Bulb	1	1	as available	TBD

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

**Table 5**  
**Proposed wildflower field Planting Palette (Approximately 0.5 Acre)**

Botanical Name	Common Name	Container Size	Spacing (on center)	Group Size	Quantity (per acre)	Total # Plants
<i>Dichelostemma capitatum</i> <sup>1</sup>	Blue Dicks	Bulb	1	1	as available	TBD
<i>Dudleya virens</i>	Bright green dudleya	D40	2	3	218	109
<i>Epilobium canum</i>	California fuchsia	D40	3	5	145	73
<i>Eriophyllum confertiflorum</i>	Golden yarrow	D40	2	3	327	163
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	D40	2	5	545	272
<i>Mirabilis laevis</i> var. <i>crassifolia</i>	Wishbone bush	D40	4	3	163	82
<i>Verbena lasiostachys</i>	Western vervain	D40	4	3	82	41
<b>Total Container Plants</b>					<b>1,480</b>	<b>740</b>
Seed Mix						
Botanical Name	Common Name	Pure Live Seed	Lbs. Per Acre		Total Lbs.	
<i>Amsinckia intermedia</i>	Common Fiddleneck	49	1.0		0.5	
<i>Antirrhinum nuttallianum</i>	Purple Snapdragon	10	0.5		0.25	
<i>Asclepias fascicularis</i>	Narrowleaf milkweed	50	1.0		0.5	
<i>Castilleja exserta</i>	Purple owl's clover	25	0.5		0.25	
<i>Clarkia purpurea</i>	Winecup clarkia	80	0.5		0.25	
<i>Corethrogyne filaginifolia</i>	California-aster	80	2.0		1.0	
<i>Deinandra fasciculata</i>	<i>fascicled tarplant</i>	0.1	1.0		0.5	
<i>Emmenanthe penduliflora</i>	Whispering Bells	3	0.5		0.25	
<i>Eschscholzia californica</i> var. <i>maritima</i>	California poppy	50	2.0		1.0	
<i>Lasthenia californica</i>	California goldfields	74	0.5		0.25	
<i>Layia platyglossa</i>	Tidy tips	30	1.0		0.5	
<i>Lupinus bicolor</i>	Miniature lupine	60	2.0		1.0	
<i>Lupinus succulentus</i>	Arroyo lupine	78	6.0		3.0	
<i>Nemophila menziesii</i>	Baby blue eyes	81	0.5		0.25	
<i>Phacelia cicutaria</i>	Caterpillar phacelia	83	0.5		0.25	
<i>Phacelia ramosissima</i>	Branching phacelia	80	0.5		0.25	
<i>Salvia columbariae</i>	Chia	80	1.0		0.5	
<i>Sisyrinchium bellum</i>	Blue-eyed grass	54	3.0		1.5	
<i>Stipa lepida</i>	Foothill needlegrass	71	2.0		1.0	
<i>Stipa pulchra</i>	Purple needlegrass	54	8.0		4.0	
<b>Total Lbs. Per Acre</b>			<b>34.0</b>		<b>17.0</b>	

<sup>1</sup> The PVPLC has propagated limited numbers of these species  
TBD = To be determined

### 3.3 Revegetation Materials

Plant materials for the restoration planting area will include container stock and seed of coastal scrub and species, as indicated in the plant palettes provided in Tables 2-5. As much as feasible,



## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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the container plant materials will be grown at the PVPLC nursery from native seed collected on the Palos Verdes Peninsula. The nursery will grow the plants in D40 Deepots. Additionally, for the seed mixes, PVPLC will collect available seed from the peninsula for application at the restoration site. If some species cannot be grown as container stock at the PVPLC nursery, or local seed is not available for collection, the planting palettes may be adjusted, or another source may be used for acquiring locally sourced plant materials.

### **3.4 Target Functions and Values**

The primary functional goal of restoring coastal sage scrub, cactus scrub, Palos Verdes blue butterfly habitat, and wildflower field habitat is to restore vegetation that contains a diversity of native coastal scrub plant species and that provides habitat value for sensitive wildlife species, particularly the coastal California gnatcatcher, coastal cactus wren and Palos Verdes blue butterfly. Additionally, a secondary consideration is to create contiguous and intact habitat which can resist the re-establishment of invasive plant species.

