2007 Preserve Habitat Management Plan for the Portuguese Bend Nature Preserve

In Compliance with the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan

APRIL 2007

PREPARED FOR:

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Preserve Habitat Management Plan (PHMP) for the Portuguese Bend Nature Preserve

EXECUTIVE SUMMARY

This initial Preserve Habitat Management Plan (PHMP) for the Portuguese Bend Nature Preserve (PBNP) was prepared in accordance with requirements of the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan (Draft NCCP/HCP). The initial PHMP consists of numerous subsidiary plans and reports (described below) which have been reviewed and approved by the City of Rancho Palos Verdes, the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

This initial PHMP consists of four plans and reports (*Table 1*), including an Initial Management and Monitoring Report (IMMR), a Predator Control Plan (PCP), a Habitat Restoration Plan (HRP) and a Targeted Exotic Removal Program for Plants (TERPP). A brief description of each is provided below; however, specific details about each of the plans and reports can be found within those documents, included herein.

TABLE 1
PHMP Report and Plan Submittals

Type of Preserve Activity	Initial Plans/Reports	Annual Submittals (due October 1)	Every Third Year Submittals (due October 1)
Species Monitoring	Initial Management and Monitoring Report (IMMR)	Draft NCCP/HCP-Covered Plant Species Monitoring Report	Comprehensive Management and Monitoring Report
Predator Control	Predator Control Plan (PCP)		Updated PCP
Habitat Restoration	Habitat Restoration Plan (HRP)	HRP Annual Monitoring Report	Updated HRP
Exotic Plant Removal	Targeted Exotic Removal Program for Plants (TERPP)	TERPP Status Report	
Habitat Tracking		Habitat Tracking Report	

In addition to the initial plans and reports, the following are to be submitted annually (following the initial PHMP submittal), including the HRP annual monitoring report, TERPP status report, Covered Plant Species Monitoring Report and Habitat Tracking Report (*Table 1*). Every three years, the PHMP requires a Comprehensive Management and Monitoring Report, an updated PCP and an updated HRP. Each of the reports and updated plans are due by October 1.

The IMMR includes the results of the focused surveys for Draft NCCP/HCP-covered plant and wildlife species and is included in *Section 1* of this document. It was prepared to document the results of the initial focused surveys for Draft NCCP/HCP-covered plant and wildlife species within the PBNP, identify potential disturbance factors/threats to Draft NCCP/HCP-covered plant and wildlife species, and to make management recommendations for the preservation of the existing Draft NCCP/HCP-covered plant and wildlife species populations. Other special-status plant and wildlife species were also documented if observed on site.

The PCP describes potential provisions for control of predators to wildlife within the PBNP and is included in *Section 2*. It provides the framework for the pet/feral animal education program, the education program regarding native predators, and establishes the parameters for monitoring for feral or domestic animals, native large predators and mesopredators.

The HRP (located in *Section 3*) identifies a 15-acre site within the Alta Vicente Ecological Reserve in the PBNP as the proposed location for the first three-year habitat restoration project in accordance with the requirements of the Draft NCCP/HCP. It includes the restoration implementation strategy and provides guidelines for the establishment of coastal sage scrub, coastal cactus scrub, and butterfly habitat. It also presents information on the project location and work descriptions, planting recommendations, maintenance requirements, monitoring methodology and revegetation success criteria. According to the HRP, 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.

And finally, the TERPP provides details regarding the prioritization of exotic plant control within the PBNP and is located in *Section 4*. It describes the methodology of the proposed TERPP, wherein each year exotic plants on five acres or 20 individual sites are to be removed to have a beneficial effect on the habitat in the area.

2006 Initial Management and Monitoring Report

2006 INITIAL MANAGEMENT AND MONITORING REPORT
for the
RANCHO PALOS VERDES DRAFT NATURAL COMMUNITY CONSERVATION PLAN AND HABITAT CONSERVATION PLAN

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APRIL 2007

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2006 Initial Management and Monitoring Report for the Rancho Palos Verdes Draft NCCP/HCP

1.0 INTRODUCTION

This Initial Management and Monitoring Report (IMMR) for the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan (Draft NCCP/HCP) was prepared by Dudek to document the results of the initial focused surveys for Draft NCCP/HCP-covered plant and wildlife species within the Portuguese Bend Nature Preserve (PBNP), identify potential disturbance factors/threats to Draft NCCP/HCP-covered plant and wildlife species, and to make management recommendations for the preservation of the existing Draft NCCP/HCP-covered plant and wildlife species populations. Other special-status plant and wildlife species were also documented if observed on site. This report was prepared in accordance with the requirements of the Draft NCCP/HCP (URS 2006) for the City of Rancho Palos Verdes, California (City).

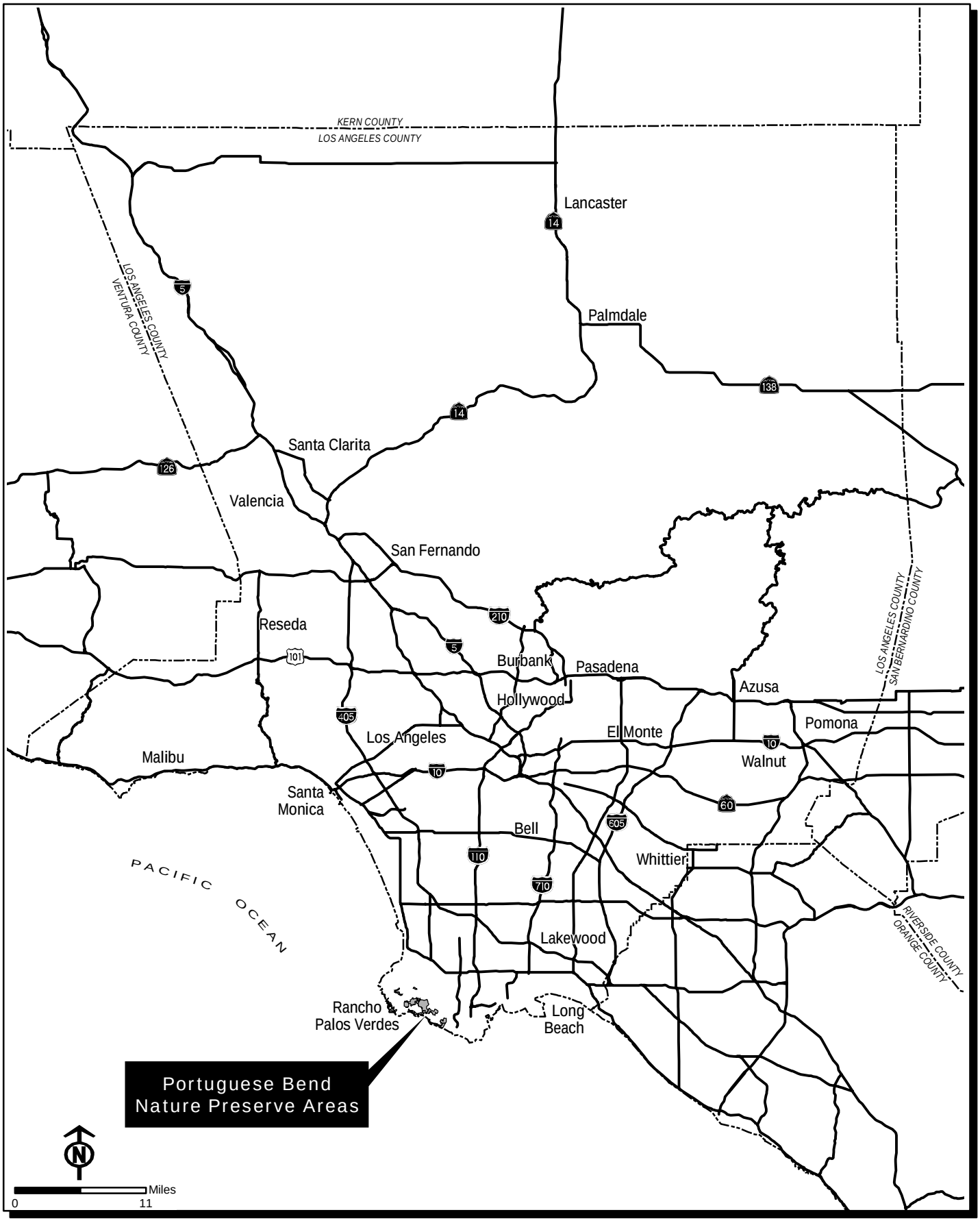
As of the writing of this plan, the Draft NCCP/HCP Implementing Agreement has not been signed by the regulatory agencies, and therefore, the Draft NCCP/HCP is technically not officially executed. However, the City and the Palos Verdes Peninsula Land Conservancy (PVPLC) are continuing to coordinate with the resource agencies to complete this plan.

The Draft 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, a Reserve design was proposed to conserve regionally important habitat areas and provide habitat linkages in order to benefit sensitive plants and wildlife.

2.0 SITE DESCRIPTION

The PBNP is located on the southern side of the Palos Verdes Peninsula, north of the Pacific Ocean in the City of Rancho Palos Verdes, California (*Figures 1* and *2*). The approximately 1,428-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.

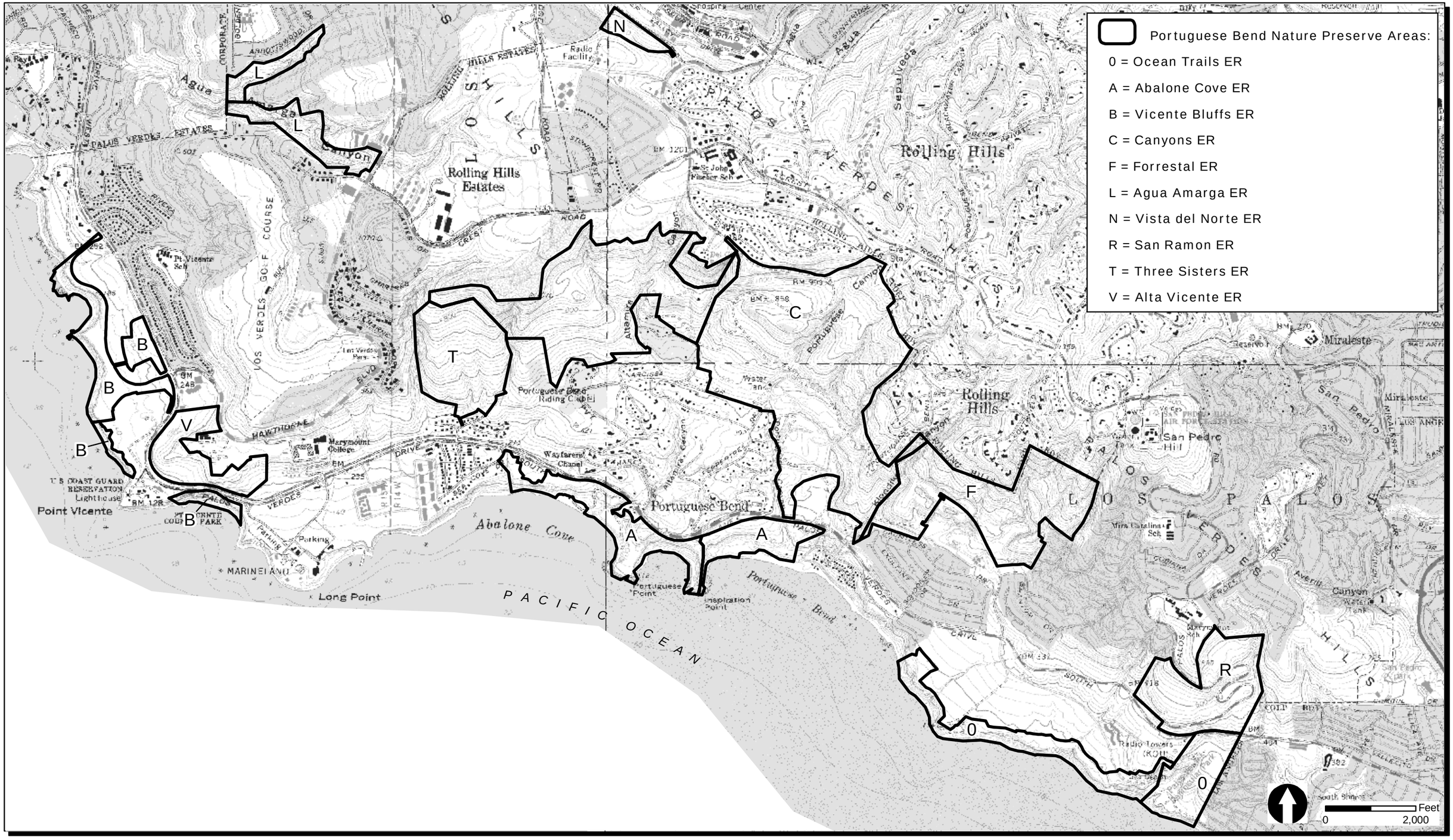
The PBNP has been divided into ten Ecological Reserve (ER) areas, including Agua Amarga (Area L), Vicente Bluffs (Area B), Alta Vicente (Area V), Three Sisters (Area T), Abalone Cove (Area A), Canyons (Area C), Forrestal (Area F), Ocean Trails (Area O), San Ramon (Area R), and Vista del Norte (Area N) (*Figure 2*). Topography is diverse, ranging from relatively flat



Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Regional Map

FIGURE 1



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

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Vicinity Map

FIGURE 2

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 of Areas B, A, and O to approximately 1,300 feet above mean sea level at the northernmost parcel, Area N (*Figure 2*). Adjacent land uses include single-family residences on most sides, open space associated with neutral lands on the peninsula that are under investigation for purchase by the PVPLC, 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.

2.1 Plant Communities and Land Covers

Plant communities and land covers within the PBNP 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 Draft NCCP/HCP were prepared by Atwood et al. (1994) and updated and verified by Ogden (1999). Plant community classification in the Draft NCCP/HCP generally follows Holland (1986), with some minor adaptations following Sawyer and Keeler-Wolf (1995). 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.

2.2 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.

3.0 SURVEY METHODS

The 2006 botanical and wildlife surveys that form the basis of the initial baseline information were focused on documenting the presence and monitoring the status of Draft NCCP/HCP-covered plant and wildlife species. Additional sensitive plant and wildlife species and host plants for Draft NCCP/HCP-covered butterfly species were also documented during the surveys. Collectively, Draft NCCP/HCP-covered species, additional sensitive plant species, and host plant species for Draft NCCP/HCP-covered butterfly species are termed special-interest plant species in this report. Data regarding additional non-covered botanical and wildlife resources potentially present within the PBNP were obtained through a review of the pertinent literature, field reconnaissance, and focused surveys for special-interest species, with varying levels of specificity; all of which are described below.

3.1 Literature Review

Special-interest botanical and wildlife resources present or potentially present within the PBNP were identified through a literature search using the following sources: California Natural Diversity Database (CNDDB) (California Department of Fish and Game [CDFG] 2005), the CDFG Special Animals List (Accessed April 15, 2006 from http://www.dfg.ca.gov/whdab/pdfs/SPAnimals.pdf), local botanical resources including multi-year botanical surveys conducted by local botanist, Angelika Brinkmann-Busi, and California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants (2001) including any revisions provided on http://www.cnps.org/inventory (Accessed April 2006). General information regarding vegetation communities was obtained from Holland (1986) and Sawyer and Keeler-Wolf (1995). Plant species nomenclature follows Hickman (1993).

General information regarding wildlife species present in the region was obtained from Garrett and Dunn (1981) for birds, Hall (1981) for mammals, Stebbins (2003) for reptiles and amphibians, and Emmel and Emmel (1973) for butterflies.

In addition to these general documents referenced for botanical and wildlife resources potentially present, the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan (URS 2006), the Final Environmental Impact Report for the Rancho Palos Verdes Natural Communities Conservation Planning Subarea Plan (URS 2004b) and the Rancho Palos Verdes Natural Communities Conservation Planning Subarea Plan (URS 2004a) were reviewed to identify known locations of Draft NCCP/HCP-covered species and to determine habitat preferences and species characteristics prior to the 2006 surveys.

3.2 Field Reconnaissance Methods

Botanical and wildlife surveys were conducted by Dudek staff biologists with assistance provided by biological staff from the PVPLC, independent botanist Angelika Brinkmann-Busi, lepidopterist Dr. Gordon F. Pratt and his assistant, Cecilia L. Pierce. All surveys were conducted on foot. All plant and wildlife species encountered during the field surveys were identified and recorded for inclusion in *Appendix A* and *B*, respectively. Latin and common names of plants follow *The Jepson Manual* (Hickman 1993) or other recent published taxonomic treatments. Where not listed in Hickman (1993), common names of plants were taken from Abrams (1923). Where not found in this reference, a variety of sources were used (e.g., Abrams 1923, Dale 1986, or Roberts 1998). For wildlife, resources for Latin and common names follow Garrett and Dunn (1981) for birds, Hall (1981) for mammals, Stebbins (2003) for reptiles and amphibians, and Emmel and Emmel (1973) for butterflies.

3.2.1 Botanical Surveys

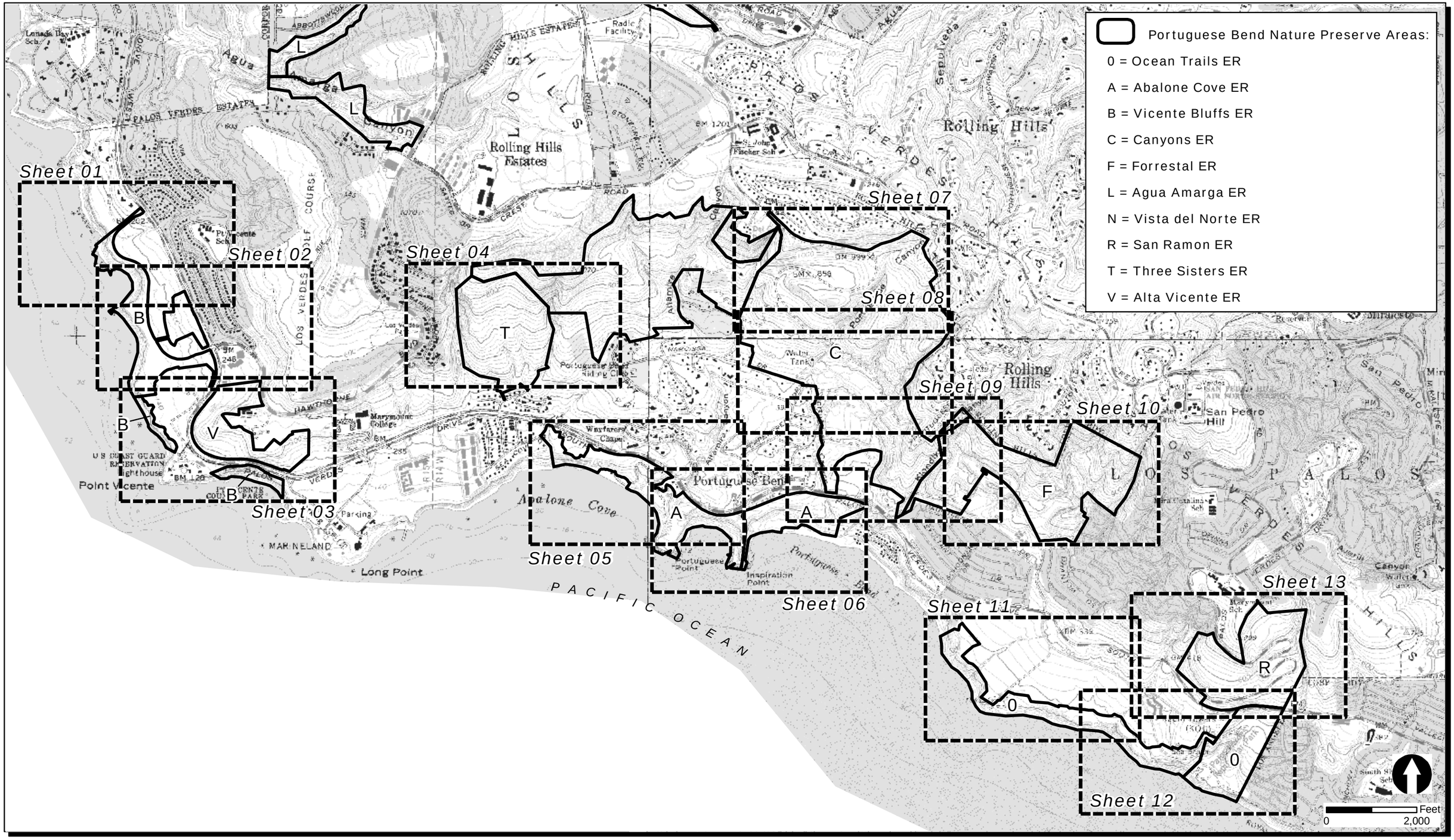
Botanical surveys of the site were conducted between early May and mid-October of 2006 in accordance with the schedule provided in *Table 1* below. Surveys were conducted by Dudek biologists Andrew C. Thomson (ACT), Colin K. Khoury (CKK), and Douglas A. Gettinger (DAG) and by independent botanist Angelika Brinkmann-Busi (AB) with assistance from PVPLC biologist Andrea Vona (AV). Surveys focused on the identification and location of Draft NCCP/HCP-covered plant species and host plants for Draft NCCP/HCP-covered butterfly species. Additional sensitive plant species incidentally observed during surveys were also recorded (*Figures 3* and *4a–4m*).

Sensitive plant species are those species that have been given special recognition by federal, state, or local conservation agencies and organizations due to limited, declining, or threatened population sizes. This includes those species listed by the state and federal government as threatened or endangered, those species proposed for state and/or federal listing or candidates and species on the *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2001) or CNPS online inventory (http://www.cnps.org/inventory).

TABLE 1
2006 Plant Survey Schedule and Personnel – Portuguese Bend Nature Preserve

Date	Biologists	Survey Area
5/4/06	AB	V
5/8/06	AB	V,A
5/10/06	AB	F
5/11/06	AB	A
5/18/06	AB	A,F
5/22/06	ACT, DAG	R
5/23/06	ACT, DAG	O
5/24/06 to 5/25/06	ACT	O
6/23/06	ACT, CKK	A
6/26/06	AB	F
6/28/06	AB	T
6/30/06	AB	F
6/30/06	ACT, AV, ABB	A, B
7/3/06	AB	T
7/5/06	ACT	B
7/18/06	ACT	B
7/20/06	AB	P
7/21/06	DAG	O
07/25/06	AB	P
07/26/06	AB	P
08/02/06	AB	F
08/04/06	AB	F
08/07/06	AB	T
08/10/06	AB	P
08/11/06	AB	P
10/12/06	DAG	O

The Draft NCCP/HCP includes a total of six covered plant species, including aphanisma (*Aphanisma blitoides*), south coast saltscale (*Atriplex pacifica*), Catalina crossosoma (*Crossosoma californicum*), island green dudleya (*Dudleya virens* ssp. *insularis*), Santa Catalina Island desert-thorn (*Lycium brevipes* var. *hassei*), and woolly sea-blite (*Suaeda taxifolia*). Focused surveys were conducted throughout PBNP for each of the Draft NCCP/HCP-covered plant species. In addition to the Draft NCCP/HCP-covered plant species, focused surveys were also conducted for dune buckwheat (*Eriogonum parvifolium*) because it is the primary host plant for the Draft NCCP/HCP-covered El Segundo blue butterfly (*Euphilotes battoides allyni*) (ESBB). No focused surveys were conducted for additional plant species; however, additional sensitive plant species and host plants for the Palos Verdes blue butterfly (*Euphilotes battoides allyni*) (PVB) were documented during the 2006 botanical surveys when observed.

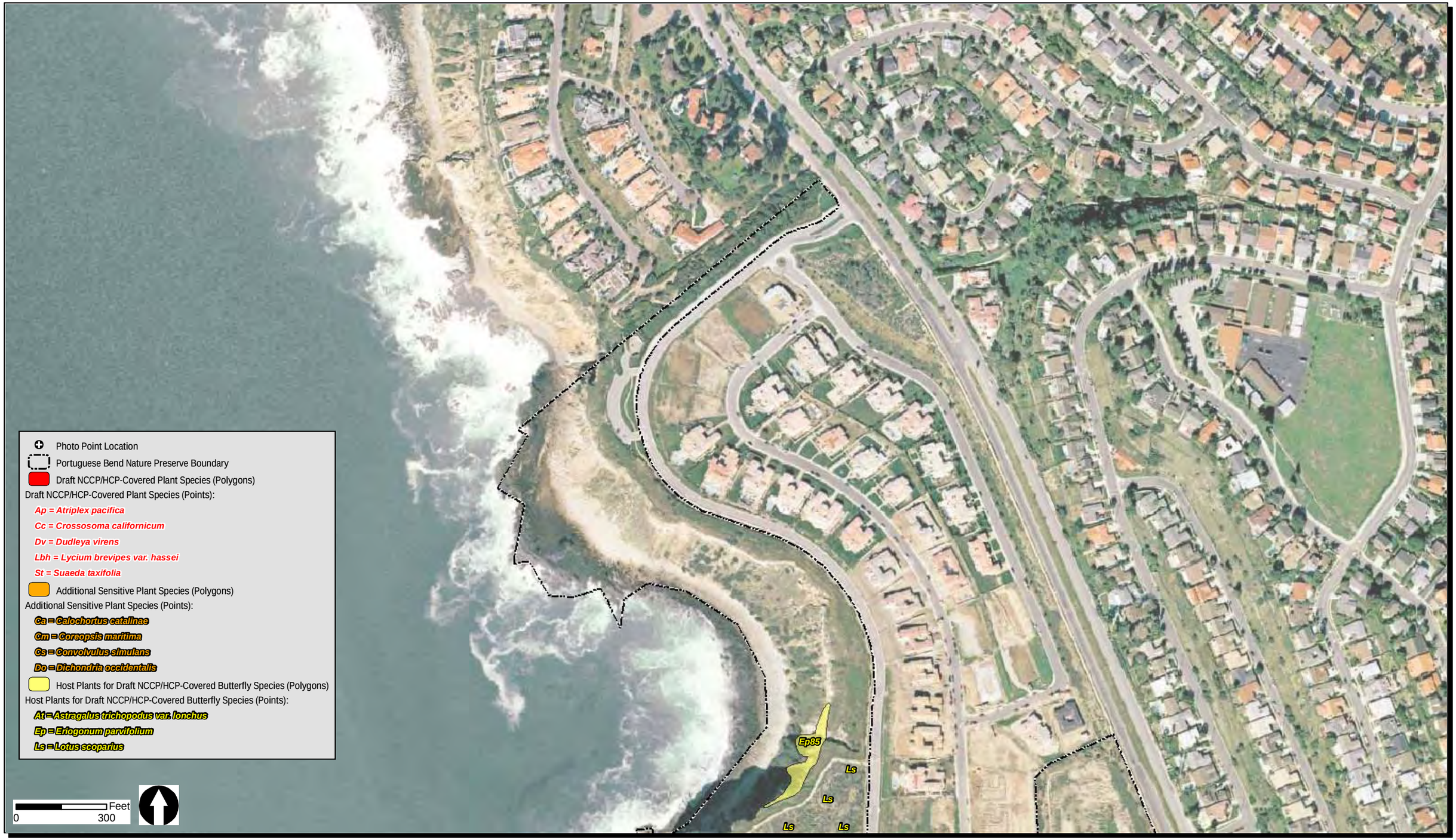


SOURCE: USGS 7.5 Minute Series, Redondo Beach, San Pedro, Torrance and Rancho Palos Verdes Quadrangles

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species Sheet Index Map

FIGURE 3



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 01

FIGURE 4a

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

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Plant Species - Sheet 02

FIGURE 4b

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

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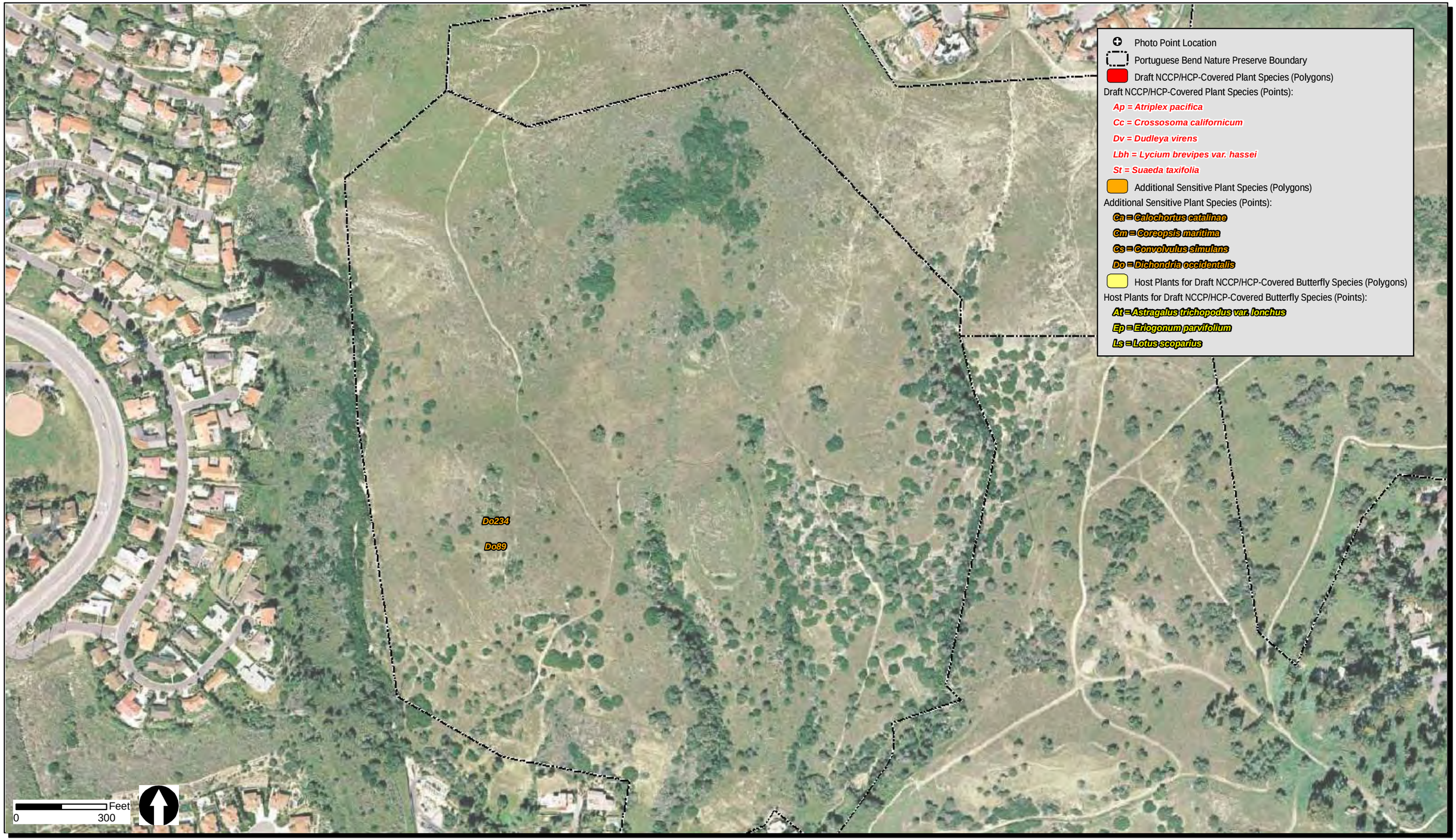
Plant Species - Sheet 03

FIGURE 4c



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

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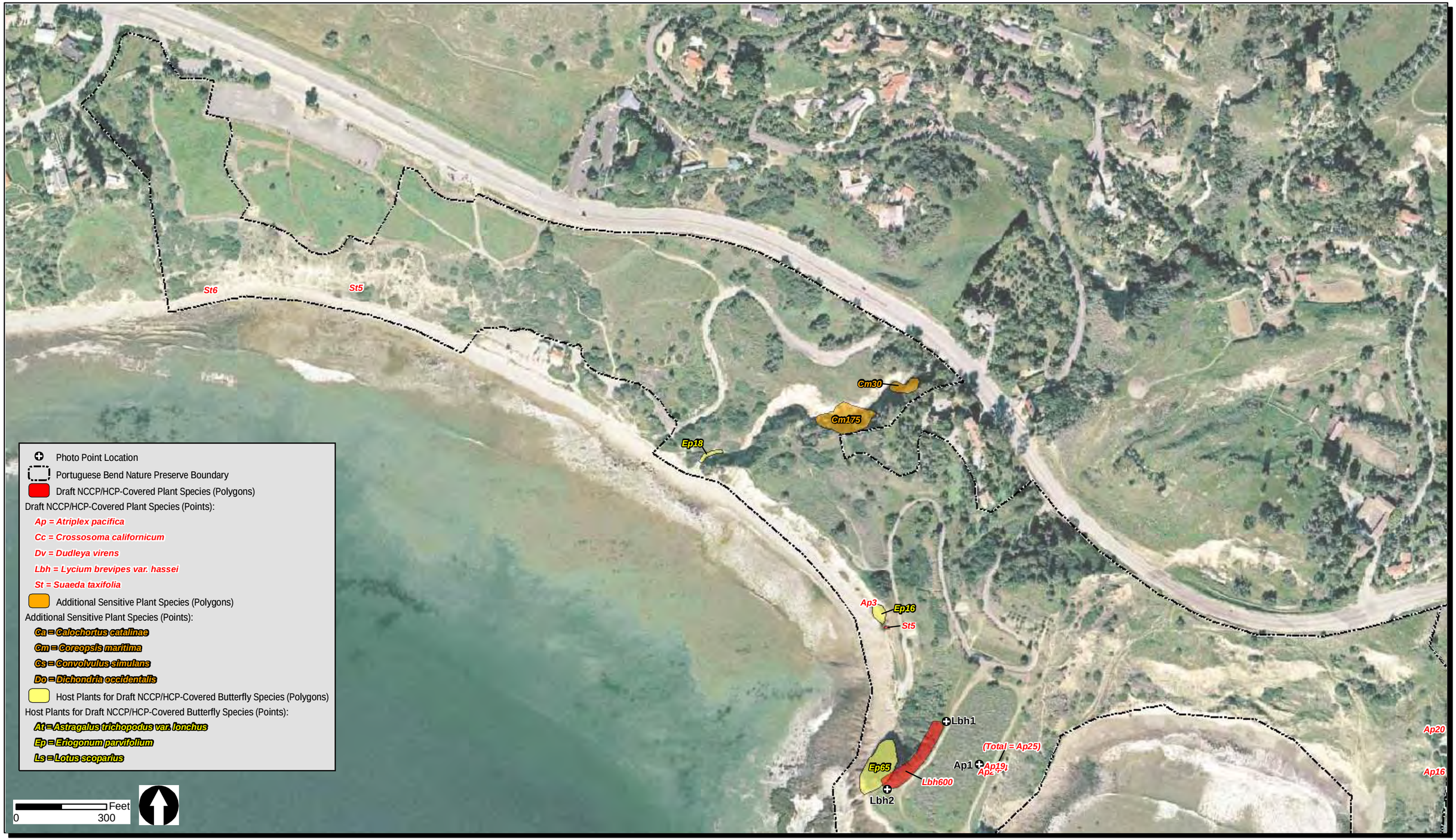
Plant Species - Sheet 04

FIGURE 4d



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 05

FIGURE 4e

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 06

FIGURE 4f

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 07

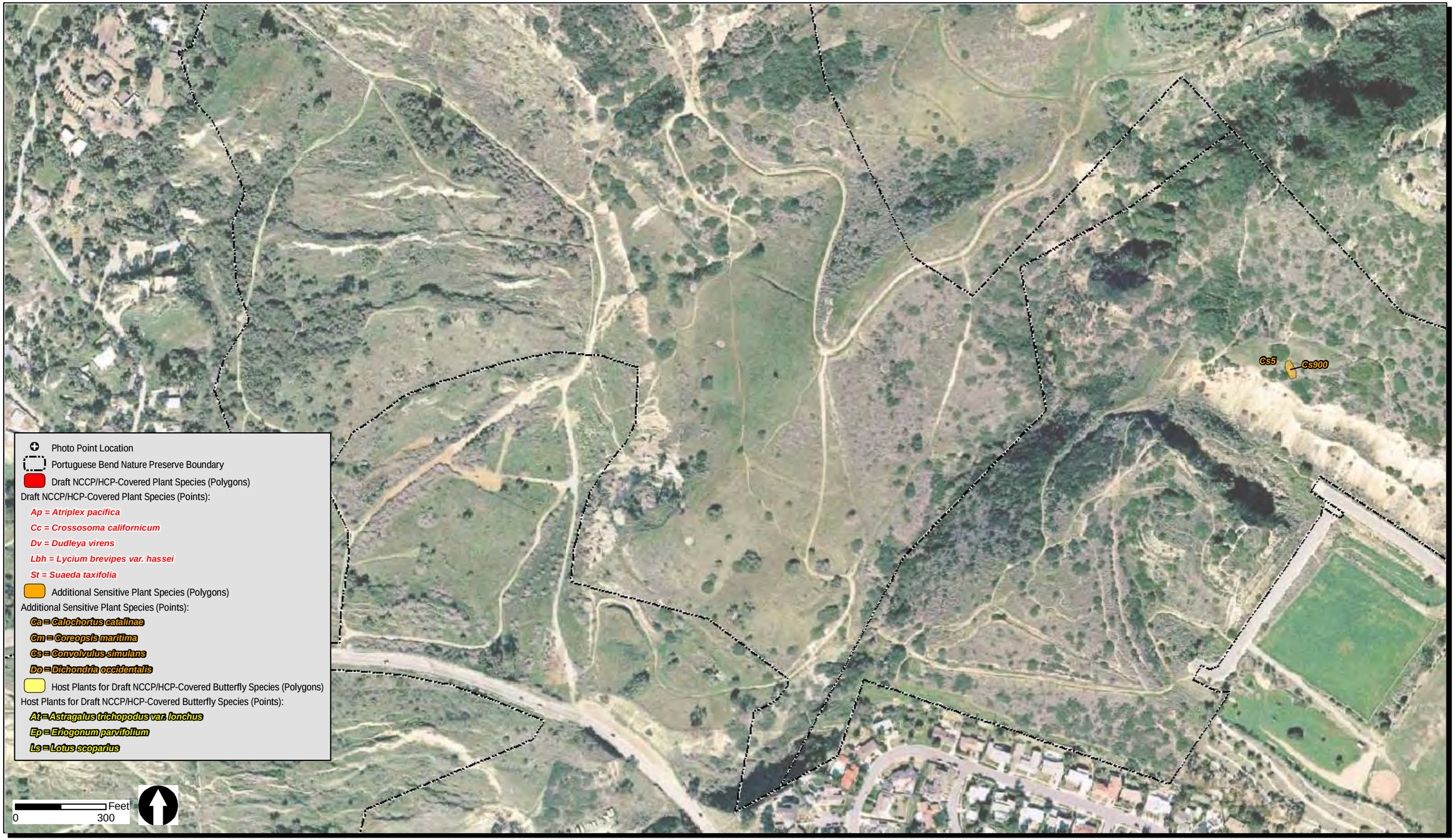
FIGURE 4g

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 08

FIGURE 4h

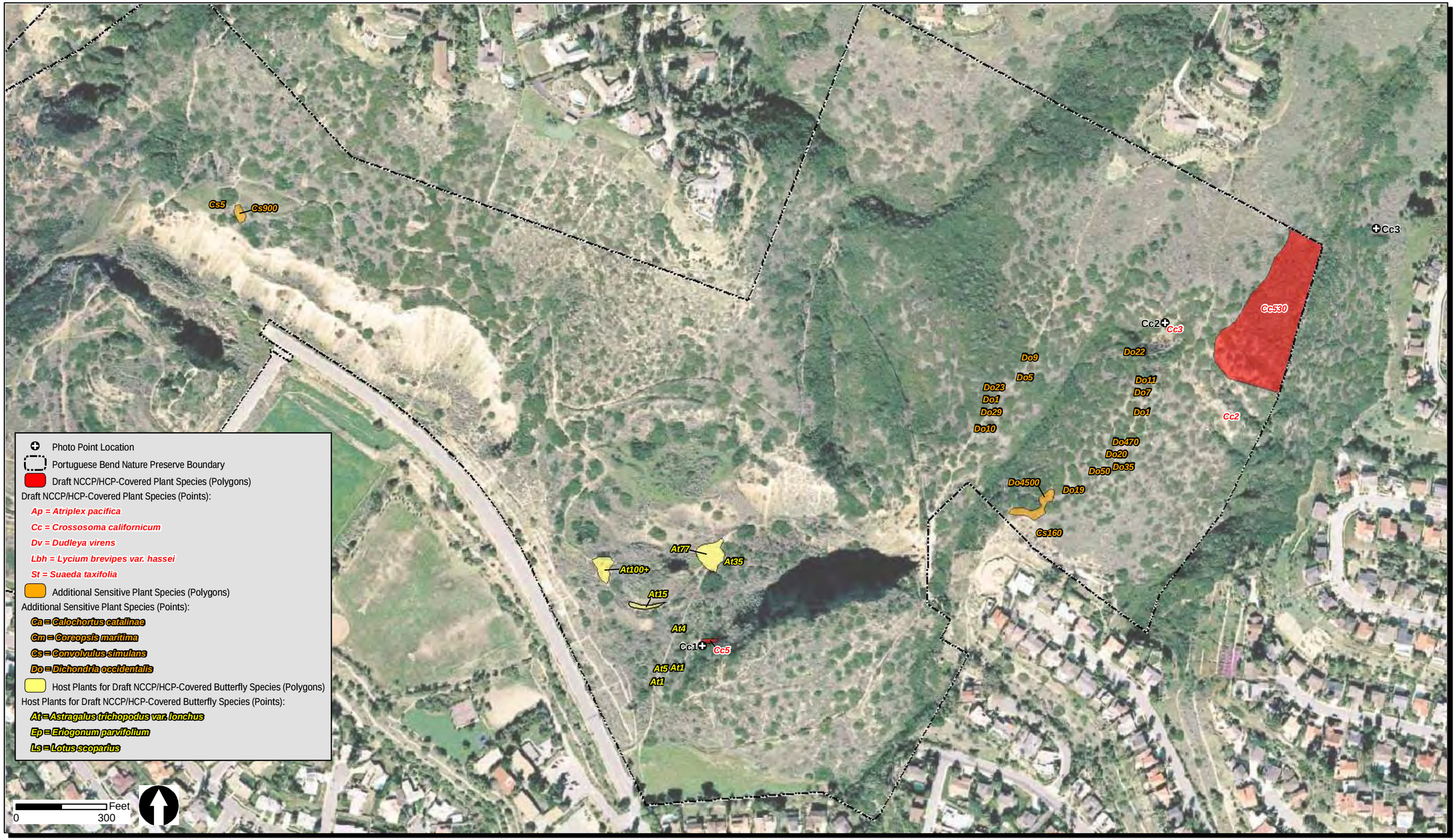


AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 09

FIGURE 4i



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 10

FIGURE 4j

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 11

FIGURE 4k

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 12

FIGURE 4I

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Plant Species - Sheet 13

FIGURE 4m

Field data sheets were prepared that include pertinent survey parameters such as plant species, population estimates/counts, population structure, natural recruitment, slope, aspect, soil texture, dominant vegetation community, estimate of percent native, bare ground, and non-native cover, disturbance factors/threats, and associated species (*Appendix C*). Each occurrence (i.e., point or polygon) was assigned a unique polygon or point identification code that identifies the survey area, the surveyor, and the record number. A pre-survey site meeting was held to determine survey methodologies for the Draft NCCP/HCP-covered plant species in order to ensure consistency among surveyors in population estimation methods and results.

The Draft NCCP/HCP recommends timing surveys during the most phenologically appropriate time for each species, including between April and May for aphanisma, between May and July for south coast saltscale, between April and June for island green dudleya, June for Santa Catalina Island desert-thorn, and between February and May for Catalina crossosoma, which is generally coincident with the blooming periods for these species. The blooming period is not necessarily the easiest time of the year to locate these species, however. For example, the stems of both aphanisma and south coast saltscale tend to turn red in the summer, which can provide good color contrast between these species and the surrounding vegetation, thereby making them easier to locate. Further, the flowers for these two species are inconspicuous, and do not aid in the location of these species. Similarly, the leaves of Catalina crossosoma turn red in the late summer, making them stand out among the surrounding shrubs and easier to count. The remaining three Draft NCCP/HCP-covered species (island green dudleya, Santa Catalina Island desert-thorn and woolly sea-blite) are all perennials that can be observed year round, although island green dudleya and Santa Catalina Island desert-thorn are probably easiest to identify during the blooming periods.

The timing of the 2006 botanical surveys generally coincided with appropriate survey periods for the Draft NCCP/HCP-covered plant species. Focused surveys were conducted for Santa Catalina Island desert-thorn in May while they still had some flowers and had developed some fruits. For south coast saltscale, aphanisma, and island green dudleya, focused surveys were conducted between May and July, when south coast saltscale and island green dudleya were easily observable and when aphanisma would have been observable. Focused surveys were conducted for woolly sea-blite between June and July. The surveys for Catalina crossosoma were conducted in August, when the leaves began to turn red, making them more easily observable amongst the surrounding vegetation. Focused surveys for dune buckwheat were conducted between June and July, when the plants were in the early blooming stages.

While surveying in the field and mapping Draft NCCP/HCP-covered plant species, a 5-meter rule for annual species and a 10-meter rule for perennial species was used to separate polygons

for mapping purposes. This distance is a heuristic mapping tool based on the topography, vegetation, detectability of the plants, the general accuracy of the GPS, and time constraints. This heuristic criterion is not specifically tied to biology (i.e., reproductive biology, seed dispersal) of the plant species and thus is not intended to reflect reproductively isolated sub-populations, the total extent of the seed bank, or any other feature of the species life history. When observed, polygons for additional sensitive plant species were mapped similarly, though not as rigorously, using professional judgment and experience to delineate polygons based on the detectability of the species, topography, and vegetation. While the 5-meter and 10-meter rules were generally applied for mapping special-interest species, in some instances difficult terrain or topography precluded the ability to accurately measure distances between individuals (e.g., island green dudleya on the coastal cliffs). In these instances, the surveyor's best judgment of the approximate 10-meter distance was estimated from a vantage point.

When surveying a large group of plants, the outer perimeter of each polygon was searched in one continuous direction until returning to the starting point, with plants being located within at least every 0 to 5 meters for annuals and 0 to 10 meters for perennials along the boundary. If the location of the polygons were accessible, the perimeter of the polygons was recorded with a global positioning system (GPS). If not accessible, then the perimeter of the polygons was drawn on aerial maps of the survey area. Sometimes a combination of GPS and drawn polygons was used if only portions of polygons were accessible. Each species polygon was given a unique identifier (i.e., survey area code–surveyor initials–record number) in the field. Field data sheets were completed for each of the Draft NCCP/HCP-covered plant polygons that include data on site conditions (i.e., plant number estimates, population structure, natural recruitment, aspect, slope, soil texture, vegetation community, associated species, and disturbance factors/threats).

When possible, a direct count of individuals at each point location or polygon was made. In some instances when populations were inaccessible, binoculars (10×42; 8×42) were used to aid in counting individuals. This method was particularly relevant on the coastal bluffs, which were surveyed from above and below. When a direct count was infeasible (due to access constraints, high number of individuals, visual obscurity, etc.), an estimate was made by sampling a subset of the polygon. For example, after mapping the boundaries of the polygon, the number of individuals was counted/estimated in a square sample estimation area, which is a subset of the total polygon. The sample estimation area was 1 meter square (1 m × 1 m). The number of subsets within the total polygon was determined and added/multiplied, resulting in a total estimate of the number of individuals of the polygon (e.g., 4×125=500, 8×12=96, 9×100=900). For population estimates, a modified magnitude scale was used to arrive at an estimate of the number of individuals within each polygon. This number was then rounded to the nearest magnitude or multiple of a magnitude (e.g., 500; 100; 1,000).

Sometimes individual plants are difficult to detect due to the growth habitat or method of reproduction. For example, island green dudleya grows in clumps, with multiple pups growing from a centralized rooting structure. For instances when differentiating individual plants was difficult, a standard method was developed in the field and used consistently throughout the surveys. For island green dudleya, closely-spaced pups within a clump were counted as one individual. For woolly sea-blite, Santa Catalina Island desert-thorn, and Catalina crossosoma, individual shrubs occasionally grow together to form masses. In this instance, individuals were estimated by counting the mounds of the approximate size of mature specimens within the masses of plants. For western dichondra, which spreads rhizomatously, individual stems emerging from the ground were counted as individuals when estimating total numbers. For south coast saltscale, Catalina mariposa lily (*Calochortus catalinae*), small-flowered morning-glory (*Convolvulus simulans*), and sea dahlia (*Coreopsis maritima*), individual plants were typically discernable.

Photo-documentation points were established for the five Draft NCCP/HCP-covered species located on site in 2006, including south coast saltscale (three locations), island green dudleya (three locations), Catalina crossosoma (three locations), Santa Catalina Island desert-thorn (two locations), and woolly sea-blite (three locations). Photo-documentation points were recorded with GPS or marked on survey maps for future monitoring periods (*Figures 4c*, *4f*, *4j*, and *4l*).

3.2.2 Wildlife Surveys

Focused wildlife surveys within the PBNP were conducted for Draft NCCP/HCP-covered coastal California gnatcatcher (CAGN), cactus wren (CAWR), and El Segundo blue butterfly (ESBB). Also, additional sensitive wildlife species detected during these surveys were recorded (*Appendix B*). The details of the methods used for conducting the focused wildlife surveys are included below.

Coastal California Gnatcatcher and Cactus Wren Surveys

Focused surveys for CAGN and CAWR were conducted between March 30 and July 18, 2006 within Area O and between June 1 and August 18, 2006 within all other areas of the PBNP in accordance with the schedule provided in *Table 2*. Surveys were conducted by Dudek biologists holding federal permits to conduct surveys for CAGN: Jeff Priest (JP; TE-840619), Brock Ortega (BO; TE-813545), Jennifer Turnbull (JT; PRT-780565), Paul M. Lemons (PL; TE-051248), and Kam Muri (KM; TE-051250), with the assistance of PVPLC biologists Andrea Vona (AV) and Becky Harper (BH). Area O was surveyed under the Trump National Golf Course (TNGC) California Gnatcatcher Monitoring Project. Data from the TNGC surveys were incorporated in

this report. Additional Dudek biologists assisting with surveys for the TNGC project include Tricia Wotipka (TW), Rebekah Krebs (RK), and Thomas Liddicoat (TL).