### **3.5 Time Lapse**

The length of time to develop high quality habitat depends on a variety of factors including weather, soil conditions, herbivory, weed competition, and maintenance quality. Under optimal conditions, coastal sage scrub may take approximately three years from the application of seed and installation of 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 scrub species. In an unirrigated setting, and with drought conditions, scrub development may take longer than three years to mature enough to be suitable for nesting. As a hedge against drought, the addition of supplemental watering will increase plant survival, improve establishment, and hasten habitat development.

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# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

## 4 RATIONALE FOR EXPECTING SUCCESS

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

### 4.1 Preliminary Schedule

Appropriate timing of planting and seeding will minimize the need for supplemental watering and will increase the survival rate of the installed plants. For unirrigated restoration sites, or sites with limitations on irrigation systems, the best survival rates are achieved when container plants and seed are installed at the onset of the rainy season or soon thereafter (November through January). Planting and seeding at the site should be timed to take advantage of seasonal rainfall patterns and most appropriate growing season temperatures (see Charts 1-2 and Table 6). Seed application will occur only after container plants have had a full year to become established, and will be used to increase species density and diversity as needed.

**Table 6**  
**Preliminary Restoration Project Schedule**

Task	Date
Site clearing	Fall 2015
Invasive weed species control and grow-kill cycles	Winter and Spring 2016
Installation of supplemental watering system*	Summer 2016
Planting container stock	Fall and Early Winter 2016
Seed application	Fall and Early Winter 2017
Monitoring and maintenance	To begin upon successful installation of container plants

\* Supplemental watering system may not be installed if supplemental watering is to be conducted using a watering truck.

# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

Chart 1  
Average Monthly Precipitation for the Portuguese Bend Nature Preserve

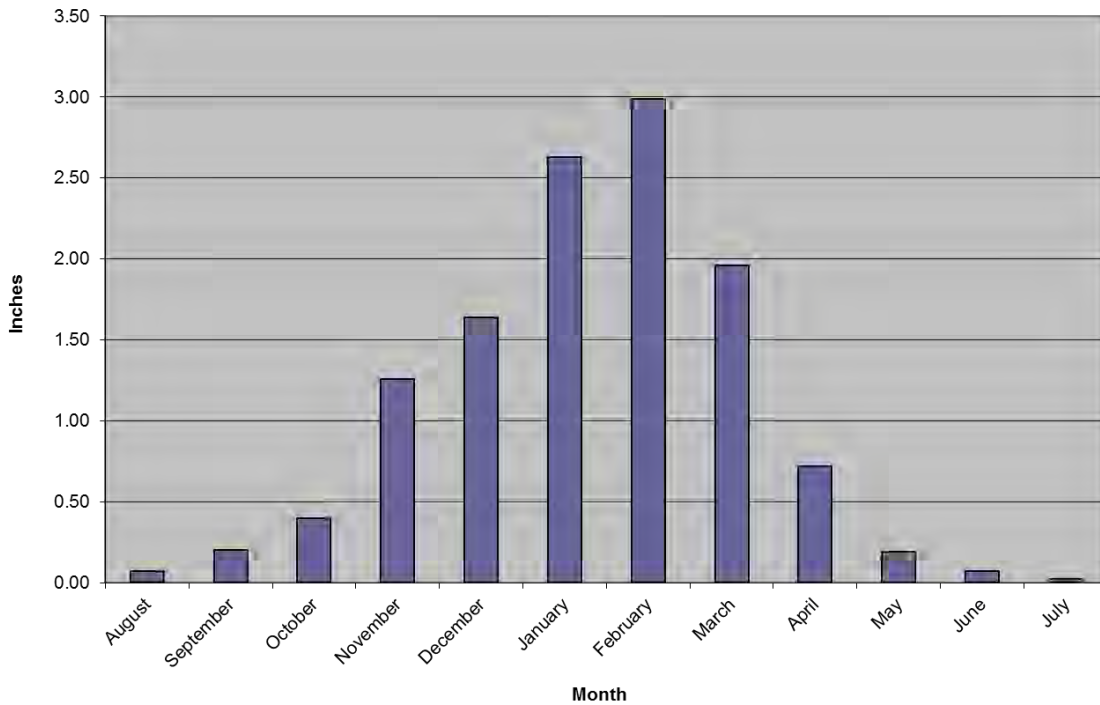
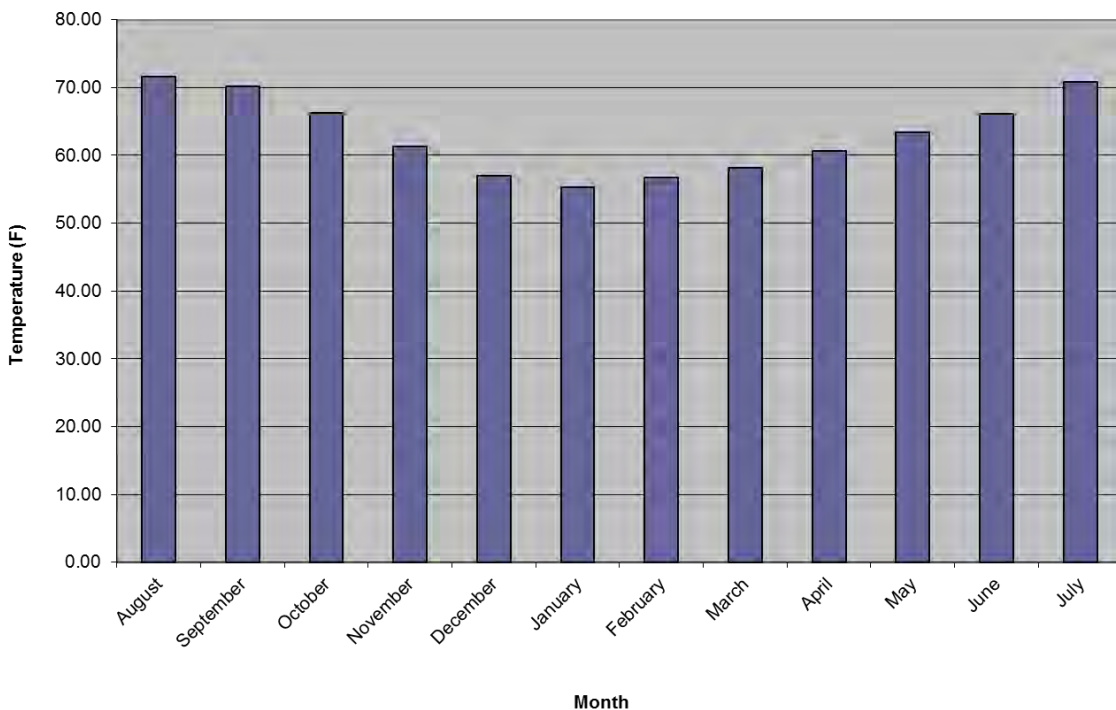


Chart 2  
Average Monthly Temperatures for the Portuguese Bend Nature Preserve



## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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### **4.1.1 Site Preparation**

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

During site preparation, all invasive weed species, particularly non-native annual grasses, black mustard, fennel, and castor bean should be killed and removed from the restoration area. Invasive species control should also include exotic trees and shrubs such as Brazilian pepper, acacia, and palms as directed by PVPLC staff.

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

### **4.1.2 Supplemental Watering System**

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

The PVPLC may establish temporary on-grade mainlines leading from the point of connection at City Hall, which was established for a previous restoration project within the Alta Vicente Reserve. The system should be designed by a landscape architect to ensure that

## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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the system has adequate water pressure and provides good coverage. The supplemental watering system would be installed as an above-ground system, so that irrigation equipment may be removed once the system has been decommissioned, and the container plants planted on site have become established.

### **4.1.3 Erosion Control**

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

### **4.1.4 Plant Installation**

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

### **4.1.5 Seed Application**

Seed shall be broadcast throughout the restoration site using hydroseed equipment or other method as recommended by the restoration ecologist.

If the seed is applied through hydroseeding, seed will be mixed uniformly in a slurry composed of water and virgin wood fiber mulch at the following rates:

- Seed mixture at indicated lbs. per acre.
- 100 percent Virgin wood fiber mulch at 2,500 Lbs. per acre.