TABLE 2
2006 Wildlife Survey Schedule and Conditions – Portuguese Bend Nature Preserve

Date	Personnel	Time	Temp. (°F)	Wind Speed (mph)	% Cloud Cover
Agua Amarga Ecological Reserve (Area L)					
Survey 1 1st half, 7/5/06	JT, AV	0745–1330	65–85	3–5	0
Survey 1 2nd half, 7/8/06	JT	0730–1100	62–80	2–1	100–0
Survey 2, 7/17/06	PL, AV	0800–1200	72–90	3–5 to 4–6 with 8–10 gusts	100–0
Survey 3, 8/9/06	PL	0700–1130	72–82	0–2; 2–4 with gusts to 6	100–5
Vicente Bluffs Ecological Reserve (Area B)					
Survey 1, 6/30/06	JT	0730–0930	65–70	0–5	0
Survey 2, 7/10/06	JT	0730–1000	66–72	0–2	0
Survey 3, 7/24/06	KM, AV	0700–0950	70–88	0–1	0–100
Alta Vicente Ecological Reserve (Area V)					
Survey 1 1st half, 6/16/06	JT	1100–1345	75–80	2–10	0
Survey 1 2nd half, 6/30/06	JT	0640–0720	65–65	0–2	0
Survey 2, 7/11/06	PL	0700–1130	68–79	0–5	100–0
Survey 3, 7/27/06	PL, AV, BH	0715–1050	71–73	0–3	100
Three Sisters Ecological Reserve (Area T)					
Survey 1, 6/8/06	JT	0800–1245	65–75	0–3	100
Survey 2, 7/11/06	KM	0655–1245	62–84	1–4	0
Survey 3, 7/28/06	KM, AV, BH	0700–1135	75–88	0–5	40–0
Abalone Cove Ecological Reserve (Area A)					
Survey 1, 6/23/06	JT, BH	0730–1230	63–75	0–9	100–0
Survey 2, 7/11/06	BO, AV	0700–1115	68–85	0–5	100–0
Survey 3, 8/1/06	PL, AV, BH	0730–1130	68–88	0–2	70–5
Canyons Ecological Reserve (Area C)					
Survey 1 1st half, 6/15/06	JT, AV	0715–1300	65–80	0–5	0
Survey 1 2nd half, 6/16/06	JT, AV	0700–1030	65–75	0–5	0
Survey 2 1st half, 7/13/06	JP	0645–1100	68–84	0–2	0
Survey 2 2nd half, 7/14/06	JP	0630–1200	67–86	0–2	10–40
Survey 3 1st half, 8/17/06	JP, AV, BH	0650–1100	63–72	<1	95–0
Survey 3 2nd half, 8/18/06	JP, AV, BH	0615–1015	58–73	0–2	30–0
Forrestal Ecological Reserve (Area F)					
Survey 1, 6/7/06	JT, BH	0650–1200	65	0–1	100
Survey 2, 7/13/06	JT	0715–1215	60–75	0–1	100–0
Survey 3, 8/18/06	BO	0530–1030	65–77	0–3	10–0

TABLE 2
2006 Wildlife Survey Schedule and Conditions – Portuguese Bend Nature Preserve

Date	Personnel	Time	Temp. (°F)	Wind Speed (mph)	% Cloud Cover
Ocean Trails Ecological Reserve (Area O)					
TGNC Survey 1, 3/30/06	JP, JT, PL, RK, AV	0620–1230	52–68	0–4	95–10
TGNC Survey 2, 4/25/06	JP, JT, BO, TL, AV	0620–1300	55–63	0–3	95–100
TGNC Survey 3, 5/23/06	JP, KM, TW, RK	0630–1245	56–76	0–4	0
TGNC Survey 4, 6/19/06	JP, JT, BO, RK	0630–1130	66–78	0–5	100–0
TGNC Survey 5, 7/18/06	JP, JT, PL, RK, BH	0630–1050	69–85	0–2	5–15
San Ramon Ecological Reserve (Area R)					
Survey 1, 6/1/06	JT, AV	0730–1111	63–74	8–6	100–0
Survey 2, 6/30/06	JT	1005–1350	70–80	3–6	0
Survey 3, 8/11/06	JP, AV, BH	0630–0900	63–73	0–3	98–30
Vista del Norte Ecological Reserve (Area N)					
Survey 1, 6/1/06	JT	1130–1215	80–85	0–2	0
Survey 2, 7/11/06	PL	1130–1315	83–85	0–2	0
Survey 3, 7/24/06	KM	1020–1045	88–88	1–3	0

The surveys were conducted following the current protocol of the US Fish and Wildlife Service, Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Protocol (July 28, 1997). The surveys included the typical three visits at a minimum of weekly intervals as required by the protocol in NCCP-enrolled areas. Survey rates were consistent with those recommended by the USFWS survey protocol (i.e., a maximum of 100 acres per day, per biologist). The average survey rates for each pass were 16.18 acres per hour for pass one; 17.02 acres per hour for pass two; and 19.13 acres per hour for pass three. The route used to complete the survey for CAGN was arranged to ensure complete coverage of the suitable habitat on site (see the *Figure 5 Index Map* and *Figures 6a–6p*). Binoculars (10×42; 8×42) were used to aid in detecting and identifying bird species. The weather conditions were within protocol limits as shown in *Table 2* below. A tape of recorded vocalizations was used in order to elicit a response from the species. The tape was played approximately every 50 to 100 feet and when a CAGN was detected, the playing of the tape ceased in order to avoid harassment.

The surveys for Area O on the TNGC property were conducted using the same methods described above; however, more extensive breeding season monitoring was conducted for the TNGC project. This involved mapping observed use areas over the five-visit monitoring period, determining breeding status, and spending more time to locate and map nest locations than is spent during a typical presence/absence survey.

Rancho Palos Verdes Preserve Areas:

0 = Ocean Trails ER

A = Abalone Cove ER

B = Vicente Bluffs ER

C = Canyons ER

F = Forrestal ER

L = Agua Amarga ER

N = Vista del Norte ER

R = San Ramon ER

T = Three Sisters ER

V = Alta Vicente ER

Sheet 01

Sheet 02

Sheet 03

Sheet 04

Sheet 05

Sheet 06

Sheet 07

Sheet 08

Sheet 09

Sheet 10

Sheet 11

Sheet 12

Sheet 13

Sheet 14

Sheet 15

Sheet 16

Feet
0 2,250

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

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species Sheet Index Map

FIGURE 5

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 01

FIGURE 6a

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 02

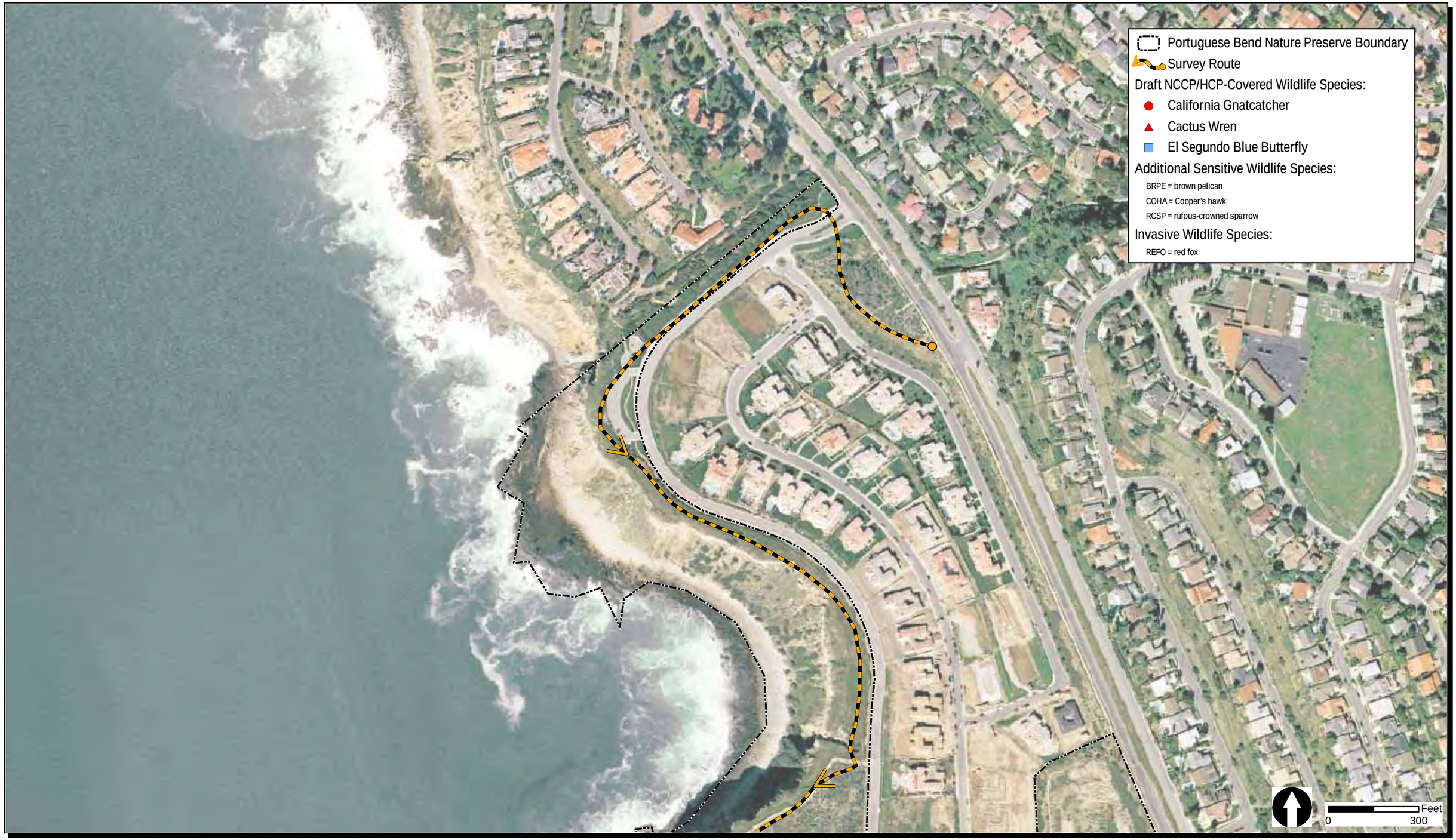
FIGURE 6b

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 03

FIGURE 6c



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 04

FIGURE 6d

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 05

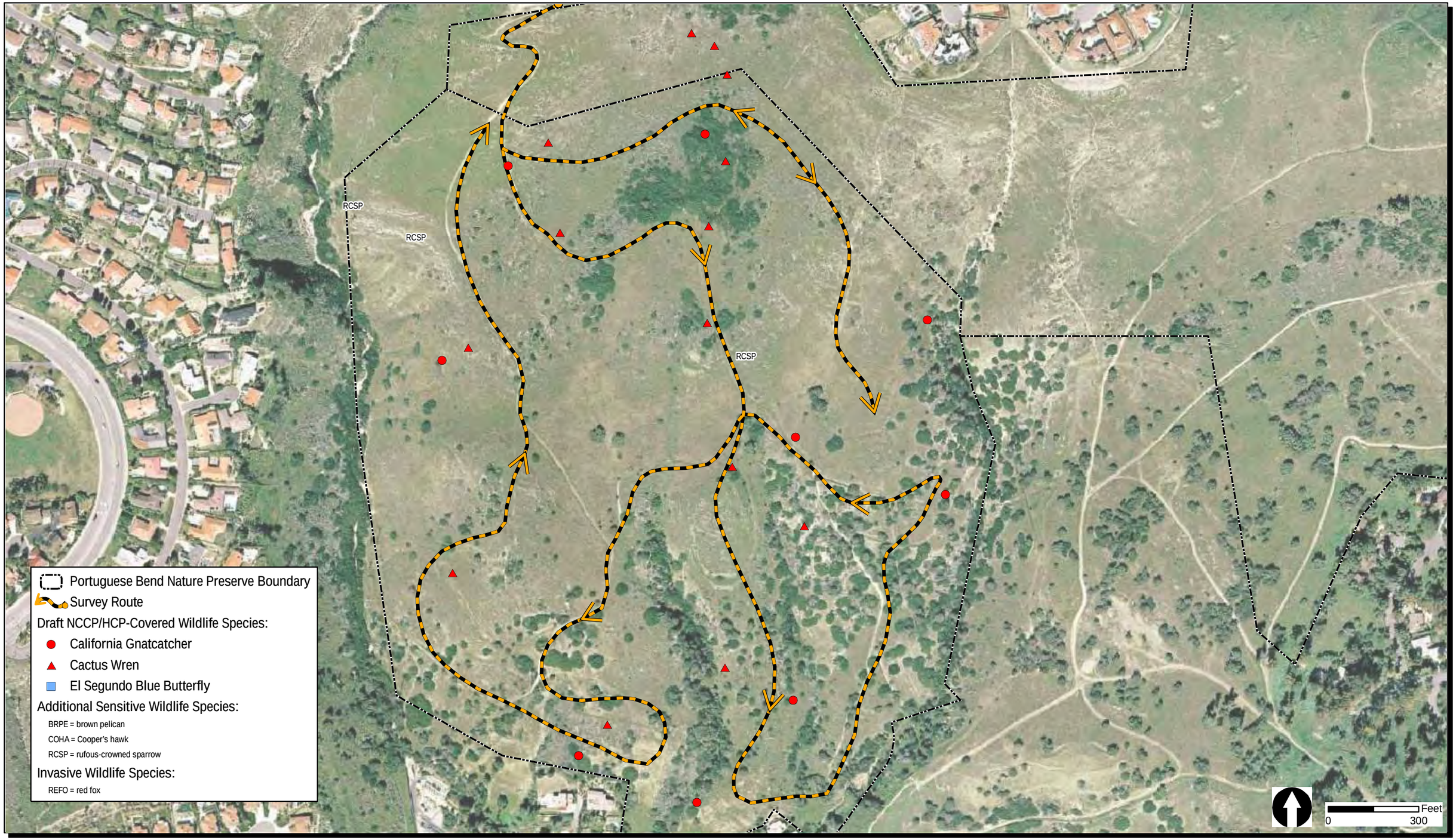
FIGURE 6e

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 06

FIGURE 6f



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 07

FIGURE 6g

Portuguese Bend Nature Preserve Boundary

Survey Route

Draft NCCP/HCP-Covered Wildlife Species:

- California Gnatcatcher
- Cactus Wren
- El Segundo Blue Butterfly

Additional Sensitive Wildlife Species:

BRPE = brown pelican

COHA = Cooper's hawk

RCSP = rufous-crowned sparrow

Invasive Wildlife Species:

REFO = red fox

REFO

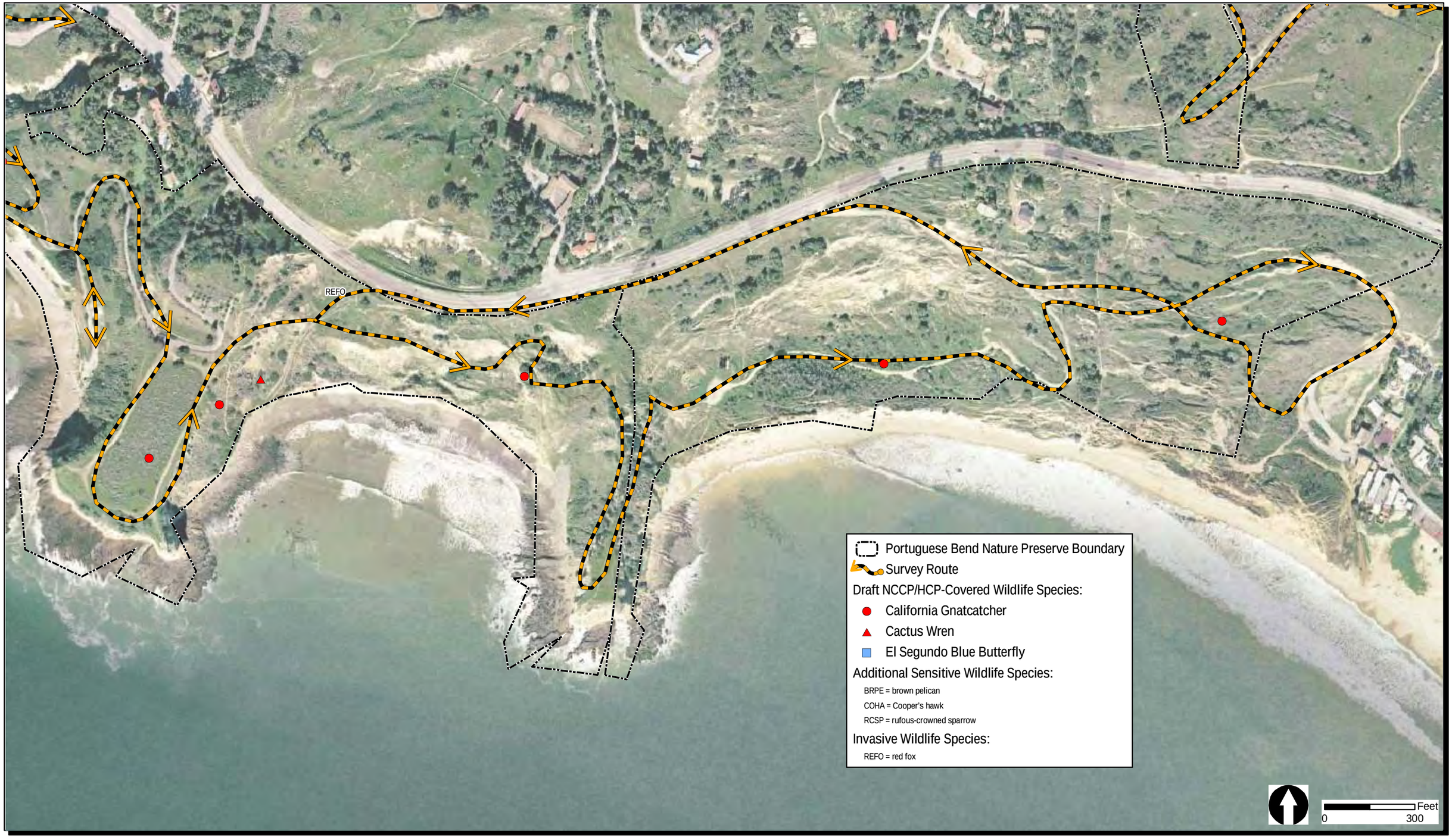
0 300 Feet

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 08

FIGURE 6h

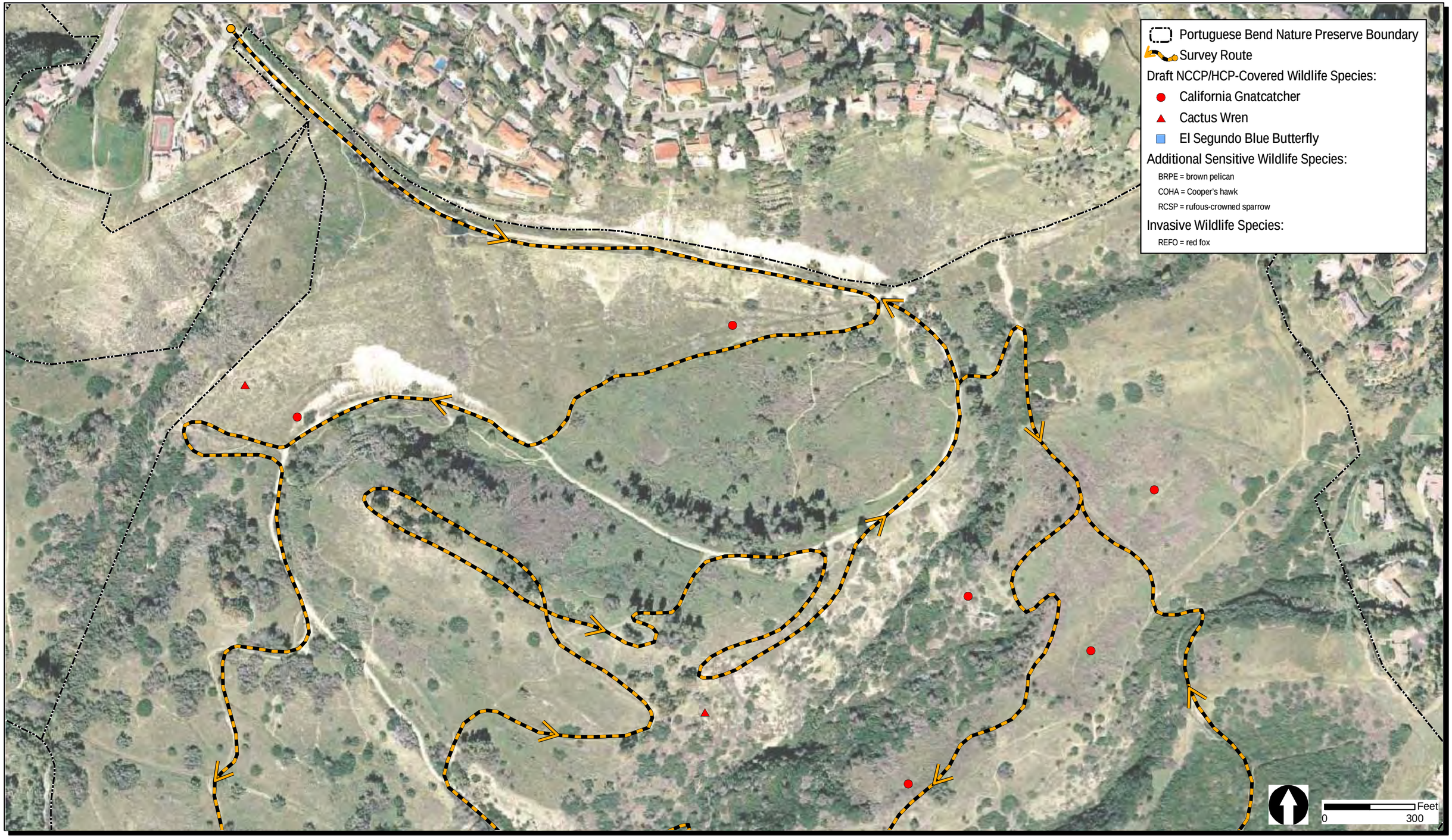


AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 09

FIGURE 6i



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 10

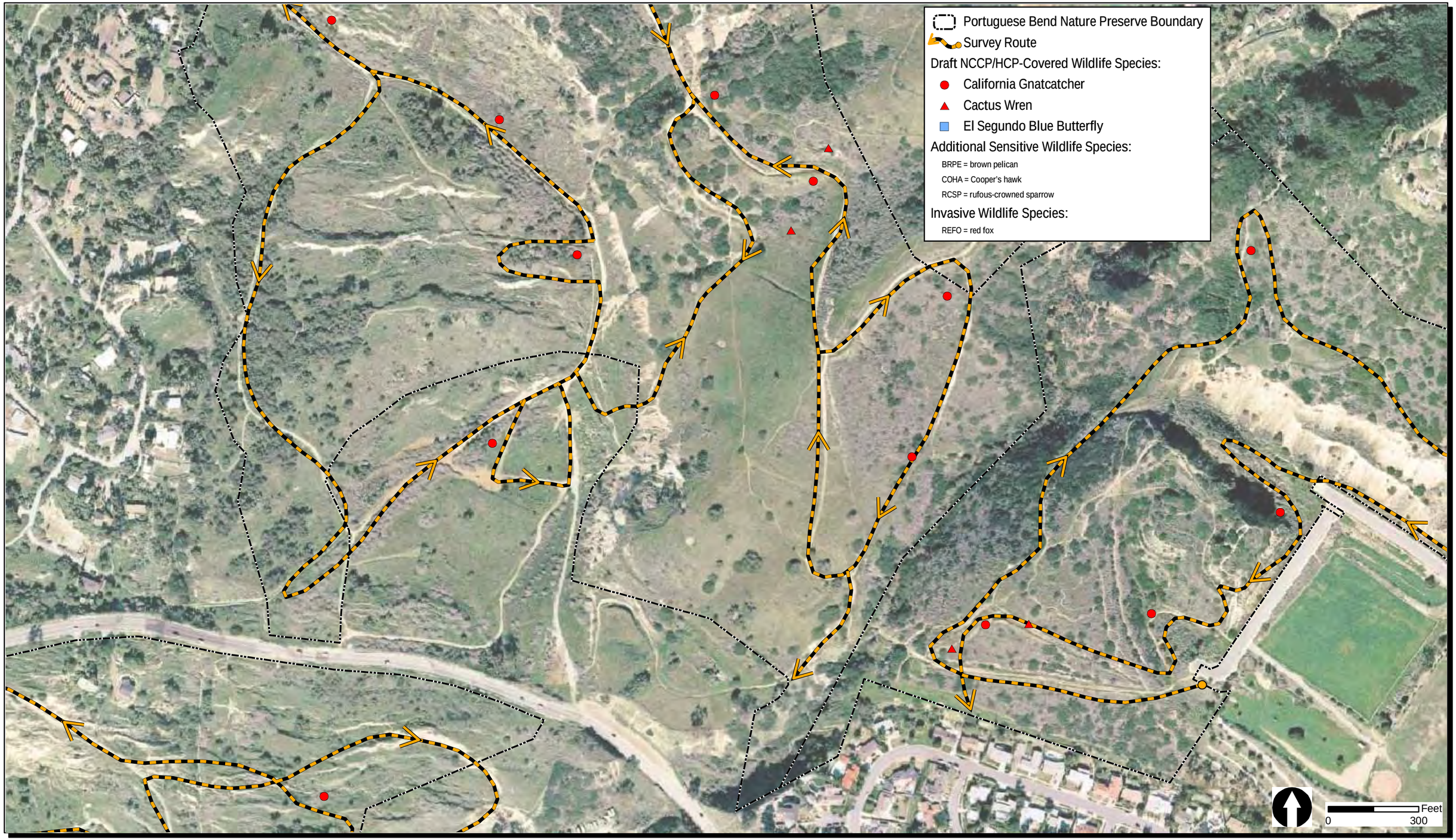
FIGURE 6j

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 11

FIGURE 6k

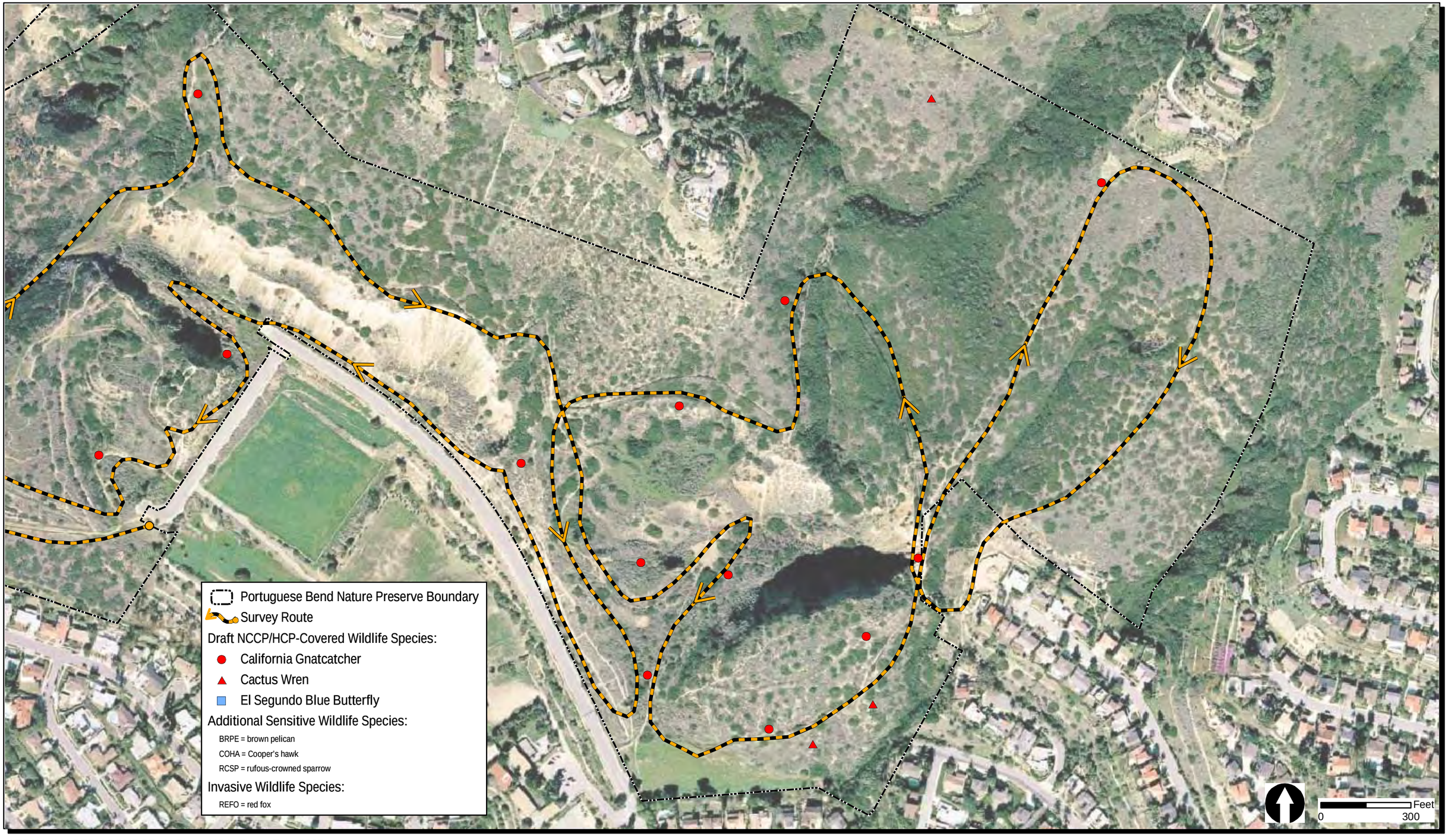


AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 12

FIGURE 6I



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 13

FIGURE 6m

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 14

FIGURE 6n

Portuguese Bend Nature Preserve Boundary

Survey Route

Draft NCCP/HCP-Covered Wildlife Species:

- California Gnatcatcher
- Cactus Wren
- El Segundo Blue Butterfly

Additional Sensitive Wildlife Species:

BRPE = brown pelican

COHA = Cooper's hawk

RCSP = rufous-crowned sparrow

Invasive Wildlife Species:

REFO = red fox

Feet
0 300

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 15

FIGURE 6o

Portuguese Bend Nature Preserve Boundary

Survey Route

Draft NCCP/HCP-Covered Wildlife Species:

- California Gnatcatcher
- Cactus Wren
- El Segundo Blue Butterfly

Additional Sensitive Wildlife Species:

BRPE = brown pelican

COHA = Cooper's hawk

RCSP = rufous-crowned sparrow

Invasive Wildlife Species:

REFO = red fox

Feet
0 300

AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Wildlife Species & Survey Routes - Sheet 16

FIGURE
6p

Throughout the breeding season, each CAGN pair in Area O was monitored to determine annual reproductive success, as well as behavioral responses to construction activities, revegetation efforts, and other factors likely to affect the species. Only anecdotal information regarding the exact number of eggs and nestlings associated with each clutch, or the presence or absence of brown-headed cowbird (*Molothrus ater*) parasitism could be obtained due to the approximately 4-week interval between site visits in this area.

The surveys on the TNGC were generally conducted in conformance with current USFWS and NCCP Scientific Review Panel (SRP) survey guidelines for NCCP-enrolled areas. Weather conditions, time of day, and season were appropriate for the detection of CAGN, CAWR, and other wildlife (*Table 2*).

Similar to the field data sheets for the botanical surveys, field data sheets were prepared and used during the CAGN and CAWR surveys to document age of birds (i.e., juvenile or adult), sex, presence of nest (and associated factors), stage of nesting, slope, elevation, vegetation community, and disturbance factors/threats (*Appendix C*).

El Segundo Blue Butterfly Survey

The focused surveys for ESBB were conducted by Dr. Gordon F. Pratt and Cecilia L. Pierce on July 13 and 18, 2006. A focused survey for the host plant, dune buckwheat, had been conducted prior to the focused survey for ESBB by Dudek biologist Andrew C. Thomson. Dr. Pratt utilized the maps prepared by Dudek depicting the locations of dune buckwheat within the PBNP to identify survey locations for ESBB.

The focused survey for ESBB was a presence/absence survey. A protocol-level survey was not conducted in 2006 due to the late start of the survey (approximately 1 week past prime). A protocol-level survey should span the flight period for ESBB, which closely corresponds with the blooming period of dune buckwheat.

Due to the extremely rugged terrain along the coastal bluffs where dune buckwheat occurs within the PBNP, not all of the locations of dune buckwheat could be accessed for conducting ESBB surveys. All accessible locations of dune buckwheat were visited on foot by Dr. Pratt and Ms. Pierce. All individual ESBB observed were recorded on survey maps of the area.

3.2.3 Survey Limitations

Botanical surveys were conducted during appropriate survey periods for each of the Draft NCCP/HCP-covered plant species and dune buckwheat, as described in *Section 3.2.1* above and

recorded in *Table 1*. Surveying during these time periods maximized the potential for detection of Draft NCCP/HCP-covered plant species and dune buckwheat during the survey effort.

Surveys for Draft NCCP/HCP-covered plant species and dune buckwheat were concentrated in areas of suitable habitat, which varied depending on the species. Other sensitive species were recorded when observed. The focused surveys for Draft NCCP/HCP-covered plant species and dune buckwheat were conducted during daylight hours under weather conditions that did not preclude observation of these species (e.g., surveys were not conducted during heavy fog or rain).

The primary limitation of the 2006 surveys was the below-average rainfall received in the region during the growing season prior to the surveys (see *Section 5.1* below). Annual species and geophytes are dependent upon adequate rainfall to grow and bloom. Therefore, the detection of annual species and geophytes is expected to be lower during the 2006 survey period compared to years with at least average rainfall.

4.0 RESULTS OF SURVEYS

4.1 Botany – Floral Diversity

A total of 264 plant species was identified within the PBNP in 2006. Of these, 127 species (48 percent) are native to the region and 137 species (52 percent) are non-native. Included with the native species are eight plant species that were introduced during restoration projects on the Palos Verdes peninsula that are native to the region, but are not known to naturally occur on the peninsula. The list of plant species identified on the site in 2006 is provided as *Appendix A*.

4.2 Special-Interest Plant Species

In 2006, all Draft NCCP/HCP-covered plant species except aphanisma were identified within the PBNP. Four sensitive plant species were also identified within the PBNP during the 2006 surveys, including Catalina mariposa lily, small-flowered morning-glory, sea dahlia, and western dichondra (*Dichondra occidentalis*). Additionally, three host plants for Draft NCCP/HCP-covered butterfly species, including dune buckwheat, deerweed (*Lotus scoparius*), and ocean locoweed (*Astragalus trichopodus* var. *lonchus*) were documented on site (*Figures 3* and *4a–4m*). These plant species are discussed in greater detail below.

4.2.1 Draft NCCP/HCP-Covered Plant Species

Survey results for Draft NCCP/HCP-covered plant species are described below and included in *Table 3*. While aphanisma was not observed during surveys in 2006, a description is included because it likely still occurs within the preserve.

TABLE 3
Survey Results for the Draft NCCP/HCP-Covered Plant Species

Draft NCCP/HCP-Covered Plant Species	Number of Locations		Estimated Area of Polygons (sq. ft.)	Average Density of Plants in Polygons (per sq. ft.)*	Total Estimated Number of Individuals (points and polygons)
	Points	Polygons			
Atriplex pacifica (south coast saltscale)	8	3	224	0.09	164
Crossosoma californica (Catalina crossosoma)	2	2	96,134	0.01	540
Dudleya virens ssp. *insularis* (island green dudleya)	4	15	1,154,586	0.01	6,530
Lycium brevipes var. *hassei* (Santa Catalina Island desert-thorn)	0	2	13,355	0.10	750
Suaeda taxifolia (woolly sea-blite)	5	8	104,410	0.02	742

* Average density of plants in polygons was calculated using the population estimates for polygons. Individuals counted at point locations were not used in the density calculation.

Photographs from the photo-documentation points were taken for the five Draft NCCP/HCP-covered species located on site in 2006, including south coast saltscale, island green dudleya, Catalina crossosoma, Santa Catalina Island desert-thorn, and woolly sea-blite (*Figures 7–9*).

***Aphanisma blitoides* (aphanisma)**

Aphanisma is a Draft NCCP/HCP-covered plant species, a USFWS Federal Species of Concern, and a CNPS List 1B.2 plant. According to CNPS (2006), it is typically found in coastal bluff scrub, coastal dunes, or coastal scrub, at elevations between sea level and approximately 305 meters (0–860 feet) above mean sea level (AMSL). It is an annual herb that typically blooms between March and June and tends to grow in sandy or sandy loam soils. It has been previously documented within the PBNP at several locations along the coastal bluffs in areas O and A. However, it was not observed during the 2006 surveys. This is likely a result of below-average precipitation during the growing season in the 2005/6 rainy season.

Photo Point Ap1

Photo Point Ap2

Photo Point Ap3

Photo Point Cc1

Photo Point Cc2

Photo Point Cc3

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Photo Documentation Points for Draft NCCP/HCP-covered Plant Species

FIGURE 7

Photo Point Dv1

Photo Point Dv2

Photo Point Dv3

Photo Point Lbh1

Photo Point Lbh2

Photo Point Lbh3

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Photo Documentation Points for Draft NCCP/HCP-covered Plant Species

FIGURE 8

Photo Point St1

Photo Point St2

Photo Point St3

Rancho Palos Verdes Draft NCCP/HCP - 2006 Initial Management & Monitoring Report

Photo Documentation Points for Draft NCCP/HCP-covered Plant Species

FIGURE 9

***Atriplex pacifica* (south coast saltscale)**

South coast saltscale is a Draft NCCP/HCP-covered plant species, a USFWS Federal Species of Concern, and a CNPS List 1B.2 plant species. According to CNPS (2006), it is typically found in coastal bluff scrub, coastal dunes, coastal scrub, or playas at elevations between sea level and 140 meters (0–395 feet) AMSL. It is an annual herb that typically blooms between March and October and tends to grow in sandy or sandy loam soils.

South coast saltscale was identified at 11 locations in Survey Areas O and A within the PBNP in 2006, with an estimated number of 164 individuals within an estimated area of approximately 224 square feet (0.005 acre) (*Figures 4e*, *4f*, and *4l*). The average density of plants in polygons was approximately 0.09 individuals per square foot. It was found primarily along hiking trails in disturbed vegetation or in openings in coastal sage scrub vegetation. While *The Jepson Manual* (Hickman 1993) lists this species as an annual, it appears to be growing as a perennial at several of the locations within the PBNP. Natural recruitment was observed at all but one of the identified locations, with both mature individuals and seedlings present.

***Crossosoma californicum* (Catalina crossosoma)**

Catalina crossosoma is a Draft NCCP/HCP-covered plant species and a CNPS List 1B.2 plant species. According to CNPS (2006), it is typically found in chaparral or coastal scrub at elevations between sea level and 500 meters (0–1,411 feet) AMSL. It is a perennial shrub that typically blooms between February and May and tends to grow in rocky soils.

Catalina crossosoma was identified at four locations in Survey Area F within the PBNP in 2006, with an estimated number of 540 individuals within an estimated area of approximately 96,134 square feet (2.21 acres). The average density of plants in polygons was approximately 0.01 individual per square foot. The majority of individuals of this species occur in one large, contiguous polygon in very steep, rocky terrain in the northeastern portion of Area F (*Figure 4j*). Two point locations were also observed in the near vicinity of the large polygon, and one additional small polygon was observed approximately 2,000 feet to the southwest. Various age classes of this species and natural recruitment were observed within the polygons of this species. However, the point locations consisted of mature individuals only with no evidence of natural recruitment. All documented occurrences are located in coastal sage scrub vegetation dominated by lemonadeberry (*Rhus integrifolia*).

***Dudleya virens* ssp. *insularis* (island green dudleya)**

Island green dudleya is a Draft NCCP/HCP-covered plant species and a CNPS List 1B.2 plant species. According to CNPS (2006), it is typically found in coastal bluff scrub or coastal scrub at

elevations between 5 and 300 meters (14–846 feet) AMSL. It is a perennial herb that typically blooms between April and June and tends to grow in sandy or sandy loam soils.

Island green dudleya was identified at 19 locations within the PBNP in 2006 with an estimated number of 6,530 individuals within an estimated area of approximately 1,154,586 square feet (26.51 acres). The average density of plants in polygons was approximately 0.01 individual per square foot. It occurs primarily within Area O and occasionally within Area B on the coastal bluffs, usually in southern coastal bluff scrub vegetation and occasionally within coastal sage scrub vegetation (*Figures 4c*, *4k*, and *4l*). Various age classes of this species were observed throughout the PBNP, with abundant vegetative reproduction observed.

***Lycium brevipes* var. *hassei* (Santa Catalina Island desert-thorn)**
Santa Catalina Island desert-thorn is a Draft NCCP/HCP-covered plant species and a CNPS List 1B.1 plant species. According to CNPS (2006), it is typically found in coastal bluff scrub or coastal scrub at elevations between 10 and 300 meters (28–846 feet) AMSL. It is a perennial shrub that typically blooms in June and tends to grow in sandy or sandy loam soils.

Santa Catalina Island desert-thorn was identified at two locations within the PBNP in 2006 with an estimated number of 750 individuals within an estimated area of approximately 13,355 square feet (0.31 acre). The average density of plants in polygons was approximately 0.10 individual per square foot. It occurs within Area A on the top of the coastal bluffs and has formed dense, impenetrable stands associated with southern coastal bluff scrub vegetation (*Figures 4e* and *4f*). No natural recruitment was observed within either of the polygons.

***Suaeda taxifolia* (woolly sea-blite)**
Woolly sea-blite is a Draft NCCP/HCP-covered plant species and a CNPS List 4.2 plant species. According to CNPS (2006), it is typically found in coastal bluff scrub, coastal dunes, or marshes and swamps at elevations between sea level and 50 meters (0–141 feet) AMSL. It is an evergreen shrub that typically blooms between January and December and tends to grow in a variety of soil types, including sandy and sandy loam.

Woolly sea-blite was identified at 13 locations within the PBNP in 2006 with an estimated number of 742 individuals within an estimated area of approximately 104,410 square feet (2.40 acres). The average density of plants in polygons was approximately 0.02 individual per square foot. It occurs within Areas B, A, and O, usually at the base and along the lower portions of the coastal bluffs, but occasionally at the top and the upper portions of the coastal bluffs (*Figures 4a*, *4b*, *4c*, *4e*, *4f*, *4k*, and *4l*). It is primarily associated with southern coastal bluff scrub vegetation

and occasionally with coastal sage scrub vegetation. Natural recruitment was observed at nine of the 15 identified locations, with both mature and young individuals present.

4.2.2 Additional Sensitive Plant Species

Focused surveys were not conducted for additional sensitive plant species. However, the presence of additional sensitive plant species was documented during the 2006 surveys when they were incidentally observed. Survey results for additional sensitive plant species are described below and included in *Table 4*.

TABLE 4
Survey Results for Additional Sensitive Plant Species

Additional Sensitive Plant Species	Number of Locations		Estimated Area of Polygons (sq. ft.)	Average Density of Plants in Polygons (per sq. ft.)*	Total Estimated Number of Individuals (points and polygons)
	Points	Polygons			
Calochortus catalinae	16	0	N/A	N/A	16
Convolvulus simulans	3	1	1,549	0.58	1,075
Coreopsis maritima	0	2	16,260	0.01	205
Dichondra occidentalis	17	1	4,740	0.95	5,569

* Average density of plants in polygons was calculated using the population estimates for polygons. Individuals counted at point locations were not used in the density calculation.

***Calochortus catalinae* (Catalina mariposa lily)**
Catalina mariposa lily is a CNPS List 4.2 plant species. It is not a Draft NCCP/HCP-covered plant species and has no state or federal status. According to CNPS (2006), it is typically found in chaparral, cismontane woodland, coastal scrub, or valley and foothill grassland at elevations between 15 and 700 meters (42–1,974 feet) AMSL. It is a bulbiferous herb that typically blooms between March and May.

Catalina mariposa lily was identified within Areas O and R within the PBNP in 2006 (*Figures 4k* and *4m*). Focused surveys were not conducted for this species, and all observations were incidental. According to the Draft NCCP/HCP (2006), Catalina mariposa lily occurs in coastal sage scrub vegetation near the Rancho Palos Verdes City Hall, in the canyon north of Barkentine Road, in the Forrestal area, in the northern part of the Portuguese Bend landslide near the closed portion of the Crenshaw Road extension, at the West Bluff and the Upper La Rotonda Preserves at Trump National Golf Club, and in the Switchbacks enhancement area north of the intersection of Palos Verdes Drives North and East.

***Convolvulus simulans* (small-flowered morning-glory)**

Small-flowered morning-glory is a CNPS List 4.2 plant species. It is not a Draft NCCP/HCP-covered plant species and has no state or federal status. According to CNPS (2006), it is typically found in chaparral, coastal scrub, or valley and foothill grassland at elevations between 30 and 700 meters (85–1,974 feet) AMSL. It is an annual herb that typically blooms between March and July and tends to grow in clay soils.

Small-flowered morning-glory was found at four locations within the PBNP in 2006 on the eastern edge of Area O within a coastal sage scrub habitat restoration area for the Trump National Golf Club and at three locations within the eastern portions of Area F (*Figures 4j* and *4l*). Focused surveys were not conducted for this species, and all observations were incidental. According to the Draft NCCP/HCP (2006), small-flowered morning glory occurs north of Forrestal Drive and northwest of the terminus of Coolheights Drive.

***Coreopsis maritima* (sea dahlia)**

Sea dahlia is a CNPS List 2.2 plant species. It is not a Draft NCCP/HCP-covered plant species and has no state or federal status. According to CNPS (2006), it is typically found in coastal bluff scrub or coastal scrub at elevations between 5 and 150 meters (14–141 feet) AMSL. It is a perennial herb that typically blooms between March and May and tends to grow in rocky soils.

Sea dahlia was identified at two locations within the PBNP in 2006. It occurs within Area A primarily on a steep northwest-facing slope in lower Altamira Canyon in coastal sage scrub vegetation (*Figure 4e*). Focused surveys were not conducted for this species, and all observations were incidental. This species was not identified in the Draft NCCP/HCP (2006) and was not known to occur within PBNP prior to the 2006 surveys.

***Dichondra occidentalis* (western dichondra)**

Western dichondra is a CNPS List 4.2 plant species. It is not a Draft NCCP/HCP-covered plant species and has no state or federal status. 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 (164–1,640 feet) AMSL. It is a rhizomatous herb that typically blooms between March and July.

Western dichondra was found at 16 locations, mostly within Area F within coastal sage scrub dominated by lemonadeberry, and a few within Area V within coastal sage scrub dominated by cactus (*Opuntia littoralis, O. oricola, O. prolifera*). Focused surveys were not conducted for this species, and all observations were incidental. According to the Draft NCCP/HCP (2006), western dichondra occurs in coastal sage scrub vegetation northwest of Coolheights Drive in Area F.

4.2.3 Host Plants for Draft NCCP/HCP-Covered Butterfly Species

Focused surveys were conducted for dune buckwheat because it is the larval host plant for ESBB, which is known to occur within the PBNP. However, focused surveys for the larval host plants for PVB were not conducted because PVB is not known to occur within the PBNP. The presence of ocean locoweed and California broom was documented during the 2006 when they were observed. Survey results for host plants for Draft NCCP/HCP-covered butterfly species are described below and included in *Table 5*.

TABLE 5
Survey Results for Host Plants for
Draft NCCP/HCP-Covered Butterfly Species

Host Plants for Draft NCCP/HCP-covered Butterfly Species	Number of Locations		Estimated Area of Polygons (sq. ft.)	Average Density of Plants in Polygons (per sq. ft.)*	Total Estimated Number of Individuals (points and polygons)
	Points	Polygons			
Astragalus trichopodus var. *lonchus*	35	4	16,984	0.03	1,516
Eriogonum parvifolium	0	13	73,068	0.01	547
Lotus scoparius	47	0	N/A	N/A	189

* Average density of plants in polygons was calculated using the population estimates for polygons. Individuals counted at point locations were not used in the density calculation.

***Astragalus trichopodus* var. *lonchus* (ocean locoweed)**

Ocean locoweed is not listed by CNPS, nor does it have state or federal status. This species was documented during the surveys because it is one of two primary host plants for the NCCP-covered PVB. 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.

Ocean locoweed occurs as an occasional component of southern coastal bluff scrub and coastal sage scrub vegetation throughout the PBNP. Focused surveys were not conducted for this species, and all observations were incidental. It has been planted in habitat restoration areas associated with the Trump National Golf Club in Area O.

***Eriogonum parvifolium* (dune buckwheat)**

Dune buckwheat is not listed by CNPS, nor does it have state or federal status. Focused surveys were conducted for this species because it is the primary host plant for ESBB. Dune buckwheat

is typically found in coastal dunes or coastal bluffs at elevations between sea level and 700 meters (0–1,974 feet) AMSL. It is a perennial shrub that blooms between June and July and tends to grow in sandy soils.

Dune buckwheat was identified at 13 locations within the PBNP in 2006. It occurs within Areas B and A on the coastal bluffs as a component of southern coastal bluff scrub vegetation, particularly on steep, north-facing aspects (*Figures 4a*, *4b*, *4c*, *4e*, and *4f*). A focused survey was conducted for this species because it is the host plant for ESBB. Dune buckwheat commonly occurs clinging to rocks on north-facing coastal cliffs or at the base of north-facing coastal cliffs.

***Lotus scoparius* (California broom; deerweed)**
California broom is not listed by CNPS, nor does it have state or federal status. This species was documented during the surveys because it is one of two primary host plants for the NCCP-covered PVB. All observations of California broom were incidental, as focused surveys for this plant species were not conducted. California broom is typically found in chaparral, roadsides, coastal sand, desert slopes, flats, or washes at elevations between sea level and 1,500 meters (0–4,230 feet) AMSL. It is a perennial shrub that blooms between April and July.

California broom was identified at 47 locations within the PBNP in 2006. California broom occurs as an occasional component of coastal sage scrub vegetation throughout the PBNP. It has been planted in habitat restoration areas associated with the Trump National Golf Club and Ocean Point Estates in Areas O and B, respectively. Because this species was planted, and is a common component of the vegetation community at the Ocean Point Estates restoration area, individuals were not counted, and general notations were made documenting its occurrence within the restoration area (*Figures 4a*, *4b*, and *4c*).

4.3 Special-Interest Wildlife Species

In 2006, three Draft NCCP/HCP-covered wildlife species were identified within the PBNP, including CAGN, CAWR, and ESBB. Three additional sensitive wildlife species were also identified within the PBNP during the 2006 surveys, including Cooper's hawk (*Accipiter cooperii*), rufous-crowned sparrow (*Aimophila ruficeps canescens*), and brown pelican (*Pelecanus occidentalis californicus*). These wildlife species are discussed in greater detail below. Additionally, a description of PVB is also included because it is a Draft NCCP/HCP-covered species and its larval host plants were documented within the PBNP during the 2006 surveys. *Figures 6a* through *6p* depict the locations of special-interest wildlife species.

4.3.1 Draft NCCP/HCP-Covered Wildlife Species

Campylorhynchus brunneicapillus **(cactus wren)**

The CAWR is a Draft NCCP/HCP-covered wildlife species, a State Species of Concern (SSC), and a focal species of the NCCP. The cactus wren is an obligate, non-migratory resident of the coastal sage scrub plant community (as defined by Westman 1983 and O'Leary 1990). It is closely associated with cacti and occurs almost exclusively in thickets of cholla (*Opuntia prolifera*) and prickly pear (*Opuntia littoralis* and *Opuntia oricola*) in coastal sage scrub habitat below 457 meters in elevation on mesas and lower slopes of the coast ranges (Proudfoot et al. 2000). A detailed description of the habitat, biogeography, biology, and threats to CAWR are included in a species account attached in *Appendix D*.

During 2006 focused surveys, CAWR was observed in all survey areas within PBNP except Area N and Area B, with the highest number of individuals observed in Area T (*Figures 6a–6p*) (*Table 6*). CAWR was observed in dense patches of cacti within coastal sage scrub habitat and occasionally southern coastal bluff scrub.

A total of 89 CAWR were documented within the PBNP during the 2006 surveys, with 12 pairs and three family groups observed (*Table 6*). Three juveniles were also observed during the surveys. The number of pairs and family groups is likely underestimated because the presence/absence surveys for CAWR in 2006 were not intended to determine breeding status. Furthermore, the total number of CAWR is likely also underestimated because surveys were partially conducted during the breeding season of CAWR when female CAWR may have been incubating eggs on nests. Therefore, sightings would have likely favored individual adults which do not participate in egg incubation.

Polioptila californica californica **(coastal California gnatcatcher)**

CAGN is federally-listed as threatened, is a California Species of Special Concern, and is an NCCP focal species. It inhabits coastal sage scrub habitats, especially below 950-foot elevation in coastal regions and higher inland, and on slopes less than about 40 percent. This species' habitat is formally protected and managed through the NCCP program and the Endangered Species Act (ESA Sections 10 and 7). A description of the habitat, biogeography, biology, and threats to CAGN are described in detail in a species account attached in *Appendix D*.

TABLE 6
CAGN and CAWR Survey Results for the Portuguese Bend Nature Preserve

Survey Area	Pairs		Family Groups		Lone Adults		Juveniles		TOTAL	
	CAGN	CAWR	CAGN	CAWR	CAGN	CAWR	CAGN	CAWR	CAGN	CAWR
N	0	0	0	0	0	0	0	0	0	0
L	2	0	0	0	2	4	1	0	7	4
B	4	0	1	0	0	0	1	0	9	0
V	7	4	2	0	1	7	5	0	20	15
T	7	7	4	3	1	7	11	3	26	24
A	7	0	9	0	1	9	11	0	29	9
C	14	0	7	0	0	4	23	0	54	4
F	10	0	7	0	2	6	15	0	37	6
O	14	1	10	0	3	15	29	0	62	17
R	7	0	3	0	0	10	12	0	26	10
TOTAL	**72**	**12**	**43**	**3**	**10**	**62**	**108**	**3**	**270**	**89**

Table 6 depicts the results of the 2006 focused surveys within PBNP for CAGN. A total of 270 CAGN were documented within the PBNP during the 2006 surveys, with 72 breeding pairs observed (*Table 6*). CAGN was observed in all survey areas within PBNP except Area N, with the highest number of individuals observed in Areas O and C with 62 and 54 individuals, espectively (*Figures 6a–6p*) (*Table 6*). CAGN was observed primarily in coastal sage scrub habitat and occasionally in non-native grasslands, disturbed vegetation, and southern coastal bluff scrub.

Euphilotes battoides allyni **(El Segundo blue butterfly)**

The El Segundo Blue butterfly (ESBB) is a federally-listed endangered subspecies of the square-spotted blue butterfly (Subfamily Polyommatinae) that are specifically adapted to wild buckwheats (*Eriogonum* spp.) (Pratt and Emmel 1998). According to Pratt (2006), the larvae of these butterflies feed specifically on flowers and seeds of their buckwheat food plants. The adult emergence of the butterflies is timed with the early bloom period of their specific buckwheat food plant (Pratt 2006).

The ESBB is specifically adapted to dune buckwheat, which occurs within the PBNP in a few isolated locations along the coastal bluffs of the Palos Verdes Peninsula. Previously, the ESBB was only known from the El Segundo Dunes and other dune habitats, but has more recently been documented on steep slopes, such as at Malaga Cove (Pratt 2006).

Within the PBNP, Dr. Richard Arnold conducted a butterfly survey in the summer of 1998 with negative results for ESBB in this area of the City. Subsequent biological surveys in 2000 for proposed development of the York Long Point site detected a small population of ESBB in coastal bluff scrub habitat.