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

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### **5 MAINTENANCE PLAN**

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

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

#### **5.1 Maintenance Activities**

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

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

## Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

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

### 5.2 General Habitat Maintenance Guidelines

#### 5.2.1 Weed Control

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

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

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

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



## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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

### **5.2.2 Supplemental Watering System**

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

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

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

### **5.2.3 Clearing and Trash Removal**

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

## **5.3 Schedule of Maintenance Inspections**

The project's restoration ecologist will perform quarterly maintenance/monitoring inspections during the scheduled maintenance and monitoring period. Recommendations for maintenance

## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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efforts will be based upon these site observation visits. Weed control shall be conducted as needed to ensure adequate control to promote healthy establishment of the target habitat types. It is anticipated that weed control will be necessary on a monthly basis during the winter and early spring when weeds are vigorously growing. Weed control during other times of the year will likely be diminished, but conducted as necessary, and as directed

# Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve

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## 6 MONITORING PLAN

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

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

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

### 6.1 Performance Standards

Performance standards have been established for the habitat restoration area based on the guidelines in the draft NCCP and on expected vegetative development relative to undisturbed habitat of the same type (Table 7). The following performance standards apply to the Alta Vicente restoration site:

1. Soil at the site is stable and shows no significant erosion.
2. After five years, non-native plant cover is less than 25% with less than 15% cover of invasive perennial species. After five years, there will be no presence of species on Cal-IPC List A with the possible exception of Cal-IPC List A non-native annual grasses.
3. Native plant cover after three years in the CSS community should be greater than 40% with at least 30% cover from perennial species. At five years, total native cover should be greater than 50% percent with appropriate species diversity.
4. Native plant cover after three years in the cactus scrub community should be greater than 30% with at least 20% cover from perennial species and 5% cover from cactus species. Native plant cover after five years in the cactus scrub community should be greater than 40% with at least 10% cover from cactus.
5. Native plant cover after three years in Palos Verdes blue butterfly habitat should be greater than 30%, but not more than 70%. The remainder should be bare ground.

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Perennial (shrub) species should be maintained at between 10% and 50% cover. Ocean locoweed (*Astragalus trichopodus* var. *lonchus*) should constitute at least 10% cover.

6. Native plant cover after three years in the wildflower field should be greater than 30%. Native plant cover after five years should be greater than 40%.

**Table 7**  
**Performance Standards**

Year	Percent Cover of Native Species (%)				Non-native Cover (for all habitat types)	
	Coastal Sage Scrub	Cactus Scrub	PV Blue Butterfly Habitat	Wildflower	Invasive Perennial Species Cover	Total Non-native Species Cover
Year 3	>40% (>30% perennial)	>30% (>20% perennial and >5% cacti)	30%-70% native cover; 10%-50% max. shrub cover; >10% host plant cover	>30%	<15% (0% of Cal-IPC List A)*	<25%
Year 5	>50%	>40% (>10% cacti)	30%-70% native cover; 10%-50% max. shrub cover; >10% host plant cover	>40%	<15% (0% of Cal-IPC List A)*	<25%

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

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

## 6.2 Monitoring Methods and Schedule

Annual qualitative assessments will be conducted through visual analysis of the coastal sage scrub, cactus scrub, butterfly habitat and wildflower field to assess vegetation development, weed presence, and plant establishment. Qualitative monitoring will include reviewing the health and vigor of container plants and seed plantings, assessing survival/mortality, checking for the presence of pests and disease, soil moisture content, and the effectiveness of the supplemental watering, erosion problems, invasion of weeds, and the occurrence of trash

## **Habitat Restoration Plan for the Alta Vicente Reserve in the Palos Verdes Nature Preserve**

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and/or vandalism. Representative photographs of the restoration site from stationary photo points will be taken annually.

Permanent vegetation sampling sites will be established within the coastal sage scrub, cactus scrub and the butterfly habitat restoration areas at randomized representative locations. A minimum of one transect shall be established for each two acres of restoration area, and at least one transect for each habitat type. No transects will be established in the wildflower field. Transect data will be collected in Years 3 and 5 from the restoration sites in the spring and will be used to determine compliance and achievement of the restoration performance standards. Transect data will be collected using the point-intercept method to determine percent target vegetation cover and weed cover. If the restoration project is in compliance with the Year 5 performance standards in an earlier monitoring period, then qualitative assessments may be substituted for the quantitative monitoring until the end of the 5-year restoration program. If the restoration site is performing below the interim performance standards, the project's restoration ecologist will determine if remedial measures are necessary.

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

### **6.3 Monitoring Reports**

The PVPLC will monitor and report on the restoration work underway in the Alta Vicente Reserve. The restoration area will be monitored for five years, with reports prepared annually. Monitoring reports should provide concise, meaningful summaries of the restoration progress and provide direction and maintenance recommendations for future work.