During focused surveys for ESBB, the species was documented in two locations within the PBNP. One of the locations is just north of Point Vicente in a large patch of dune buckwheat where approximately 36 ESBB were observed (*Figure 6f*). The other location is southeast of Point Vicente at the Fisherman's access area where approximately 13 ESBB were observed (*Figure 6f*). It appears as though 12 of the ESBB that were observed in this latter area may actually occur right on the boundary or just outside the boundaries of the preserve. The 13th individual appeared to have strayed approximately 1,300 feet away from the nearest dune buckwheat plant (Pratt 2006), but was documented within the PBNP. In addition to those observed during the focused surveys conducted by Pratt and Pierce, ESBB was observed during the focused surveys for dune buckwheat by Thomson (Dudek) in additional areas to the north of those documented by Pratt and Pierce. The species identification was corroborated by photographs of the ESBB taken by Thomson, but the incidental observations were not included in the monitoring results because Mr. Thomson is not qualified to survey for this species.

Due to a slightly late start of the survey for ESBB (past the peak bloom period of dune buckwheat), the survey results are likely conservative (both in total numbers and extent of occupied habitat). Additionally, the quantity of butterflies that emerge from diapause is greater during years of higher rainfall when the flowering of dune buckwheat is more abundant and of a longer duration (Pratt 2006).

***Glaucopsyche lygdamus palosverdesensis* (Palos Verdes blue butterfly)**
The following description of the PVB is taken from the Draft NCCP/HCP (2006):

> The PVB is a rare subspecies of the silvery blue butterfly (Perkins and Emmel 1977; Arnold 1987). The PVB is restricted to open CSS habitats that support either ocean locoweed (*Astragalus trichopodus* var. *lonchus*) or deerweed (*Lotus scoparius*), which are this species' larval host plants (Mattoni 1992a). Currently, PVB is known to occur only at the Naval Fuel Depot in San Pedro (between Western Avenue and Gaffey Street, south of Palos Verdes Drive North; Mattoni 1992a), at Malaga Dunes, and was recently reintroduced at the Chandler Preserve. Historical occurrences of PVB in RPV include locations near the "Switchback" area of Palos Verdes Drive East, locations within the landslide moratorium area (Edward's Canyon in Area 4, Portuguese Canyon, and Forrestal [Klondike]

Canyon), and Agua Amarga (Arnold 1984, 1987, 1990; Mattoni 1992a). Habitat for PVB is typified by open CSS and ecotone areas between sage scrub and grassland. Locoweed is the primary larval host plant present in RPV. Deerweed does not generally occur in RPV and is restricted mostly to the northeast slope of the peninsula. Locoweed is an early successional or disturbance-associated species and will decline if there is an extended period without disturbance (e.g., fire). Habitat loss and fragmentation associated with agriculture and residential development, fire suppression (e.g., fuel modification activities), severe weather conditions, and over-collecting by butterfly enthusiasts have contributed to the current endangered status of this species (Arnold 1987; Mattoni 1992a). Federally designated critical habitat for the PVB includes the "Switchback" area of Palos Verdes Drive East, Fred Hesse Park, and Agua Amarga Canyon (USFWS 1980).

Like the ESBB, PVB is federally listed as endangered. Focused surveys for this species were not required by the Draft NCCP/HCP because it is not known to occur within the PBNP. However, incidental observations of its larval host plants (ocean locoweed and California broom) were documented when observed.

4.3.2 Additional Sensitive Wildlife

***Accipiter cooperii* (Cooper's hawk)**
Cooper's hawk is a California Special Concern Species. It is not a Draft NCCP/HCP-covered species and it is not state- or federally-listed as threatened or endangered. It typically occurs in riparian and oak woodlands and montane canyons. Focused surveys for this species were not conducted; however, it was observed incidentally during focused surveys for CAGN and CAWR in Area C within the PBNP (*Figure 6k*).

***Aimophila ruficeps canescens* (rufous-crowned sparrow)**
Southern California rufous-crowned sparrow is a California Special Concern Species. It is not a Draft NCCP/HCP-covered species and is not state- or federally-listed as threatened or endangered. It typically occurs in grass-covered hillsides, coastal sage scrub, and chaparral with boulders and outcrops. Focused surveys for this species were not conducted; however, it was observed incidentally during focused surveys for CAGN and CAWR in Area T in coastal sage scrub habitat within the PBNP (*Figure 6g*).

***Pelecanus occidentalis californicus* (brown pelican)**
Brown pelican is state-listed endangered and federally-listed endangered. It is not a Draft NCCP/HCP-covered species. It typically occurs in open sea, large water bodies, coastal bays,

and harbors. Focused surveys for this species were not conducted; however, it was observed incidentally during focused surveys for CAGN and CAWR in Area O along the shoreline within the PBNP (*Figure 6n*). This species is expected to occur along the entire shoreline in the area.

5.0 DISCUSSION

This section discusses the results of the 2006 surveys in relation to weather conditions during the monitoring period, potential threats/disturbance factors of the Draft NCCP/HCP-covered species, management recommendations to minimize threats/disturbance factors, and the status of Draft NCCP/HCP-covered species based on data collected since the initiation of the Draft NCCP/HCP species monitoring program.

5.1 Weather Conditions during the Monitoring Period

Two resources were used to determine weather conditions during the 2005/6 season, including California Irrigation Management Information System (CIMIS) and the Western Regional Climate Center (WRCC). Both resources are needed because neither provides complete data sets for temperature and precipitation for the nearest weather stations to the PBNP. Weather data from the two sources were compared to determine the most appropriate source and weather station for climatic data for the PBNP. There are three weather stations listed as occurring within the vicinity of the PBNP, including Palos Verdes, Long Beach, and Torrance.

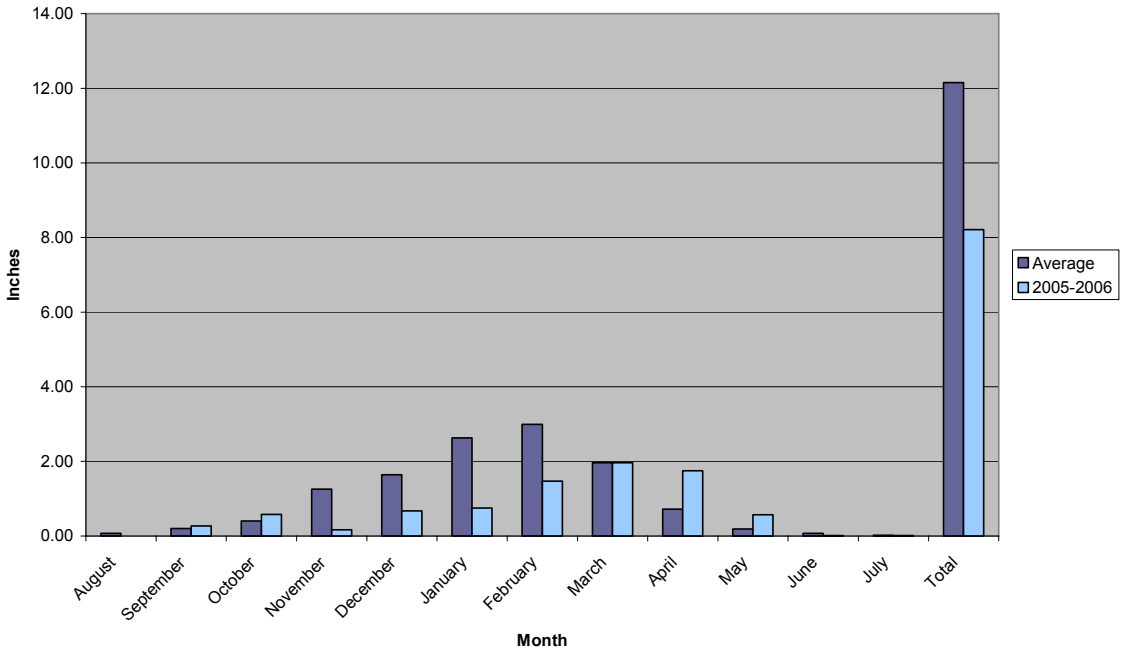
Data for the Palos Verdes weather station were included in WRCC; however, the data are incomplete. The WRCC resource, however, does include average precipitation data from 1949 to the current year for the Palos Verdes weather station. According to the available data from CIMIS and WRCC, the Long Beach weather station (as opposed to the Torrance weather station) has the most similar temperature and precipitation data to that of the Palos Verdes weather station. For example, the average annual precipitation for the Palos Verdes weather station from 1949 to present was 12.34 inches (WRCC, accessed from http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6663), compared to the average annual precipitation for the Long Beach weather station of 12.14 inches from 1927 to 1969 (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5082). Therefore, climatic data for the PBNP was taken from the Long Beach weather station for this report.

Because the rainy season (which occurs from late fall to spring) is so closely tied to the growing season in the region, rather than measuring annual precipitation and temperature from the beginning of the year to the end, the season is measured starting in August and continues through

July in this report. Therefore, the data reflect the weather during the entire growing season prior to the collection of monitoring data. This is important in order to correlate weather conditions with species presence and population size in any given year, which are largely affected by climatic conditions during the growing season.

During the 2005/6 period, the Long Beach weather station recorded a total of 8.21 inches of precipitation (CIMIS; accessed from http://wwwcimis.water.ca.gov/cimis/monthlyReport.do), which is 3.93 inches below the annual average. Further, the majority of precipitation received in the region came late in the growing season (*Chart 1*). March had average rainfall and April and May had above-average rainfall.

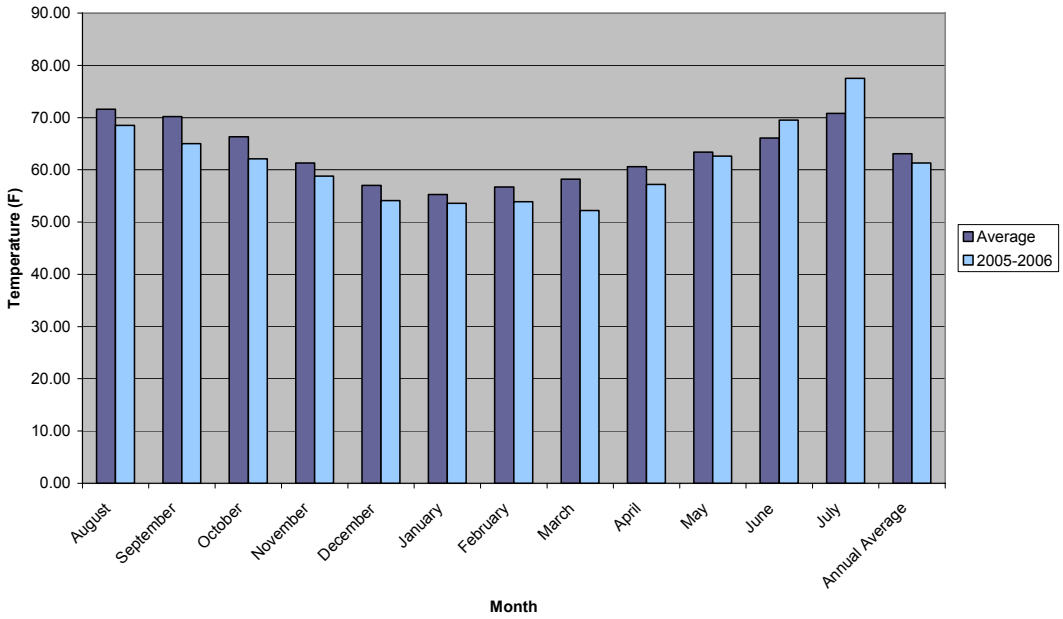
Chart 1
2005-2006 Average Monthly Precipitation for the Portuguese Bend Nature Preserve



The average monthly temperatures for the region from the Long Beach weather station (CIMIS; accessed from http://wwwcimis.water.ca.gov/cimis/monthlyReport.do) are included in *Chart 2*.

The average monthly temperatures in 2005/6 were lower than average through the growing season, higher than average in June, and substantially higher in July 2006 (a record or near-record month for high temperature) (*Chart 2*).

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



Based on the temperature and precipitation data for the 2005/6 season compared to expected averages for the region, it is expected that the 2006 monitoring results for Draft NCCP/HCP-covered species are likely lower than average for species presence and population size, particularly with the annual plant species such as aphanisma. However, multiple years of both weather data and species monitoring results will be needed to establish reliable statistical relationships between weather and productivity to determine any population trends for Draft NCCP/HCP-covered plant and wildlife species within the PBNP.

5.2 Potential Threats/Disturbance Factors and Management Recommendations

Potential threats/disturbance factors described in this report were recorded during the focused botanical and wildlife surveys conducted in 2006. Data sheets included a line item to describe potential threats/disturbance factors for each Draft NCCP/HCP-covered species occurrence. General management recommendations were developed to address each of the potential threats/ disturbance factors and are described below.

5.2.1 Potential Threats/Disturbance Factors for Draft NCCP/HCP-Covered Species

Threats/disturbance factors for Draft NCCP/HCP-covered plant species that were identified within the PBNP include trails/trampling, invasive plants, erosion (coastal bluff and canyon), and herbivory.

Threats/disturbance factors for Draft NCCP/HCP-covered wildlife species that were identified within the PBNP include trails, invasive plants, proximity to houses, parks, or other developed areas, potential for predation from feral cats and red fox, potential nest parasitism from brown-headed cowbirds, and agricultural or disking activities. These threats/disturbance factors, along with management recommendations, are discussed below.

5.2.2 Management Recommendations

Trails: Trails occur throughout most areas of the PBNP. While walking/hiking/riding trails are a permitted use within the PBNP, excessive or unauthorized trails can result in habitat degradation or species disturbance. The development of the Public Use Master Plan for the PBNP will review existing trails to determine if they are appropriate preserve features. If it is determined that some trails are not appropriate for the preserve (e.g., redundant trails, unauthorized trails, etc.), it is recommended that they be blocked, appropriate signage installed, and trail restoration implemented.

Invasive Plants: Invasive plants are present throughout much of the PBNP. Invasive plants pose a substantial threat to the integrity of the vegetation communities within the PBNP. Included in this category is the presence of invasive ornamental species that are located along preserve boundaries in some areas. Of particular concern are some highly invasive non-native species, such as Geraldton carnation spurge (*Euphorbia terracina*), which was observed in Areas R, O, and A, castor bean (*Ricinus communis*), which was observed in several drainages in Areas R, O, A, and B, and Australian saltbush (*Atriplex semibaccata*), which was observed in all areas, particularly on the coastal bluffs.

In accordance with the Draft NCCP/HCP, a Targeted Exotic Plant Removal Program for Plants (TERPP) and a Habitat Restoration Plan (HRP) will be prepared and implemented to address and ameliorate the effects of invasive plant species in the areas with extensive vegetation disturbance and invasive plant problems within the PBNP. The TERPP will designate 5 acres or 20 small sites where invasive plants will be removed (Draft NCCP/HCP 2006). The HRP will identify potential habitat restoration locations within the PBNP and will be revised every 3 years (Draft

NCCP/HCP 2006). If designed and implemented appropriately, these two plans should be effective in reducing the prevalence, and thereby the threat, of invasive plants within the PBNP.

Erosion: Coastal bluff erosion was observed in all survey areas within the PBNP that occur on the coastline. Coastal bluff erosion is particularly severe in the Portuguese Bend area. In addition to coastal bluff erosion, canyon erosion was documented in lower Altamira canyon where the population of sea dahlia occurs. Canyon erosion also occurs in several other canyons on the Peninsula within the PBNP. Plant species that occur on the coastal bluffs (such as island green dudleya, aphanisma, woolly sea-blite, and Santa Catalina Island desert-thorn) or on the side slopes of eroding canyons are threatened by potential erosion. Additionally, wildlife species that 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 PBNP were a consequence of unauthorized, unstable coastal bluff trails. Established trails could be constructed as replacements to the unauthorized trails to facilitate recreational use, if allowed, and/or unauthorized trails could be closed and revegetated to minimize erosion. Some additional erosion problems on the coastal bluffs are related to disturbed vegetation and the presence of invasive annual species. Restoration of degraded coastal bluffs would help to minimize soil erosion and improve native coastal bluff scrub habitat. Restoration on the coastal bluffs would be complicated by the steep, rugged terrain, which limits access, but could be conducted in some areas with better access. In particular, portions of the coastal bluffs in Area B could be enhanced or restored, with a joint goal to improve habitat for the ESBB.

Canyon erosion can sometimes be mitigated by installing erosion control devices or mechanisms, such as check dams or weirs, and/or revegetating eroded side slopes. Severe canyon erosion problems should be monitored throughout the PBNP and an evaluation of the value of attempting canyon erosion repair to promote the preservation of species should be completed to determine if (and where) canyon erosion repairs should be implemented. It is recommended that the coastal bluffs and eroded canyon areas be considered as potential sites when decisions are made regarding the locations of sites for the TERPP and the HRP described above.

Herbivory: Herbivory of island green dudleya by rabbits was observed in some portions of the PBNP. However, the majority of individuals affected by herbivory are some that have been planted as part of restoration projects associated with the Trump National Golf Course mitigation. These occur in more open and flatter areas away from the coastal bluffs where rabbits have accessibility to the plants. Problems with herbivory were not observed where the majority

of island green dudleya occurs on the steep coastal bluffs. Therefore, herbivory of natural populations of island green dudleya by rabbits is not considered a threat that needs to be addressed at this time. However, continued monitoring of this potential threat is recommended.

Proximity to Houses, Parks, and other Developed Areas: Preserve areas that are in proximity to houses, parks, and other developed areas are potentially subject to adverse edge effects (e.g., invasive ornamental vegetation, noise, cat and dog predation, pioneer trails, etc.). If funding permits, 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.

Threats from invasive ornamental vegetation to native vegetation communities within the PBNP were discussed above in the section on Invasive Plants. With regard to specific problems with invasive ornamental plants invading into the PBNP from residential areas, parks, and other developed areas, it is recommended that owners or managers of adjacent parcels contributing to invasive ornamental problems in the PBNP be provided a notice which discusses the problems associated with invasive ornamental plants to native vegetation communities and wildlife habitat and recommends alternative, non-invasive ornamental plant options. Additionally, it is recommended that areas affected by invasive ornamental vegetation from adjacent sources to the PBNP be considered as potential sites when decisions are made regarding the locations of sites for the TERPP and the HRP described above.

High noise levels may affect the breeding success of some birds, including CAGN. Additionally, domestic cats and dogs may adversely affect native wildlife. These are potential threats, but determining significant effects from these threats would require specific studies. If adverse effects from these threats are documented within PBNP, management actions could include noise attenuation and public outreach to educate residents about the effects of these threats to native wildlife.

Pioneer trails can become problematic in residential areas adjacent to the preserve. The disturbed areas should be monitored over time to determine if the disturbance areas are growing. If disturbance areas are growing, barriers should be installed and signs should be posted to prevent additional disturbance. New disturbance areas should be restored.

Potential Predation from Feral Cats and Red Fox: In accordance with requirements of the Draft NCCP/HCP, a Predator Control Plan will be developed by PVPLC staff to address threats from non-native predators such as feral cats and red fox. One red fox was observed in Area A during the 2006 surveys within the PBNP (*Figure 6i*). It is recommended that a trapping program for red fox be considered for this area to reduce the threat of predation from this non-native

species. Other areas of the PBNP should also be monitored for additional occurrences of this species, and trapping programs implemented where appropriate.

Potential Nest Parasitism by Brown-Headed Cowbird: As stated in the previous section, a Predator Control Plan will be developed by PVPLC staff to address threats from non-native species, including brown-headed cowbird. Brown-headed cowbird is a nest parasite that lays its eggs in other bird species' nests, including the nests of CAGN. This behavior negatively affects native bird species, and can reduce reproductive success. Brown-headed cowbirds were observed in Areas C and O. It is recommended that a cowbird trapping program be implemented within Area C to reduce the potential for the cowbird to parasitize nests of native bird species. Two traps should adequately cover the area. Area O already has an ongoing cowbird trapping program associated with the Trump National Golf Course. Ongoing monitoring for cowbirds is recommended throughout the PBNP.

Agricultural Land and Disking: Agricultural use was identified in Area V and disking was identified in Area T (*Figure 6f*). These are permitted uses at approved areas within the Preserve. Although disking is required by the Fire Department in some areas, the Draft NCCP/HCP requires an annual meeting to make sure that the areas disked are adequate but not more than is required to produce the desired results. The limits of disturbance should be documented and mapped, and, if funding permits, these areas should be monitored over time to determine if they are increasing in size, and whether or not they are a source of non-native, invasive plant species spreading into the preserve.

5.3 Status of Draft NCCP/HCP-Covered Species

One of the primary purposes of the 2006 surveys is to provide initial survey data to help develop a baseline for future monitoring efforts. While botanical and wildlife species surveys have been conducted in portions of the PBNP in the past, a comprehensive survey to document Draft NCCP/HCP-covered species within the entire PBNP has not been completed. Consequently, comparisons to previous studies to assess population trend analyses are not possible. It is the intent of this initial survey to establish monitoring protocols for each of the Draft NCCP/HCP-covered species so that monitoring results can be compared over time to track population dynamics of the Draft NCCP/HCP-covered plant and wildlife species. Unfortunately, this initial survey was conducted in a year with below-average precipitation during the growing season, resulting in a likely conservative estimate of the populations of annual species such as south coast saltscale. Further, aphanisma was not observed in 2006, and several known locations exist for this species from surveys in previous years. Therefore, while this 2006 survey effort contributes to the baseline for the PBNP, additional survey efforts, particularly during years with

average and above-average precipitation, will help to provide additional population data to improve the baseline data for Draft NCCP/HCP-covered species within the preserve. Several years of data collection will be necessary to eventually establish a baseline due to population dynamics in relation to environmental conditions.

The goal of population monitoring is to implement a monitoring program sufficient to detect significant long-term declines in population levels of Draft NCCP/HCP-covered species within the PBNP (Draft NCCP/HCP 2006). Long-term monitoring within the preserve will focus on population parameters that indicate whether a population is expanding, stable, or declining. Population parameters measured include population size, population density, and population structure (i.e., age classes). Population parameters will be correlated with environmental and ecological data to determine possible causes for declining trends, if observed. Depending on the causes determined, significant declines in population size or density over time may warrant remedial measures to reverse declining trends. Such data analysis will be performed as part of a comprehensive report every 3 years. After multiple years of data are collected, a test for time series analysis may be used to identify significant trends (Draft NCCP/HCP 2006). Because this is the first monitoring period of the Draft NCCP/HCP for Draft NCCP/HCP-covered species in the PBNP, no trend analysis or time series analysis has been conducted.

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APPENDIX A

Vascular Plant Species Observed (2006)

APPENDIX A

Vascular Plant Species Observed (2006)

FILACEAE

DENNSTAEDTIACEAE – BRAKEN FAMILY

Pellaea andromedifolia – coffee fern

POLYPODIACEAE – POLYPODY FAMILY

Polypodium californicum – California polypody

CONIFERAE

PINACEAE – PINE FAMILY

* *Pinus canariensis* – Canary Island pine

* *Pinus halepensis* – Aleppo pine

ANGIOSPERMAE (DICOTYLEDONES)

AIZOACEAE – FIG-MARIGOLD FAMILY

* *Aptenia cordifolia* – baby sun-rose

* *Carpobrotus aequilaterus* – sea-fig

* *Carpobrotus edulis* – Hottentot fig

* *Malephora crocea* – coppery mesemb

* *Mesembryanthemum crystallinum* – crystalline iceplant

* *Mesembryanthemum nodiflorum* – slender-leaved iceplant

AMARANTHACEAE – AMARANTH FAMILY

* *Amaranthus albus* – tumbleweed

ANACARDIACEAE – SUMAC FAMILY

Malosma laurina – laurel sumac

* *Pistacia atlantica* – pistachio

Rhus integrifolia – lemonade-berry

Rhus ovata – sugar-bush

* *Schinus molle* – Peruvian pepper tree

* *Schinus terebinthifolius* – Brazilian pepper tree

APIACEAE – CARROT FAMILY

Apiastrum angustifolium – wild celery
* *Apium graveolens* – celery
* *Conium maculatum* – poison hemlock
* *Foeniculum vulgare* – fennel

ASCLEPIADACEAE – MILKWEED FAMILY

Asclepias fascicularis – narrow-leaf milkweed

ASTERACEAE – SUNFLOWER FAMILY

Acourtia microcephala – sacapellote, Perezia
* *Ageratina adenophora* – Ageratina
Amblyopappus pusillus – coast weed
Ambrosia psilostachya – western ragweed
Artemisia californica – coastal sagebrush
Artemisia douglasiana – California mugwort
Baccharis emoryi – Emory's baccharis
Baccharis pilularis – coyote brush
Baccharis salicifolia – mule fat
* *Bidens pilosa* – common beggar-ticks
Brickellia californica – California brickellbush
* *Carduus pycnocephalus* – Italian thistle
* *Centaurea melitensis* – star thistle
* *Chrysanthemum coronarium* – garland chrysanthemum
* *Conyza bonariensis* – horseweed
Conyza canadensis – horseweed
Coreopsis maritima – sea dahlia
Deinandra (= Hemizonia) fasciculata – tarweed
Encelia californica – California bush sunflower
x *Encelia farinosa* – brittlebush, incienso
Ericameria palmeri var. *pachylepis* – goldenbush
Eriophyllum confertiflorum – long-stem golden yarrow
Filago californica – California fluffweed
* *Filago gallica* – narrow-leaf filago
* *Gazania* sp. – gazania
Gnaphalium bicolor – bicolor cudweed
Gnaphalium californicum – California everlasting
Gnaphalium canescens – white everlasting
* *Gnaphalium luteo-album* – white cudweed

x *Grindelia stricta* – gumweed
Gutierrezia californica – California matchweed
Hazardia squarrosa – saw-toothed goldenbush
Heterotheca grandiflora – telegraph weed
* *Hypochaeris glabra* – smooth cat's-ear
Isocoma menziesii ssp. *vernonioides* – coast goldenbush
* *Lactuca serriola* – prickly lettuce
Lasthenia californica – California goldfields
Lessingia filaginifolia – California aster
Malacothrix saxatilis var. *tenuifolia* – cliff malacothrix
* *Osteospermum fruticosum* – trailing African daisy
* *Picris echioides* – bristly ox-tongue
Rafinesquia californica – California chicory
* *Senecio vulgaris* – common groundsel
* *Silybum marianum* – milk thistle
* *Sonchus asper* – prickly sow-thistle
* *Sonchus oleraceus* – common sow-thistle
Stephanomeria virgata – twiggy wreathplant
Xanthium strumarium – cocklebur