Annual reports will include the following:

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

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# **APPENDIX A**

## *Soil Test Results*



<b>WALLACE LABS</b> <b>365 Coral Circle</b> <b>El Segundo, CA 90245</b> <b>(310) 615-0116</b>		<b>SOILS REPORT</b> Location Palos Verdes Peninsula, Job No. 9085 Requester Andy Thomson and Jake Marcon, Dudek graphic interpretation: * very low, ** low, *** moderate *** high, ***** very high		Print Date July 17, 2015	Receive Date 7/16/15
<b>ammonium bicarbonate/DTPA</b> extractable - mg/kg soil Interpretation of data low medium high 0 - 7 8-15 over 15 0-60 60 -120 121-180 0 - 4 4 - 10 over 10 0- 0.5 0.6- 1 over 1 0 - 1 1 - 1.5 over 1.5 0- 0.2 0.3- 0.5 over 0.5 0- 0.2 0.2- 0.5 over 1		<b>Sample ID Number</b> <b>Sample Description</b> <b>elements</b> phosphorus potassium iron manganese zinc copper boron calcium magnesium sodium sulfur molybdenum nickel aluminum arsenic barium cadmium chromium cobalt lead lithium mercury selenium silver strontium tin vanadium	15-198-01 AV #1 graphic 1.77 * 154.88 **** 2.36 * 1.44 **** 0.86 ** 4.44 ***** 0.30 *** 201.11 *** 520.68 ***** 536.41 ***** 9.32 * n d * 0.60 * n d * 0.05 * 2.62 * 0.23 * n d * 0.04 * 1.63 ** 0.30 * 0.11 * n d * n d * 0.50 * n d * 1.31 **	15-198-02 AV #2 graphic 3.28 ** 111.48 *** 2.54 ** 2.18 **** 0.81 ** 2.83 **** 0.21 *** 189.13 *** 247.46 ***** 141.94 *** 10.83 * 0.03 *** 1.74 ** n d * n d * n d * 1.86 * 0.24 * n d * 0.03 * 0.93 * 0.26 * n d * n d * n d * 0.34 * n d * 0.77 *	15-198-03 AV #3 graphic 2.64 * 139.59 **** 2.13 * 1.30 **** 0.87 ** 3.85 ***** 0.23 *** 295.01 *** 393.25 ***** 192.61 *** 11.04 * 0.05 *** 1.59 ** n d * 0.03 * 3.41 ** 0.39 * n d * 0.08 * 2.01 ** 0.40 * n d * n d * n d * 0.45 * n d * 1.29 **
The following trace elements may be toxic The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions.		<b>Saturation Extract</b> pH value ECe (milli-mho/cm)	7.91 **** 0.55 ** millieq/l	7.95 **** 0.47 ** millieq/l	7.87 **** 0.40 ** millieq/l
1-2 affects a few plants 2-4 affects some plants, > 4 affects many plants.		calcium magnesium sodium potassium cation sum chloride nitrate as N phosphorus as P sulfate as S anion sum boron as B	6.8 0.3 2.0 0.2 78.5 3.4 -0.9 0.0 3.9 3.6 70 2.0 3 0.2 0.2 0.0 8.7 0.5 2.7 2.0 0.21 **	18.6 0.9 6.3 0.5 47.8 2.1 0.7 0.0 50 1.4 2 0.1 0.2 0.0 7.6 0.5 2.0 2.0 0.41 ***	18.6 0.9 6.5 0.5 39.6 1.7 -0.8 0.0 26 0.7 5 0.4 0.0 0.0 6.6 0.4 1.5 1.5 0.15 *
problems over 150 ppm good 20 - 30 ppm toxic over 800 toxic over 1 for many plants increasing problems start at 3 est. gypsum requirement-lbs./1000 sq. ft.		<b>SAR</b> relative infiltration rate soil texture lime (calcium carbonate) organic matter moisture content of soil half saturation percentage	6.8 **** 181 slow sand - 9.8% clay silt - 29.2% yes clay - 61.0% fair 12.5% gravel over 2 mm 44.0% 0.4%	2.4 ** 24 slow sand - 16.8% clay silt - 35.6% high clay - 47.7% fair 10.7% gravel over 2 mm 40.7% 12.1%	2.0 ** 80 slow sand - 16.5% clay silt - 37.1% slight clay - 46.5% fair 12.6% gravel over 2 mm 39.3% 1.7%

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