BORAGINACEAE – BORAGE FAMILY

Amsinckia menziesii var. *intermedia* – yellow fiddleneck
Cryptantha sp. – cryptantha
* *Echium fastuosum* – pride of Madeira
Heliotropium curassavicum – wild heliotrope

BRASSICACEAE – MUSTARD FAMILY

* *Brassica nigra* – black mustard
* *Cakile maritima* – sea rocket
* *Capsella bursa-pastoris* – shepherd's purse
* *Coronopus didymus* – swine cress
* *Hirschfeldia incana* – short-podded mustard
* *Lobularia maritima* – sweet-alyssum
* *Matthiola incana* – common stock
* *Raphanus sativus* – wild radish
Rorippa nasturtium-aquaticum – water cress
* *Sisymbrium irio* – London rocket

CACTACEAE – CACTUS FAMILY

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

CAPPARACEAE – CAPER FAMILY

Isomeris arborea – bladderpod

CAPRIFOLIACEAE – HONEYSUCKLE FAMILY

Sambucus mexicana – Mexican elderberry

CARYOPHYLLACEAE – PINK FAMILY

* *Silene gallica* – common catchfly

CHENOPODIACEAE – GOOSEFOOT FAMILY

Atriplex californica – California saltbush
* *Atriplex glauca* – saltbush
Atriplex lentiformis – big saltbush, quail brush
Atriplex pacifica – south coast saltscale
* *Atriplex semibaccata* – Australian saltbush
* *Bassia hyssopifolia* – five-hooked bassia
* *Chenopodium album* – lamb's-quarters
* *Chenopodium ambrosioides* – Mexican tea
* *Chenopodium murale* – nettle-leaved goosefoot
* *Salsola tragus* – Russian-thistle
Suaeda taxifolia – woolly sea-blite

CONVOLVULACEAE – MORNING-GLORY FAMILY

Calystegia macrostegia ssp. *cyclostegia* – morning-glory
Cressa truxillensis – alkali weed
* *Convolvulus arvensis* – bindweed
Convolvulus simulans – small-flowered morning-glory
Dichondra occidentalis – western dichondra

CRASSULACEAE – STONECROP FAMILY

Dudleya lanceolata – lanceleaf dudleya
Dudleya virens ssp. *insularis* – island green dudleya

CROSSOSOMATACEAE – CROSSOSOMA FAMILY

Crossosoma californica – Catalina crossosoma

CUCURBITACEAE – GOURD FAMILY

Marah macrocarpus – wild cucumber

EUPHORBIACEAE – SPURGE FAMILY

Chamaesyce albomarginata – rattlesnake spurge
* *Chamaesyce maculata* – spotted spurge
* *Euphorbia lathyris* – gopher plant
* *Euphorbia peplus* – petty spurge
* *Euphorbia terracina* – Geraldton carnation spurge
* *Ricinus communis* – castor-bean

FABACEAE – PEA FAMILY

* *Acacia cyclops* – acacia
* *Acacia* sp. – acacia

Astragalus trichopodus var. *lonchus* – ocean locoweed
* *Caesalpinia spinosa* – spiny holdback
* *Ceratonia siliqua* – carob tree; locust bean tree
* *Coronilla valentina* – Mediterranean crownvetch
* *Lathyrus odoratus* – sweet pea
* *Lathyrus tingitanus* – Tangier pea
* *Lotus corniculatus* – bird's-foot lotus

Lotus salsuginosus – coastal lotus

Lotus scoparius – California broom; deerweed

Lupinus bicolor – Lindley's annual lupine
x *Lupinus longifolius* – bush lupine

Lupinus succulentus – arroyo lupine
* *Medicago polymorpha* – California burclover
* *Medicago sativa* – alfalfa
* *Melilotus alba* – white sweet-clover
* *Melilotus indica* – yellow sweet-clover
* *Spartium junceum* – Spanish broom
* *Trifolium hirtum* – rose clover
* *Vicia sativa* – spring vetch

GERANIACEAE – GERANIUM FAMILY

* *Erodium botrys* – long-beaked filaree
* *Erodium cicutarium* – red-stemmed filaree
* *Geranium carolinianum* – Carolina geranium
* *Pelargonium zonale* – garden geranium

HYDROPHYLLACEAE – WATERLEAF FAMILY

Eucrypta chrysanthemifolia – common eucrypta
Phacelia cicutaria – caterpillar phacelia
Phacelia ramosissima – shrubby phacelia
Phacelia parryi – Parry's phacelia
Phacelia tanacetifolia – lacy scorpionweed
Phacelia viscida – sticky phacelia
Pholistoma racemosum– San Diego fiesta flower

LAMIACEAE – MINT FAMILY

* *Marrubium vulgare* – horehound
x *Salvia apiana* – white sage
Salvia columbariae – chia
Salvia leucophylla – purple sage
Salvia mellifera – black sage
Stachys ajugoides var. *rigida* – rigid hedge-nettle

MALVACEAE – MALLOW FAMILY

* *Malva nicaeensis* – bull mallow
* *Malva parviflora* – cheeseweed
* *Malva sylvestris* – mallow

MYOPORACEAE – MYOPORUM FAMILY

* *Myoporum laetum* – myoporum

MYRTACEAE – MYRTLE FAMILY

* *Callistemon viminalis* – weeping bottlebrush
* *Eucalyptus camaldulensis* – red gum
* *Eucalyptus globulus* – blue gum
* *Eucalyptus* sp. – eucalyptus
* *Melaleuca* sp. – NCN

NYCTAGINACEAE – FOUR O'CLOCK FAMILY

Mirabilis californica – California wishbone-bush

OLEACEAE – OLIVE FAMILY

* *Fraxinus uhdei* – tropical ash

* *Olea europaea* – mission olive

ONAGRACEAE – EVENING-PRIMROSE FAMILY

Epilobium canum ssp. *canum* – California fuchsia

Epilobium ciliatum – California cottonweed

OXALIDACEAE – OXALIS FAMILY

* *Oxalis corniculata* – creeping woodsorrel

* *Oxalis pes-caprae* – Bermuda buttercup

PAPAVERACEAE – POPPY FAMILY

Eschscholzia californica – California poppy

PITTOSPORACEAE – PITTOSPORUM FAMILY

* *Pittosporum undulatum* – Australian cheesewood

PLANTAGINACEAE – PLANTAIN FAMILY

Plantago erecta – dotseed plantain

* *Plantago major* – common plantain

PLUMBAGINACEAE – LEADWORT FAMILY

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

* *Limonium sinuatum* – statice

POLYGONACEAE – BUCKWHEAT FAMILY

Eriogonum cinereum – ashyleaf buckwheat

Eriogonum elongatum – long-stemmed buckwheat

Eriogonum fasciculatum ssp. *fasciculatum* – California buckwheat

Eriogonum fasciculatum ssp. *foliolosum* – California buckwheat

Eriogonum fasciculatum ssp. *polifolium* – California buckwheat

Eriogonum fasciculatum x *cinereum* – NCN (natural hybrid)

Eriogonum parvifolium – dune buckwheat

* *Polygonum arenastrum* – common knotweed

Polygonum hydropiperoides – waterpepper

Pterostegia drymarioides – pterostegia
* *Rumex crispus* – curly dock

PRIMULACEAE – PRIMROSE FAMILY
* *Anagallis arvensis* – scarlet pimpernel

RHAMNACEAE – BUCKTHORN FAMILY
Ceanothus spinosus – greenbark ceanothus

ROSACEAE – ROSE FAMILY
Heteromeles arbutifolia – toyon
x *Horkelia cuneata* – wedgeleaf horkelia
Prunus ilicifolia ssp. *lyonii* – Catalina cherry
* *Pyracantha* sp. – firethorn

RUBIACEAE – MADDER FAMILY
Galium angustifolium – narrow-leaved bedstraw
Galium aparine – goose grass

SALICACEAE – WILLOW FAMILY
Salix lasiolepis – arroyo willow

SAPINDACEAE – SOAPBERRY FAMILY
* *Koelreuteria* sp. – golden rain tree

SCROPHULARIACEAE – FIGWORT FAMILY
Antirrhinum nuttallianum – purple snapdragon
Castilleja affinis – coast paintbrush
Keckiella cordifolia – heart-leaf penstemon
* *Veronica anagallis-aquatica* – water speedwell

SOLANACEAE – NIGHTSHADE FAMILY
Datura wrightii – western jimsonweed
Lycium californicum – California boxthorn
Lycium brevipes var. *hassei* – Santa Catalina Island desert-thorn
x *Lycium* sp. – unidentified Lycium
* *Lycopersicon esculentum* – garden tomato
* *Nicotiana glauca* – tree tobacco
Solanum douglasii – white nightshade

TROPAEOLACEAE – NASTURTIUM FAMILY

* *Tropaeolum majus* – garden nasturtium

URTICACEAE – NETTLE FAMILY

Urtica dioica ssp. *holosericea* – stinging nettle

* *Urtica urens* – dwarf nettle

VALERIANACEAE – VALERIAN FAMILY

* *Centranthus ruber* – red valerian

VERBENACEAE – VERVAIN FAMILY

* *Lantana montevidensis* – purple trailing lantana

Verbena lasiostachys – western verbena

ANGIOSPERMAE (MONOCOTYLEDONES)

ARECACEAE – PALM FAMILY

* *Phoenix canariensis* – Canary Island date palm

* *Washingtonia robusta* – Mexican fan palm

CYPERACEAE – SEDGE FAMILY

Carex sp. – sedge

Cyperus eragrostis – tall cyperus

Cyperus esculentus – yellow nut-grass

* *Cyperus involucratus* – umbrella sedge

IRIDACEAE – IRIS FAMILY

x *Sisyrinchium bellum* – blue-eyed-grass

LILIACEAE – LILY FAMILY

* *Asparagus asparagoides* – smilax

Bloomeria crocea – common goldenstar

Calochortus catalinae – Catalina mariposa lily

Dichelostemma capitatum – blue dicks

* *Yucca* sp. – Spanish bayonet

POACEAE – GRASS FAMILY

* *Aegilops cylindrica* – jointed goat grass
* *Agrostis viridis* – water bent
* *Avena barbata* – slender oat
* *Avena fatua* – wild oat
* *Brachypodium distachyon* – false brome
Bromus carinatus – California brome
* *Bromus catharticus* – rescue grass
* *Bromus diandrus* – ripgut grass
* *Bromus hordeaceus (=mollis)* – soft chess
* *Bromus madritensis* ssp. *rubens* – foxtail chess
Bromus sp. – brome grass
* *Cortaderia selloana* – pampas grass
* *Cynodon dactylon* – Bermuda grass
* *Digitaria sanguinalis* – hairy crabgrass
Distichlis spicata – salt grass
* *Hordeum murinum* ssp. *leporinum* – foxtail barley
* *Hordeum vulgare* – barley
* *Lamarckia aurea* – goldentop
Leymus condensatus – giant ryegrass
* *Lolium multiflorum* – Italian ryegrass
* *Lolium perenne* – perennial ryegrass
Melica imperfecta – California melic
x *Muhlenbergia rigens* – deergrass
Nassella cernua – nodding needlegrass
Nassella lepida – foothill needlegrass
Nassella pulchra – purple needlegrass
* *Paspalum dilatatum* – dallis grass
* *Pennisetum clandestinum* – kikuyu grass
* *Pennisetum setaceum* – fountain grass
* *Piptatherum miliaceum* – smilo grass
* *Phalaris minor* – canary grass
* *Poa annua* – bluegrass
* *Polypogon monspeliensis* – rabbit's-foot grass
* *Triticum aestivum* – cultivated wheat
* *Vulpia myuros* var. *hirsuta* – annual fescue
* *Vulpia myuros* var. *myuros* – rattail fescue

TYPHACEAE – CATTAIL FAMILY

Typha angustifolium – narrow-leafed cattail

Typha latifolia – broad-leaved cattail

*	Signifies introduced (non-native) species
x	Likely introduced from restoration projects; native to the region but not naturally occurring within the PBNP area
NCN	Signifies no common name

APPENDIX B

Wildlife Species Observed (2006)

APPENDIX B

Wildlife Species Observed (2006)

REPTILES

IGUANIDAE – IGUANID LIZARDS

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

ANGUIDAE – ALLIGATOR LIZARDS

Gerrhonotus multicarinatus – southern alligator lizard

COLUBRIDAE – COLUBRID SNAKES

Lampropeltis getulus – common kingsnake
Pituophis melanoleucus – gopher snake

VIPERIDAE – VIPERS

Crotalus viridis – western rattlesnake

BIRDS

PELECANIDAE – PELICANS

Pelecanus occidentalis – brown pelican

PHALACROCORACIDAE – CORMORANTS

Phalacrocorax auritus – double-crested cormorant

ANATIDAE – WATERFOWL

Anas platyrhynchos – mallard

ACCIPITRIDAE – HAWKS

Accipiter cooperii – Cooper's hawk
Buteo jamaicensis – red-tailed hawk

FALCONIDAE – FALCONS

Falco sparverius – American kestrel

PHASIANIDAE – PHEASANTS and QUAILS

Callipepla californica – California quail
Pavo cristatus – Peafowl

RALLIDAE – RAILS and GALLINULES

Fulica americana – American coot

CHARADRIIDAE – PLOVERS

Charadrius vociferus – killdeer

LARIDAE – GULLS and TERNS

Larus sp. – gull
Sterna antillarum – least tern

COLUMBIDAE – PIGEONS and DOVES

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

CUCULIDAE – CUCKOOS and ROADRUNNERS

Geococcyx californianus – greater roadrunner

TYTONIDAE – BARN OWLS

Tyto alba – barn owl

STRIGIDAE – TRUE OWLS

Bubo virginianus – great horned owl

APODIDAE – SWIFTS

Aeronautes saxatalis – white-throated swift

TROCHILIDAE – HUMMINGBIRDS

Calypte anna – Anna's hummingbird
Calypte costae – Costa's hummingbird
Selasphorus rufus – rufous hummingbird
Selasphorus sasin – Allen's hummingbird

PICIDAE – WOODPECKERS

Colaptes auratus – northern flicker
Sphyrapicus ruber – red-breasted sapsucker (sign)

TYRANNIDAE – TYRANT FLYCATCHERS

Empidonax difficilis – Pacific-slope flycatcher
Myiarchus cinerascens – ash-throated flycatcher
Sayornis nigricans – black phoebe
Tyrannus vociferans – Cassin's kingbird
Tyrannus verticalis – western kingbird

HIRUNDINIDAE – SWALLOWS

Hirundo rustica – barn swallow
Petrochelidon pyrrhonota – cliff swallow
Stelgidopteryx serripennis – northern rough-winged swallow
Tachycineta bicolor – tree swallow

CORVIDAE – JAYS and CROWS

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

AEGITHALIDAE – BUSHTITS

Psaltriparus minimus – bushtit

TROGLODYTIDAE – WRENS

Campylorhynchus brunneicapillus – cactus wren
Thryomanes bewickii – Bewick's wren

SYLVIIDAE – GNATCATCHERS

Polioptila caerulea – blue-gray gnatcatcher
Polioptila californica californica – coastal California gnatcatcher

TIMALIIDAE – LAUGHINGTHRUSH and WRENTITS

Chamaea fasciata – wrentit

MIMIDAE – THRASHERS

Mimus polyglottos – northern mockingbird
Toxostoma redivivum – California thrasher

PTILOGONATIDAE – SILKY-FLYCATCHERS

Phainopepla nitens – phainopepla

STURNIDAE – STARLINGS

* *Sturnus vulgaris* – European starling

PARULIDAE – WOOD WARBLERS

Geothlypis trichas – common yellowthroat

Vermivora celata – orange-crowned warbler

EMBERIZIDAE – BUNTINGS and SPARROWS

Aimophila ruficeps – rufous-crowned sparrow

Melospiza melodia – song sparrow

Molothrus ater – brown-headed cowbird

Pipilo crissalis – California towhee

Pipilo maculatus – spotted towhee

Zonotrichia leucophrys – white-crowned sparrow

CARDINALIDAE – CARDINALS and GROSBEAKS

Passerina caerulea – blue grosbeak

Pheucticus melanocephalus – black-headed grosbeak

ICTERIDAE – BLACKBIRDS and ORIOLES

Agelaius phoeniceus – red-winged blackbird

Icterus cucullatus – hooded oriole

Sturnella neglecta – western meadowlark

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

GEOMYIDAE – POCKET GOPHERS

Thomomys bottae – Botta's pocket gopher

MURIDAE – RATS and MICE

Neotoma sp. – woodrat (midden)

CANIDAE – WOLVES and FOXES

Canis latrans – coyote

* *Vulpes vulpes* – red fox

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

Euphilotes battoides allyni – El Segundo blue butterfly

Leptotes marina – marine blue

Strymon sp. – hairstreak

NYMPHALIDAE – BRUSH-FOOTED BUTTERFLIES

Nymphalis antiopa – mourning cloak

Vanessa atalanta – red admiral

* signifies introduced (non-native) species

APPENDIX C

Plant and Wildlife Survey Field Data Form Examples

Palos Verdes Peninsula Land Conservancy

California Gnatcatcher Monitoring Field Form

Date____________ (M/D/Y) Surveyor______________________________ Survey Area __________ Sheet ___ of ____

	START	END
Time (2400)		
Temperature (°Fahrenheit)		
Cloud Cover (%)		
Wind Speed (MPH)		

ID # = Alphanumeric identifier for point location Age/Sex = Pair, Male, Female, Juvenile Mapped = GPS or Photo Nest= Yes or No Para = Yes or No
Height = height of nest in shrub Dist = Distance of next below shrub canopy
Slope = note the average slope for the ID # Elev = note the elevation of the ID #
Veg = note the dominant vegetation classification for the ID# (Use Holland)
Habitat Dist. = trails, weeds, houses, noise, pets, etc.

ID #	AGE/SEX	MAPPED	NEST	% COMPL	# EG/NSTL /FLDG	PARASIT	HOST SHRUB	HEIGHT	DIST	SLOPE	ELEV	VEG	HABITAT DIST.

Palos Verdes Peninsula Land Conservancy
Sensitive Species Survey Form ___ _____ 2006

Project site:

Species:

Surveyor(s):

GPS unit:	UTM Coordinates:
Survey area:	Polygon #: 2006 - _____ (5-digit code) (survey area-initials (2)-record number)

Location (*e.g.*, E side Long Cyn):

Population estimate:

Size of sample estimation area (*e.g.*, 10 x 20 cm, 1 x 1 m):

Number of sample estimation areas in polygon and estimate of number of individuals within each sample:

Estimated number of individuals in polygon:

(# indiv./est. area x # est. areas)

OR--Total number of individuals in this estimation area:

Population estimate notes:

Population Structure (Age class, etc.)	Polygon mapping schematic (if needed)
Natural recruitment? (y/n)	
Polygon data: Aspect:	
Slope (in degrees):	
Soils:	
Habitat (consistent with NCCP):	

Description of Vegetation (Estimate percent cover native vegetation, bare ground, non-native plants):

Associated Species:

Disturbance factors/immediate threats:

Additional Notes (*i.e.*, site conditions, dispersal vectors, herbivory):

Photo Documentation Point? (y/n)

APPENDIX D

Coastal California Gnatcatcher and Cactus Wren Species Accounts

APPENDIX D

Coastal California Gnatcatcher and Cactus Wren Species Accounts

Coastal California Gnatcatcher (*Polioptila californica californica*)

Habitat and Habitat Associations

The coastal California gnatcatcher (gnatcatcher), a subspecies of the California gnatcatcher, is a small member of the thrush family (Muscicapidae). The gnatcatcher typically occurs in or near sage scrub habitat, which is a broad category of vegetation that includes the following plant communities as classified by Holland (1986): Venturan coastal sage scrub, Diegan coastal sage scrub, maritime succulent scrub, Riversidean sage scrub, Riversidean alluvial fan sage scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub. Coastal sage scrub is composed of relatively low-growing, dry-season deciduous, and succulent plants. Characteristic plants of this community include California sagebrush (*Artemisia californica*), various species of sage (*Salvia* sp.), California buckwheat (*Eriogonum fasciculatum*), lemonadeberry (*Rhus integrifolia*), California encelia (*Encelia californica*), and *Opuntia* spp. Ninety-nine percent of all gnatcatcher locality records occur at or below an elevation of 984 feet (Atwood 1990).

Coastal sage scrub is patchily distributed throughout the range of the gnatcatcher, and the gnatcatcher is not uniformly distributed within the structurally and floristically variable coastal sage scrub community. Rather, the subspecies tends to occur most frequently within the California sagebrush-dominated stands on mesas, gently sloping areas, and along the lower slopes of the coast ranges (Atwood 1990). An analysis of the percent gap in shrub canopy supports the general impression that gnatcatchers prefer relatively open stands of coastal sage scrub (Bontrager 1991). The gnatcatcher occurs in high frequencies and densities in scrub with an open or broken canopy, while it is absent from scrub dominated by tall shrubs and occurs in low frequencies and densities in low scrub with a closed canopy (Weaver 1998). The territory size increases as vegetation density decreases and with distance from the coast, probably due to food resource availability. Thus, gnatcatchers will use even sparsely vegetated coastal sage scrub for shelter and to forage for insects as long as perennial shrubs are available (ERCE 1990).

Gnatcatchers also use chaparral, grassland, and riparian or alluvial habitats where they occur adjacent to sage scrub (Bontrager 1991). The use of these habitats appears to be most frequent during late summer, autumn, and winter, with smaller numbers of birds using such areas during the breeding season. These non-sage scrub habitats are used for dispersal, but data on dispersal use are largely anecdotal (Bowler 1995; Campbell et al. 1995). Although existing quantitative data may reveal relatively little about gnatcatcher use of these other habitats, these areas may be critical during certain times of the year for dispersal or as foraging areas during drought conditions (Campbell et al. 1998). Breeding territories have also been documented in non-sage scrub habitat. Campbell et al. (1998) discuss likely hypotheses explaining why non-CSS habitat

is used by gnatcatchers including food source availability, dispersal areas for juveniles, temperature extremes, fire avoidance, and lowered predation rate for fledglings.

Environmental, vegetational, and food-abundance characteristics are important aspects of territory quality; however, they are related to the time of year when the evaluation is made (Redak et al. 1997). Based on the studies of Redak et al. (1997) during the breeding season, habitat use was negatively associated with distance to the coast and the elevation of the territory. The habitat use was positively associated with the abundance of adult stages of beetles, flies, spiders, and larval stages of all arthropods. Plots with high densities of California sagebrush, flat-topped buckwheat, and white sage were also used by birds. In contrast, during the non-breeding season, the correlation of habitat use with vegetation and location variables remained but the correlation was no longer present with the arthropod communities.

Biogeography

Historically, gnatcatchers occurred from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties and into Baja California, Mexico to approximately 30 degrees north latitude, near El Rosario (Atwood 1990). A detailed analysis of elevational limits associated with gnatcatcher locality records reveals that a significant portion, 65 to 70 percent of the historic range, may have been located in Southern California rather than Baja California (USFWS 2000). The gnatcatcher was considered locally common in the mid-1940s, but by the 1960s this subspecies had declined substantially in the United States owing to widespread destruction of its habitat (Atwood 1990). Currently, the subspecies occurs on coastal slopes of Southern California, ranging from southern Ventura southward through Palos Verdes Peninsula in Los Angeles County through Orange, Riverside, San Bernardino, and San Diego Counties into Baja California to El Rosario, Mexico, at about 30 degrees north latitude (Atwood 1991). In 1993, the USFWS estimated that approximately 2,562 pairs of gnatcatchers remained in the United States. Of these, 30 pairs occurred in Los Angeles County, 757 pairs occurred in Orange County, 261 pairs occurred in Riverside County, and 1,514 pairs occurred in San Diego County.

Biology

Genetics

The coastal California gnatcatcher was originally described as a distinct species by Brewster (1881) based on specimens; however, Grinnell (1926) concluded that it is a subspecies of the black-tailed gnatcatcher (*Polioptila melanura*), which is widely distributed throughout the Sonoran and Chihuahuan deserts of the southwestern United States and Mexico. Atwood (1980, 1988) concluded that the species was specifically distinct from *P. melanura*, based on

differences in ecology and behavior, which was adopted by the American Ornithologists' Union Committee on Classification and Nomenclature (American Ornithologists Union 1957, 1989). Recent mitochondrial DNA sequencing confirmed the species-level recognition of the coastal California gnatcatcher, which was calculated to differ from the black-tailed gnatcatcher (*P. melanura*) by 4.0 percent, similar to differences calculated in the black-capped gnatcatcher (*P. nigriceps*) and white-lored gnatcatcher (*P. albiloris*) (Zink and Blackwell 1998).

Diet and Foraging

The coastal California gnatcatcher is primarily insectivorous, non-migratory, and exhibits strong site tenacity (Atwood 1990). The diet, deduced from fecal samples, resulted in leaf- and plant-hoppers and spiders predominating the samples. True bugs, wasps, bees, and ants were only minor components of the diet (Burger et al. 1999). Gnatcatcher adults selected prey to feed their young that was larger than expected given the distribution of arthropod size available in their environment, and chicks were provisioned with larger prey items and significantly more grasshoppers, crickets, and spiders. Both adults and young consumed more sessile than active prey items (Burger et al. 1999).

The richness of the insect community within a habitat area may be a useful tool for describing the quality of the habitat (Burger et al. 1996). This is especially important for strictly insectivorous species such as the coastal California gnatcatcher. Gnatcatcher habitat use has been positively associated with total insect species richness and total individual insect abundance (Redak et al. 1996). Thus, overall food abundance and diversity plays an important role in territory selection and use for this species (Redak et al. 1996). Habitat use during the non-breeding season showed no clear relationship to any component of the arthropod community (Redak et al. 1997).

Daily Activity

Activity budget data indicate that gnatcatchers are most active and vocal during the morning. A lull in activity usually occurs during mid-day and activity increases again late in the day (Mock et al. 1990).

Reproduction

The breeding season of the gnatcatcher extends from mid February through mid-August, with the peak of nesting activity occurring from mid-March through mid-May. The gnatcatcher nest is a small, cup-shaped basket usually found 1 to 3 feet above the ground in a small shrub or cactus. Clutch sizes range between three and five eggs, with the average being four. Juvenile birds associate with their parents for several weeks (sometimes months) after fledging (Atwood 1990). The coastal California gnatcatcher is a year-round resident. Nest building begins during the mid part of March with the earliest recorded egg date approximately March 20 (Mock et al. 1990).

Post-breeding dispersal of fledglings occurs between late May and late November. Predation may be a major source of nest failure (Bontrager 1991; Grishaver et al. 1998). In western Riverside County, 78.9 percent of the nesting attempts failed, with 52.9 percent suffering from nest predation (Braden 1999).

Nest site attendance by male gnatcatchers was determined to be equal to that of females for the first nest attempt and then decline to almost 1/3 of that of the female for later nesting attempts (Sockman 1998).

The frequency with which various plant species have been recorded as nesting substrata indicates the overall preference of the sage scrub community as the habitat type (Atwood 1980). California sagebrush was chosen 25 percent of the time, with other species, including white sage, black sage, chamise, cholla, buckthorn, orange, lemonadeberry, and others making up the balance of nest shrub selections (Atwood 1980).

Survival

Gnatcatchers are persistent nest builders and typically often attempt multiple broods upon nesting failure, which is suggestive of a high reproductive potential. This is, however, typically offset by high rates of nest predation and brood parasitism (Atwood 1990). High rates of nest failure may account for the high number of nesting attempts of the coastal California gnatcatcher (Grishaver et al. 1998). Gnatcatchers typically live for 2 to 3 years, although ages of up to 5 years have been recorded for some banded birds (Braden et al. 1995). Most of the juvenile birds usually die during the cold winter months, although the percentage was not quantified. Observations indicate that gnatcatchers are highly vulnerable to extremely cold, wet weather (Mock et al. 1990).

Dispersal

Dispersal is a means by which genetic and demographic exchange between subpopulations maintains the viability of the regional metapopulation (Bailey and Mock 1998). Details regarding the dispersal effect on genetic and demographic connectivity of subpopulations and the actual requirements for dispersal are largely unknown (Rotenberry and Scott 1998), but some information can be documented from anecdotal observations. The mean dispersal distance of gnatcatchers banded as nestlings for males was 2.85 km and for females was 3.33 km (Atwood et al. 1996). Mean dispersal of juveniles in Orange County was found to be 1.05 km with one individual dispersing a total of 7.55 km (Galvin 1998). Although the mean dispersal distances that have been documented above are relatively low, dispersal of juveniles is difficult to observe and to document without extensive banding studies. It is likely that the few current studies underestimate the gnatcatcher's typical dispersal capacity because of the difficulty of detection (Bailey and Mock 1998). Juvenile coastal California gnatcatchers are apparently able to traverse

highly man-modified landscapes, including non-native landscaping vegetation, for at least short distances, and this underestimation of the species' dispersal capability can lead to an overestimation of the metapopulation's vulnerability to extinction (Bailey and Mock 1998). A few observations of gnatcatcher dispersal behavior indicate that a steppingstone linkage, that is, a series of small patches of suitable habitat interspersed with developed habitat, is deemed acceptable for situations where the habitat is otherwise fragmented and no contiguous linkage is available (Bailey and Mock 1998). Additionally, natural and restored coastal sage scrub habitat along highway corridors has been documented to be used for foraging and nesting by gnatcatchers and may serve important dispersal functions (Famolaro and Newman 1998). Typically, however, the dispersal of juveniles requires a corridor of native vegetation which provides foraging and cover opportunities to link larger patches of appropriate sage scrub vegetation (Soule 1991). These dispersal corridors may facilitate the exchange of genetic material and provide a path for recolonization of areas from which the species has been extirpated and increased mating opportunities for unpaired birds (Soule 1991; Galvin 1998).

The natal dispersal, for a non-migratory bird such as the coastal California gnatcatcher, is an important aspect of the biology of the species (Galvin 1998).

Socio-Spatial Behavior

The coastal California gnatcatcher seems to become highly territorial by late February or early March each year. Males seem to be very vocal during this time period (Mock et al. 1990). In San Diego County, the territory size for inland sites was calculated to range between 13 and 39 acres per pair, averaging 24 acres per pair (ERCE 1990). In Riverside County, it was estimated that about 24 acres of sage scrub habitat (three times the average territory size of 8 acres as measured within the HCP area) was required per pair of coastal California gnatcatchers (Braden 1998, personal communication). The distribution of the gnatcatcher is thought to be related to elevation, with most of the birds located below 250 m elevation within 35 km of the coast and 500 m elevation for inland regions (Atwood and Bolsinger 1992). During the non-breeding season, gnatcatchers have been observed to wander in adjacent territories and unoccupied habitat, increasing their home range size to approximately 78 percent larger than their breeding territory (Preston et al. 1998). Estimates of the territory size should be examined with caution, as the calculation may be influenced by differences in data collection and analysis (Atwood et al. 1998).

Coastal California gnatcatchers are most often observed in pairs even in the non-breeding season. They appear to maintain their territories and are relatively sedentary throughout the year (Dunn and Garrett 1987). In fact, vocalization rates, which may provide communication within the pair, were highest from August through March (Preston et al. 1998).

Community Relationships

Predation occurs in greater proportion in the upper and lower one third of the nest shrub. Predation was lower in nests with full clutch sizes, which may indicate the parents are more attentive to the nest after the clutch is complete (Sockman 1997). Potential predators include scrub jays, greater roadrunners, and cactus wrens, which have been observed to be actively mobbed by the gnatcatcher (Bontrager 1991). The coastal California gnatcatcher also is known to be affected by nest parasitism of the brown-headed cowbird. However, the gains in nest success from decreased nest parasitism appear to be negated by increased nest abandonment due to predation before cowbirds have migrated into an area (Braden et al. 1997). Thus, although a cowbird trapping program may reduce parasitism significantly and lower abandonment due to parasitism, nest predation then increases and negates the benefit of the trapping program (Braden et al. 1997). Nest parasitism apparently has resulted in earlier nesting dates of the gnatcatcher, which may help compensate for the negative effect of parasitism (Patten and Campbell 1998).

Although the coastal California gnatcatcher may serve as an adequate "umbrella species" for other species that occur in similar habitats and that require a similar territory size or smaller (Fleury et al. 1998), it is not a particularly good indicator of bird-species richness in coastal sage scrub habitat (Chase et al. 1998).

Threats to Species

In 1997, the total number of gnatcatchers in the United States was estimated at 2,899 pairs, after subtracting out all gnatcatcher pairs authorized for Take under Habitat Loss Permits, approved Natural Community Conservation Plans, Habitat Conservation Plans, and section 7 consultations ("Reinitiation of formal consultation on implementation of the special rule for the coastal California gnatcatcher [1-6-93-FW-37R1]"). This apparent increase in abundance since 1993 is likely the result of additional surveys occurring within previously unsurveyed areas, as well as increased productivity in response to favorable climatic conditions (USFWS 2000).

Although observed declines in numbers and distribution of the gnatcatcher resulted from numerous factors, habitat destruction, fragmentation, and adverse modification are the principal reasons for the gnatcatcher's current threatened status (USFWS 1993). The amount of coastal sage scrub available to gnatcatchers has continued to decrease during the period after the listing of the species. It is estimated that up to 90 percent of coastal sage scrub vegetation has been lost as a result of development and land conversion (Westman 1981a, 1981b; Barbour and Major 1977), and coastal sage scrub is considered to be one of the most depleted habitat types in the United States (Kirkpatrick and Hutchinson 1977; Axelrod 1978; Klopatek et al. 1979; Westman 1987; O'Leary 1990). The fragmentation of habitat may artificially increase populations in adjacent preserved habitat; however, these population surpluses may be lost in subsequent years

due to crowding and lack of resources (Scott 1993). In addition, agricultural uses, such as grazing and field crops, urbanization, air pollution, increases in fire frequency, and the introduction of exotics, have all had an adverse impact on extant sage scrub habitat. A consequence of urbanization that is contributing to the loss, degradation, and fragmentation of coastal sage scrub is an increase in wildfires due to anthropogenic ignitions (human-caused fires). High fire frequencies and the lag period associated with recovery of the vegetation may significantly reduce the viability of affected subpopulations of the gnatcatcher (USFWS 1991).

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Cactus Wren (*Campylorhynchus brunneicapillus*)

Habitat and Habitat Associations

The cactus wren is an obligate, non-migratory resident of the coastal sage scrub plant community (as defined by Westman 1983 and O'Leary 1990). It frequents deserts and other arid terrain with thickets, patches, or tracts of larger, branching cacti, stiff-twigged, thorny shrubs, and small trees (Grinnell and Miller 1944). In other areas, it is considered an inhabitant of the Chihuahuan, Mojave, and Sonoran deserts and Tamalpais thorn-shrub communities. It may also be considered a resident of scrubby flats, cactus and mesquite lowland areas, brushy mesas, gulches, hills, and canyons in Texas, desert riparian, creosote bush, and large arroyos in Nevada (Proudfoot et al. 2000). It is closely associated with three species of cacti and occurs almost exclusively in thickets of cholla (*Opuntia prolifera*) and prickly pear (*Opuntia littoralis* and *Opuntia oricola*) dominated stands of coastal sage scrub below 457 meters in elevation on mesas and lower slopes of the coast ranges (Proudfoot et al. 2000). Although it lives over a wide range from Texas to the Pacific Ocean, it is limited to regions with thorny shrubs and trees that offer nesting sites (Terres 1980).

Characteristic shrubs associated with habitat occupied by the cactus wren and within the coastal sage scrub community include California buckwheat (*Eriogonum fasciculatum*), coastal sagebrush (*Artemisia californica*), several sages (*Salvia* spp.), and scattered shrubs approaching tree size, such as laurel sumac (*Malosma laurina*) and lemonadeberry (*Rhus integrifolia*) (Garrett and Dunn 1981, Unitt 1984, Rea and Weaver 1990). Thickets of xeric vegetation may provide cover and thermal relief. The nest is also used as a roost site (Anderson and Anderson 1957).

Biogeography

The cactus wren is a resident species from Southern California south to southern Baja California, southern Nevada, southwestern Utah, western and south central Arizona, southern New Mexico, and central Texas south to Mexico (Terres 1980).

Zeiner et al. (1990) summarize the distribution, abundance, and seasonality of the cactus wren in California as follows. It is a locally common resident in the Mojave and Colorado deserts, north from the Mexican boundary to Inyo and Kern counties. The coastal race is found in arid parts of westward-draining slopes from San Diego County northwest to Ventura County. It frequents desert succulent shrub, Joshua tree, and desert wash habitats. Historically, cactus wrens within coastal areas were found on the coastal slopes and lowlands of Southern California in arid and semiarid regions with abundant cacti (Grinnell 1898, Grinnell and Miller 1944, Unitt 1984). As

early as 1944, authorities noted that loss of habitat had greatly reduced the historic range of this species (Grinnell and Miller 1944).

Biology

Genetics

The variation in plumage patterns and characters are used to distinguish the subspecies of the cactus wren. Eight subspecies are recognized, with the subspecies falling into roughly two groups: the *affinis* group (peninsular forms) and the *brunneicapillus* group (continental forms) (Proudfoot et al. 2000). The range of *C. b. couesi* is now geographically disjunct from interior desert populations as a result of urbanization of the corridor along the San Gorgonio Pass in Riverside County (Rea and Weaver 1990).

Diet and Foraging

The cactus wren forages on the ground and in low vegetation for insects and other small invertebrates, cactus fruits and other fruits, seeds, and nectar (Bent 1968; Anderson and Anderson 1973). Fruits make up 15–20 percent of the annual diet, which is more than most North American wrens (Ehrlich, et al. 1988). Foraging behavior is often regulated by heat stress (Ricklefs and Hainsworth 1968), necessitating retreat from exposed sites into shade of shrubs and trees. The cactus wren generally forages on the ground, turning over fallen leaves and other debris in search of insects. It also searches bushes and probes tree bark housing insects. Foliage-gleaning may increase with insect abundance and habitat complexity (Proudfoot et al. 2000).

Daily Activity

The cactus wren exhibits year-long, diurnal activity. The species is not migratory (Zeiner et al. 1990).

Reproduction

For the cactus wren, thickets of vegetation provide cover and shelter, and the nest, which is usually located in cactus, is used as a roost site as well as for breeding. The nest is usually built in cholla or other large, branching cactus, in yucca, or in a stiff-twigged, thorny shrub or small tree. The nest is an intricate, woven cylinder, usually placed horizontally 1.2 to 1.5 meters (4–5 feet) above the ground (Anderson and Anderson 1957). The large, globular chamber of the nest is about 18 centimeters in diameter with a tunnel-shaped passageway about 9 centimeters in diameter with as much as 30 centimeters between the back wall of the nest chamber and the entrance opening. The mouth of the entrance is usually about 7 centimeters above the base of the chamber. Because the passageway is too small to admit a flying bird, a doorstep or perch is required near the entranceway (Proudfoot et al. 2000). It breeds from March into June. The clutch size is 4–5 eggs, with a range of 3–7 eggs (Harrison 1978). Two broods per season is

common. Incubation is 15–18 days, by the female only (Anderson and Anderson 1960). The altricial nestlings fledge at 17–23 days, with an average of 21 (Hensley 1959, Anderson and Anderson 1960). The young may return to roost in the nest after fledging. The young become independent at about 1 month after leaving the nest; sometimes the young help feed the young of later broods (Harrison 1978).

Survival

Anderson and Anderson (1973) report an overall adult survival rate of 50.6 percent during a 6-year study. One banded adult was re-trapped when it was 4 years old (Terres 1980).

Dispersal

The species is generally considered to have low dispersal capabilities but there is little information available (Ogden Environmental and Energy Services 1993). In Arizona, of 55 nestlings banded, 41 dispersed from the natal site by 45 days post-fledging. Males remain near the natal site, usually dispersing only as far as parental territorial behavior dictates (Proudfoot et al. 2000).

Socio-Spatial Behavior

The home range may be the same as the territory (Anderson and Anderson 1963). The average territory was 1.9 hectares (4.8 acres), varying from 1.2–2.8 hectares (2.9–6.9 acres) in Arizona (Anderson and Anderson 1973). The cactus wren may maintain its territory year round (Anderson and Anderson 1963).

Community Relationships

Domestic cats, roadrunners, snakes, and loggerhead shrikes prey on adults and nestlings (Anderson and Anderson 1973). Austin et al. (1972) observed nestling predation by gopher snakes and whipsnakes. Frequent interactions with curve-billed thrashers have been reported by Anderson and Anderson (1963), including destruction of cactus wren roosting nests by thrashers.

Threats to Species

Continued threats to the cactus wren include habitat loss and fragmentation from urbanization and agricultural development. Domestic cats, roadrunners, snakes, and loggerhead shrikes prey on adults and nestlings (Anderson and Anderson 1973). Cactus wrens that are confined to isolated patches of habitat in urbanizing areas are subject to increased levels of predation pressures as larger predators are replaced by greater population levels of smaller predators and domestic animals. This species is especially vulnerable to stochastic events, especially wildland fires. Because of its narrow habitat requirements, sedentary behavior, and low dispersal characteristics, cactus wrens are subject to loss by fires and, if they disperse, may not find

suitable habitat to survive. Intense fires may actually kill cactus plants and eliminate habitat for the cactus wren. As a result of competition from invasive plant competition, grazing, weather patterns, and other natural and human-influenced disturbances, the reestablishment of cactus patches essential to this species may take many years. An increasing pattern of habitat fragmentation and isolated populations also diminishes the dispersal ability and inter-population connections of the cactus wren and reduces the overall genetic viability of the species (Ogden Environmental and Energy Services 1993).

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2007 Predator Control Plan

2007 PREDATOR CONTROL PLAN FOR THE PORTUGUESE BEND NATURE PRESERVE FOR THE RANCHO PALOS VERDES DRAFT NATURAL COMMUNITY CONSERVATION PLAN AND HABITAT CONSERVATION PLAN

Prepared for:

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APRIL 2007

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EXECUTIVE SUMMARY

This 2007 Predator Control Plan for the Portuguese Bend Nature Preserve (PCP) outlines appropriate provisions and measures to adequately comply with the Preserve Management requirements of the Rancho Palos Verdes Draft Natural Community Conservation Plan and Habitat Conservation Plan (Draft NCCP/HCP). The Draft NCCP/HCP Section 6.3.4 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 the Initial Management and Monitoring Report and recommends specific actions to be taken to reduce predation of covered species within the PBNP 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.

1.0 INTRODUCTION

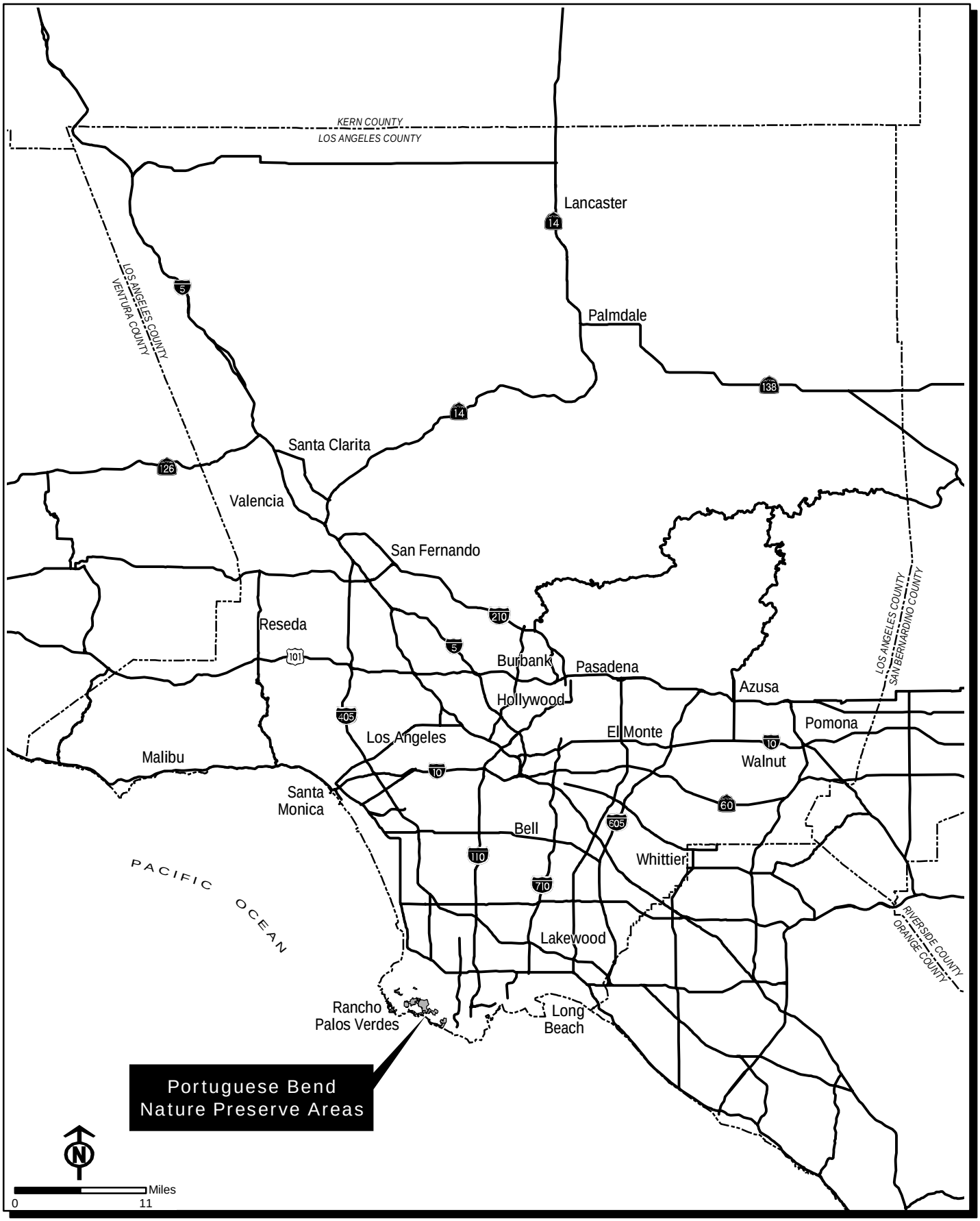
The Natural Communities Conservation Planning Subarea Plan and Habitat Conservation Plan (Draft NCCP/HCP) was prepared to "maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes and region pursuant to the requirements 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 Draft 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 2007 Predator Control Plan for the PBNP (PCP) was prepared in accordance with the requirements of the Draft NCCP/HCP (2006) by the Palos Verdes Peninsula Land Conservancy (Land Conservancy). This PCP was written after the results of the initial focused surveys for Draft NCCP/HCP-covered plant and wildlife species within the PBNP (See Initial Management and Monitoring Report 2006). It recommends specific actions to be taken to better understand presence of predators within the Preserve and to reduce predation within the Preserve over a 3-year time frame. This PCP will be reviewed and approved by the City of Rancho Palos Verdes 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 revise this plan every 3 years based on the results of the comprehensive survey also done every three years. If additional controls are needed, the plan may be revised more frequently.

As of the writing of this report, the Draft NCCP/HCP Implementing Agreement has not been signed by the Wildlife agencies, and therefore the Draft NCCP/HCP is technically not officially executed. However, the City of Rancho Palos Verdes and the Land Conservancy are continuing to coordinate with the resource agencies to complete this plan.

2.0 NEED FOR PREDATOR CONTROL

Native species are often at a disadvantage after exotic species or non-native predators are introduced, so special management measures may be needed to control these invading species. Non-native plant and 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 or mesopredators 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. Horse stables may provide resources for increased populations of parasitic cowbirds, which adversely affect native songbird breeding populations.



2007 Predator Control Plan

Regional Map

FIGURE 1

Portuguese Bend Nature Preserve

Preserve Areas:

0 = Ocean Trails ER

A = Abalone Cove ER

B = Vicente Bluffs ER

C = Canyons ER

F = Forrestal ER

L = Agua Amarga ER

N = Vista del Norte ER

R = San Ramon ER

T = Three Sisters ER

V = Alta Vicente ER

Feet
0 2,000

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

2007 Predator Control Plan

Vicinity Map

FIGURE 2

3.0 FERAL AND DOMESTIC ANIMALS

3.1 Monitoring

Through its Stewardship Program, the Land Conservancy conducts monthly monitoring walks of all properties under management and completes a "Property Review Form." A sample of this form is provided as Appendix A. This form will be modified to include an area to document evidence of feral or domestic animal use in the PBNP. 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 or scat from such an animal will be recorded. This monitoring will allow the Land Conservancy 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 will be targeted for specific control measures in the future.

The monthly monitoring program will also focus on areas in the PBNP that are in proximity to houses, parks and other developed areas. These areas are potentially subject to adverse edge effects (e.g., cat and dog predation, etc.). 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.

3.2 Pet / Feral Animal Education Program

The Land Conservancy will establish an education program for homeowners regarding responsible pet ownership. This program could consist of information distributed via the Land Conservancy's webpage, signage on the PBNP, informational handouts, and information disseminated during monthly public nature walks. 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 PBNP
5. Discouraging release of unwanted pets into the wild
6. Preventing the feeding of feral animals

3.3 Feral Animal Control Program

After the first three years of data collection, a determination will be made about the severity of feral animal usage and impacts. If a significant adverse impact is determined, then a feral animal removal program will be established. This program could consist of trapping and removal at regular intervals throughout the year, but should be based on good scientific data to be successful.

4.0 BROWN-HEADED COWBIRD

Brown-headed cowbird *(Molothrus ater)* is a nest parasite that lays its eggs in other bird species' nests, including the nests of California gnatcatcher *(Polioptila californica californica)*, an NCCP covered bird species. This behavior negatively affects native bird species, and can reduce reproductive success. It is recommended that if funding becomes available, that ongoing monitoring for cowbirds be conducted throughout the Preserve. This monitoring should include documentation of the extent of cowbird parasitism on target bird species nesting in the Preserve.

4.1 Cowbird Trapping Program

Brown-headed cowbirds were observed in Areas C and O *(Figure 2)*. It is recommended that a cowbird trapping program be implemented within Area C during the second year of the plan to reduce the potential for cowbirds to parasitize nests of native birds. One trap should adequately cover the area. Area O already has an on-going cowbird trapping program associated with the Trump National Golf Course.

5.0 NATIVE LARGE PREDATORS

5.1 Monitor population levels of large predators

As discussed in Section 2.1, 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 such as coyotes will be recorded. It is recommended that if funding becomes available, that more focused monitoring for large predators be conducted throughout the Preserve.

As a part of RECIPE (Research, Education and Community Involvement Program for the Environment), funded by the Alcoa Foundation at least through spring 2008, research is being done by a high school student on the distribution and impacts of coyotes on the Peninsula.

Information from this study, and any future similar investigations by RECIPE participants from the university or high school level, will be incorporated into the monitoring report on large predators.

5.2 Native Predator Education Program

The Land Conservancy will establish an education program for the general public regarding the role of native predators. This program could consist of information via the Land Conservancy's webpage, signage on the Preserves, informational handouts, and information disseminated during monthly public nature walks. This program will explain the role and necessity of large native predators within the ecosystem, such as coyotes, and the need to protect them from disturbance.

6.0 MESOPREDATORS 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.

6.1 Monitoring

As discussed in Section 2.1, 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 will be recorded. For example, one red fox was observed in Area A during the 2006 surveys within the PBNP *(Figure 2)*. It is recommended that if funding becomes available, that more focused monitoring for mesopredators and their impacts is conducted throughout the Preserve. This monitoring should include documentation of the extent of mesopredator impacts on target species in the Preserve.

6.2 Control

If studies or monitoring results indicate that specific mesopredators are adversely affecting sensitive native wildlife, then a program to control mesopredators will be initiated.

7.0 CONCLUSION

The Land Conservancy will plan for predator control as follows:

- Note observations and impacts of potential predators within the PBNP as a part of its regular monitoring schedule;
- Provide education programs regarding the impacts of predators on natural open spaces and habitat;
- Establish one trap for brown-headed cowbird during year 2 of this plan;
- Control predators such as feral cats and mesopredators as warranted.

Management of the PBNP for predator control would benefit from rigorous scientific study of the presence or absence of predators and the impacts they generate. As funding through the RECIPE program or other sources permits, the Land Conservancy will endeavor to provide more focused monitoring of predators and to make available the data from their impacts.

APPENDIX A

Sample Property Review Form

PALOS VERDES PENINSULA LAND CONSERVANCY

Draft

STEWARDSHIP REVIEW SHEET
CHANDLER PRESERVE

Date:		**Start time:**	
KEEPER Name:		**End time:**	
Property Condition		**Location** (list trail and/or specific location if possible)	**Comments** (explain observed conditions, note location)
Drainage or Erosion	☐ No significant change ☐ Limited sheet runoff ☐ Moderate gully erosion ☐ Heavy stream erosion		
Encroachments	☐ No change ☐ Limited (1-10 ft) ☐ Moderate (10-20 ft) ☐ Heavy (>20 ft)		
Hazards	☐ None ☐ Eroded trail ☐ Other ☐ Obstruction ☐ Fire ☐		
Signage	☐ No change ☐ Damaged, # ___ ☐ Missing, # missing____ ☐ Unauthorized signage		
Authorized Trails	☐ No change ☐ Condition 1 ☐ Condition 2 ☐ etc		
Unauthorized Trails	☐ None ☐ New, # _____		
Unauthorized Construction	☐ None ☐ New, # _____		
Trash or Dumping	☐ None ☐ Limited (<10) ☐ Moderate (10-20) ☐ Heavy (>20)		
Vandalism	☐ None ☐ Fence ☐ Facilities ☐ Cutting/Clearing of Vegetation ☐ Other		
Other			
Habitat			
Native vegetation	☐ Veg condition 1 ☐ Veg condition 2 ☐ Veg condition 3 ☐ Veg condition 3		
Exotic vegetation	☐ No change ☐ Veg cond 1 ☐ Veg cond 2 ☐ etc		
Irrigation	☐ No change ☐ Damaged PVC ☐ Damaged sprinkler head ☐ Other		
Seasonality	☐ Bloom ☐ Dormant ☐ etc ☐ etc		
Seed availability	Yes and No		
Fauna	☐ Mammals, #_____ ☐ Birds, #_____ ☐ Reptiles, #_____ ☐ Insects, #_____		
Predators	☐ Coyotes, # _____ ☐ Fox, #_____ ☐ Cowbird, # _____		
Other			
Community			
Dogs	☐ Present on leash, #_____ ☐ Present off leash, #_____		
Bicycles	☐ # present on authorized trails _____ ☐ # present off trails _____		
Hikers	☐ # present on authorized trails _____ ☐ # present off trails _____		
Equestrian	☐ # present on authorized trails _____ ☐ # present off trails _____		
Community comments			

Explanation of Themes:

Drainage or Erosion:

- No significant change – erosion not observed
- Limited sheet runoff - result of heavy rain, generally on bare soil where water flows as a sheet down any gradient, carrying soil particles. Runoff occurs where water is unable to infiltrate the soil surface.
- Gully erosion - occurs where water flows along a depression, eroding a trench or gully. This type of erosion, left unchecked, eventually develops deeper ditches or incised channels.
- Stream erosion – caused by continued water flow in a channel that may increase or worsen erosion concerns. In early stages, the gradient of the flowing water is generally steep, then becoming level and widening as sediments begin to accumulate in flatter areas. Fast moving water may move large soil particles and rocks as well as damage nearby conservation values.

Encroachments – Unauthorized cconstruction or private development, which intrudes on the Preserve that can include, but not limited to: fences, structures, and exotic vegetation.

Hazards – Anything that may endanger users of the Preserve that may include, but not limited to: erosion, obstructions, falling trees, excessive buildup of dead vegetation that may cause fire, occurrence of poisonous plants and worksite safety issues.

Signage – At times, official signage in the Preserves may be damaged or removed by users and vandals. Additionally, people may post unauthorized signs in the Preserve. All signage in the Preserves must be approved by the City or PVPLC.

Authorized Trails – Explanation of trail condition is as follows:

- No change?
- Condition 1 – Trail is passable and in good shape, shows little to no erosion.
- Condition 2 – Trail is passable, but shows some signs of disrepair or hazard for users.
- Condition 3 – Trail has been neglected, shows signs of bad tread, obstructions and other hazards exist.

Unauthorized Trails – In some Preserves, trails may become permanent through clearing and subsequent use by others

- None – no sign of new unauthorized trails
- New – recent sign of brush clearance and public use, please note number of trails observed

Trash or Dumping – All refuse should be removed by users or disposed of in the appropriate waste containers. Please rate the level of trash or dumping activity as follows:

- None - clean
- Limited – refers to general litter left behind
- Moderate – indicates disposal of debris, more than random waste left behind by the public
- Heavy – denotes illegal access, usually vehicular, to abandon large amount of unwanted material within and/or adjacent to Preserve boundaries

Vandalism – Any damage to the vegetation and/or infrastructure of the Preserve.

Habitat

Native Vegetation

Non-native Vegetation

- Type of change
    - native vegetation changed to non-native vegetation;
    - non-native vegetation to native vegetation;
    - change from one type of native vegetation to another; or
    - no change
- Cause of change

- clearing for agriculture;
- conversion for agriculture;
- plantation establishment;
- revegetation;
- land abandonment;
- pest or disease invasion;
- farm tree planting;
- urban and/or infrastructure development;

Irrigation
Seasonality
Seed availability
Wild Fauna
Feral and Domestic Fauna – Presence (ie. sighting or evidence, such as scat) of feral and domesticated animals, which may disturb wild animal populations.
Large Predators
Meso-predators
Document evidence of large predators, such as coyotes.

Community
Dogs
Bicycles
Hikers
Equestrian
Community Comments

2007 Habitat Restoration Plan

2007 HABITAT RESTORATION PLAN
for the
ALTA VICENTE ECOLOGICAL RESERVE IN THE PORTUGUESE BEND NATURE PRESERVE FOR THE RANCHO PALOS VERDES DRAFT NATURAL COMMUNITY CONSERVATION PLAN AND HABITAT CONSERVATION PLAN

Prepared for:

THE CITY OF RANCHO PALOS VERDES
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Prepared by:

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Rolling Hills Estates, CA 90274-3826
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DUDEK

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APRIL 2007

2007 Habitat Restoration Plan for the Alta Vicente Ecological Reserve

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EXECUTIVE SUMMARY

This 2007 Habitat Restoration Plan for the Alta Vicente Ecological Reserve (HRP) 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 (Draft NCCP/HCP). The Draft 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 HRP 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 HRP presents information on project location and work descriptions, planting recommendations, maintenance requirements, monitoring methodology and revegetation success criteria.

2007 Habitat Restoration Plan for the Alta Vicente Ecological Reserve

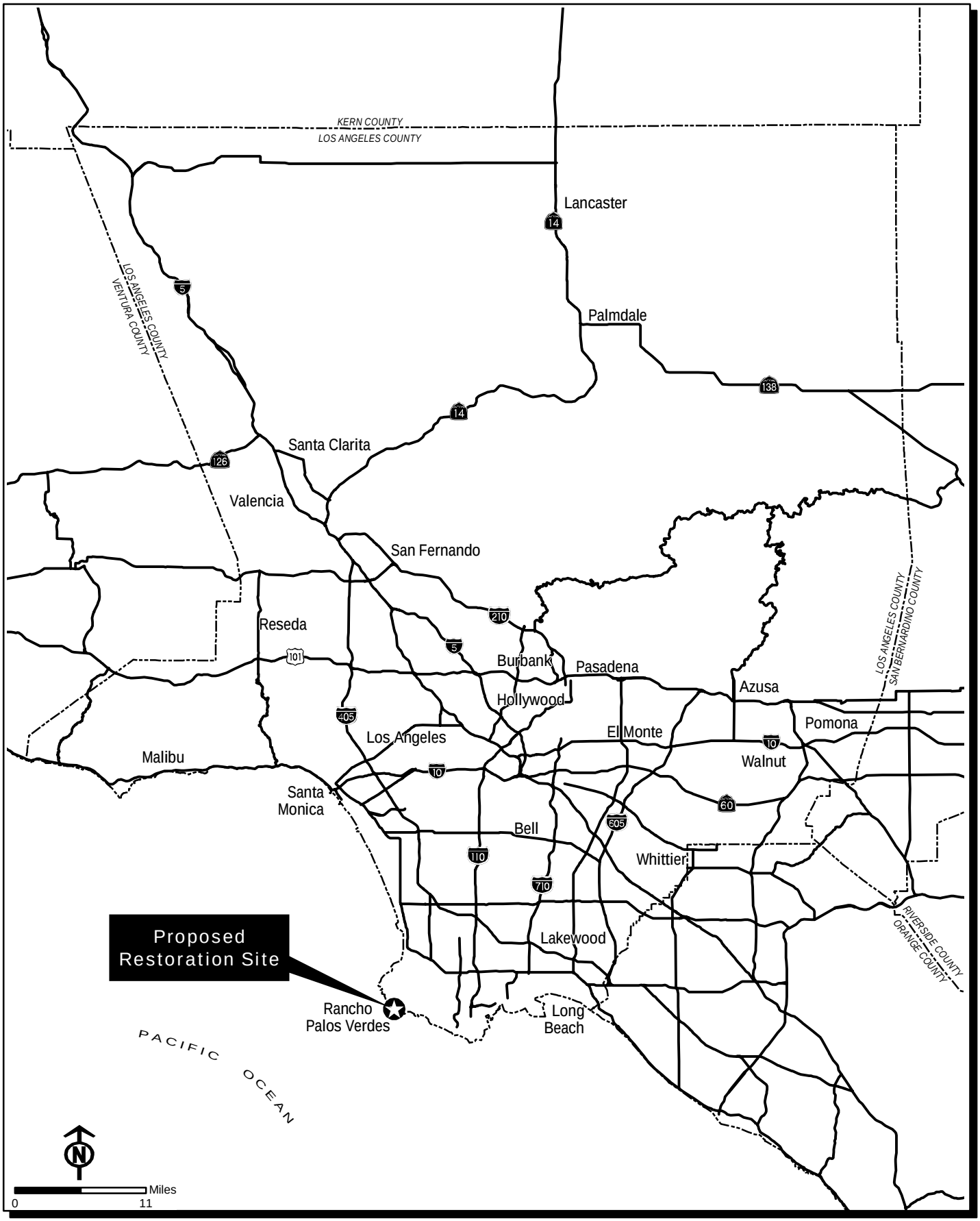
1.0 INTRODUCTION

The Rancho Palos Verdes Draft Natural Communities Conservation Plan and Habitat Conservation Plan (Draft NCCP/HCP) was prepared to "maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes (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 Draft NCCP/HCP, a preserve design was proposed to conserve regionally important habitat areas and provide habitat linkages in order to benefit sensitive plants and wildlife. The result of the preserve design as designated in the Rancho Palos Verdes Draft 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 Habitat Restoration Plan for the Alta Vicente Ecological Reserve (HRP) in the PBNP was prepared in accordance with the requirements of the Draft 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 has been 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 Draft 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.

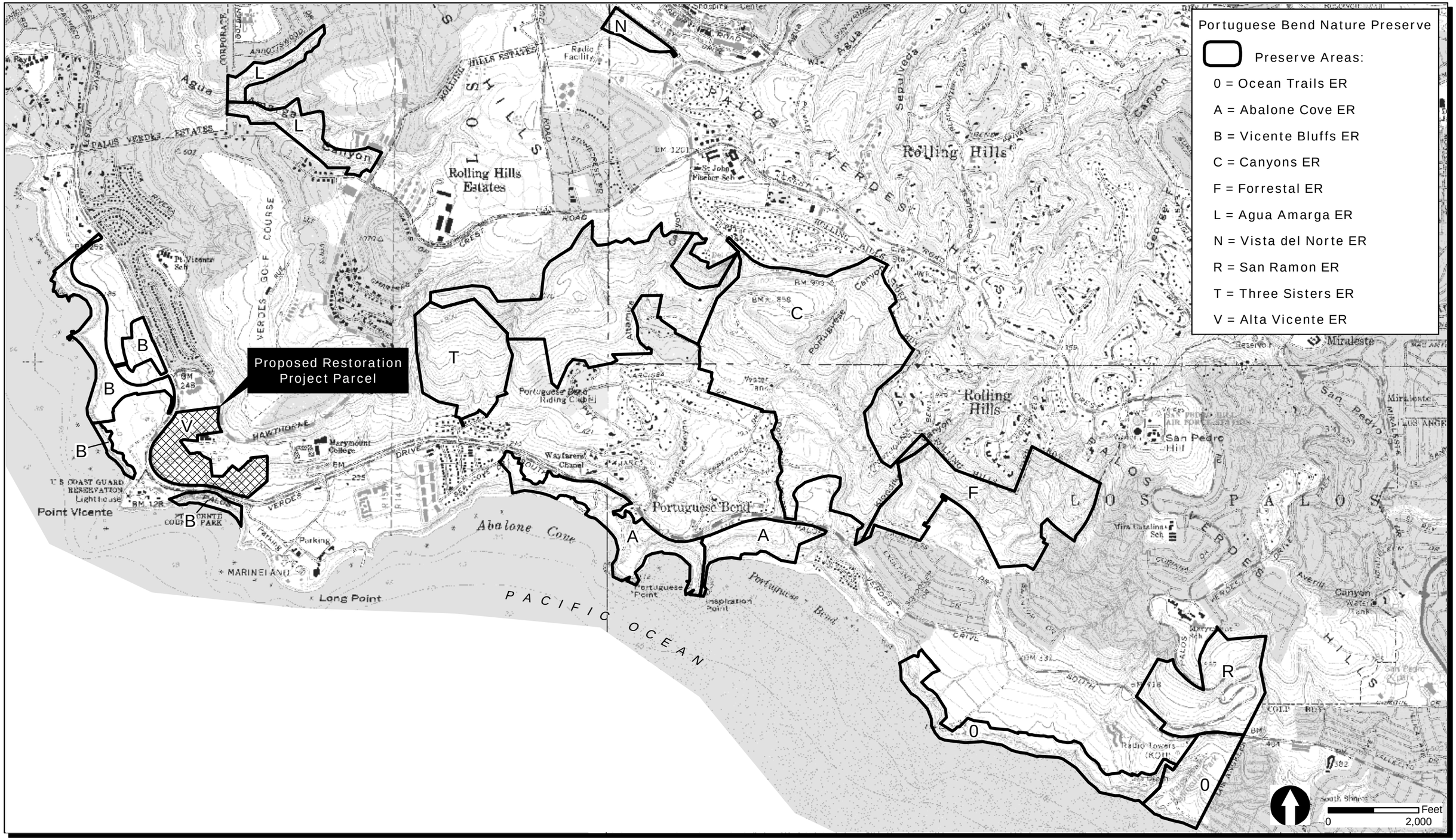
As of the writing of this report, the Draft NCCP/HCP Implementing Agreement has not been signed by the Wildlife agencies, and therefore the Draft NCCP/HCP is technically not officially executed. However, the City of Rancho Palos Verdes and the Land Conservancy are continuing to coordinate with the resource agencies to complete this plan.



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

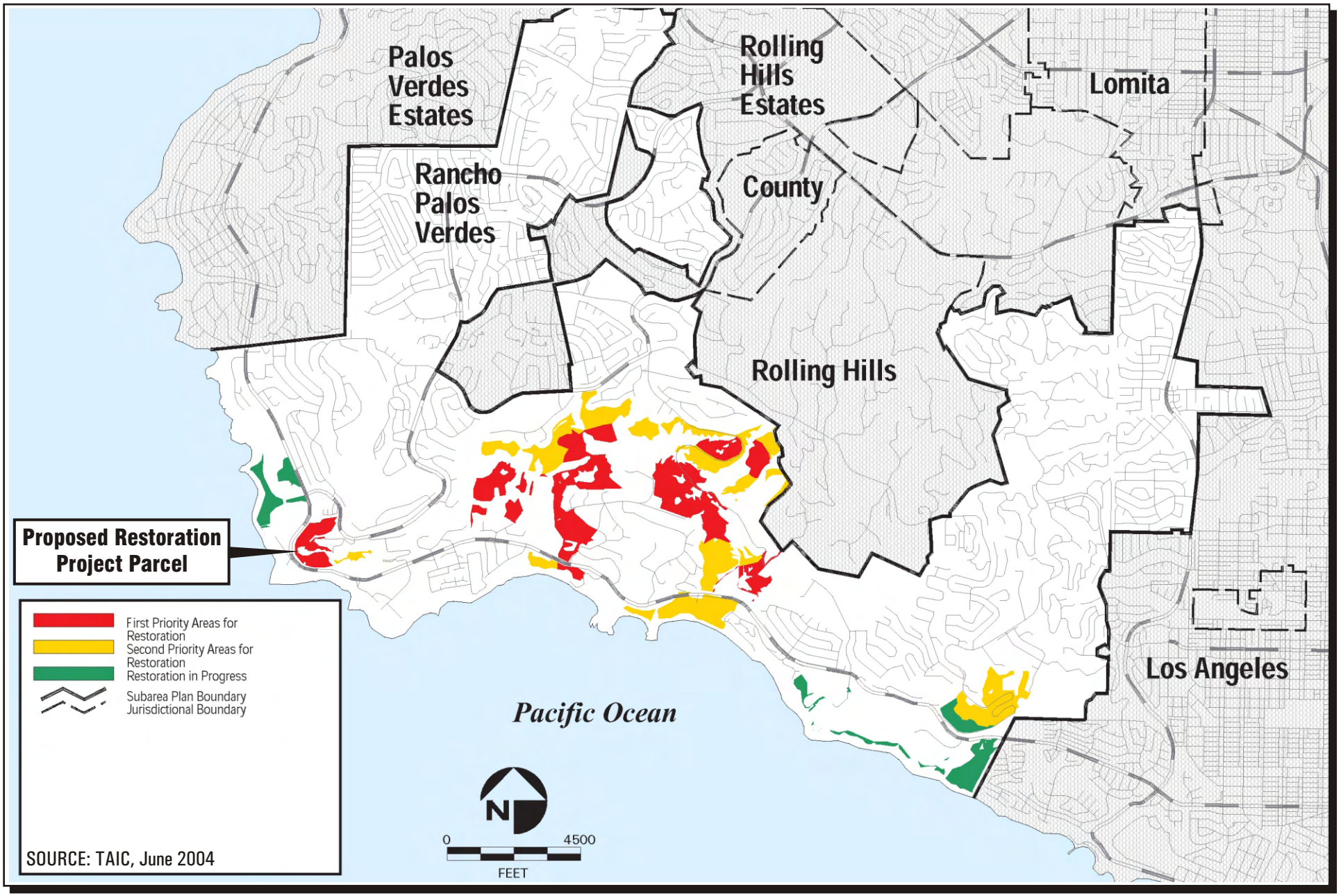
2.1 Portuguese Bend Nature Preserve Ecological Reserves

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 Draft 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 R 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 R and Area A) was visited 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 R)	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

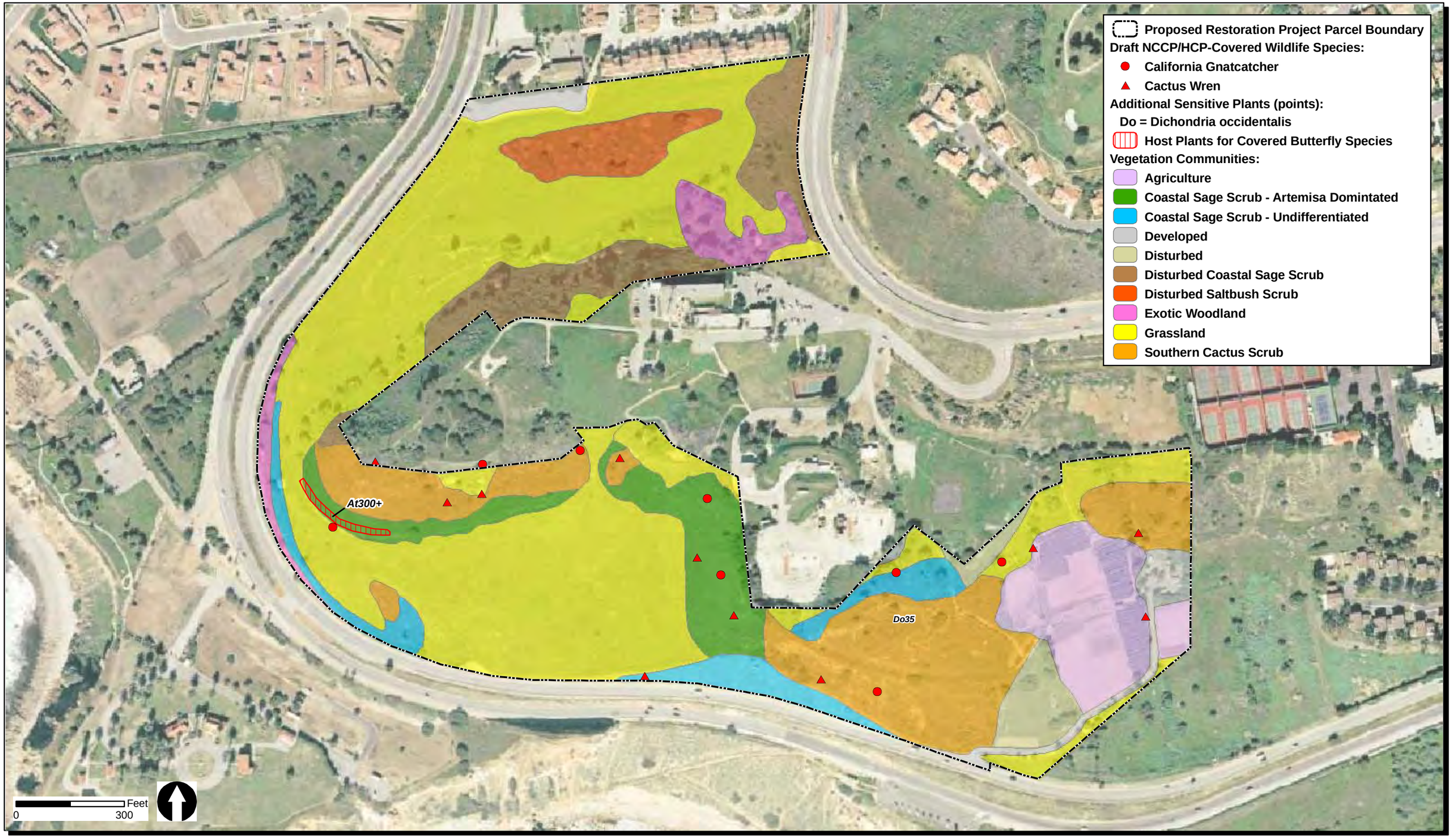
The Alta Vicente ER is located on the southwestern portion of the Palos Verdes Peninsula, north of the Pacific Ocean in the City of Rancho Palos Verdes, California (*Figure 1*). The 55.4-acre survey area lies in unsectioned lands in the following U.S. Geological Survey (USGS) 7.5 minute topographic map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



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Biological Resources Map

FIGURE 4

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).

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 Draft 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 California Department of Fish and Game 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 Draft NCCP/HCP-Covered Plant and Wildlife Species

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

In 2006, two Draft 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 HRP 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.

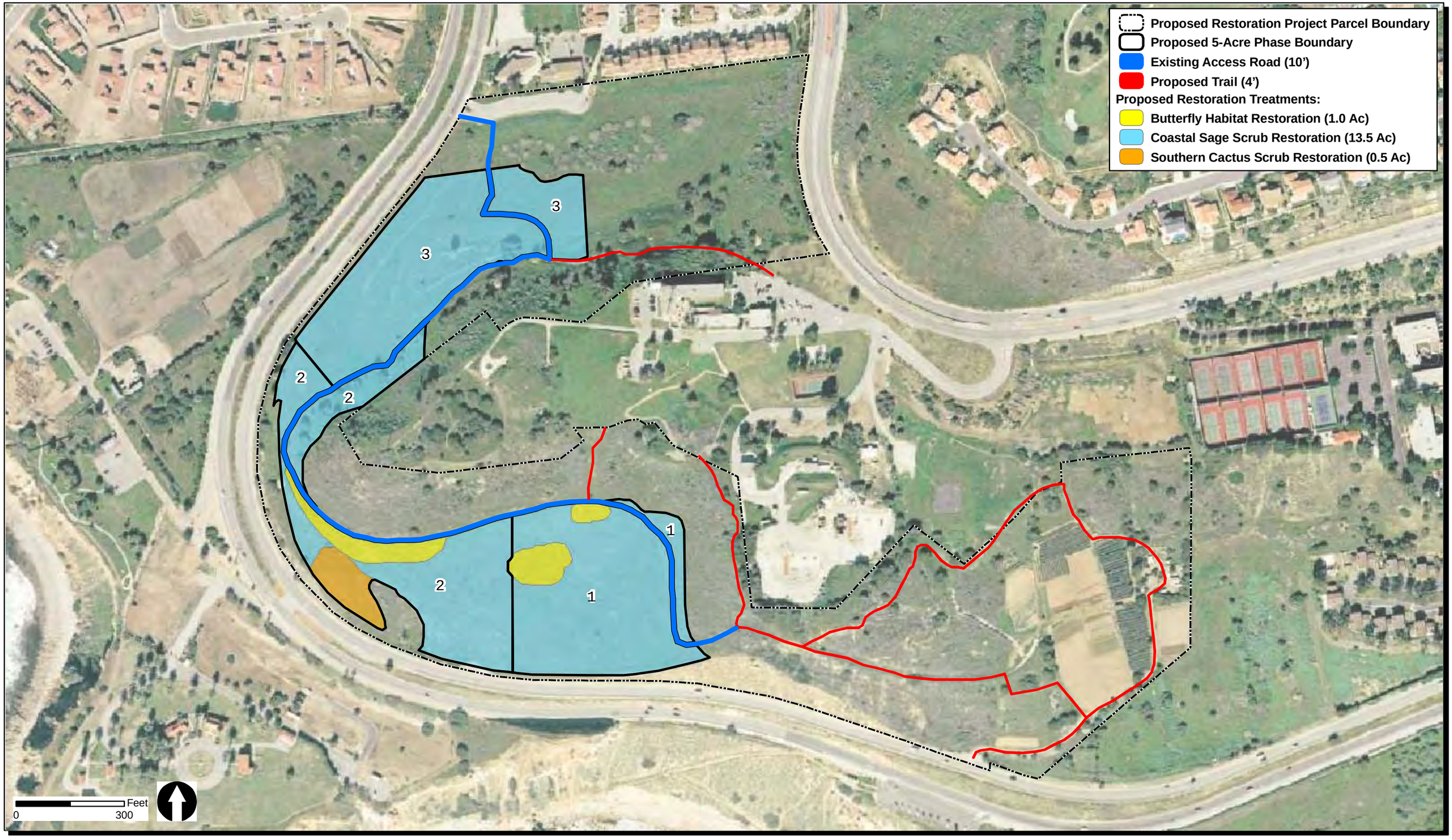
In addition to these broad goals, the following site-specific objectives for the Alta Vicente restoration site have been incorporated into this HRP in the interest of minimizing adverse impacts to biological resources:

- 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*).



AERIAL IMAGERY SOURCE: AirPhoto USA, Flown Feb. 2005

2007 Habitat Restoration Plan for Alta Vicente Ecological Reserve

Conceptual Restoration Plan

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.

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**

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

Seed Mix				
Botanical Name	**Common Name**	**Pure Live Seed**	**Lbs. Per Acre**	**Collected Locally***
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	✓
Eriophyllum confertiflorum	Golden-yarrow	25	1	✓
Gnaphalium bicolor	Everlasting	2	0.5	✓
Gnapalium californicum	California cudweed	2	0.5	✓
Gnapalium canescens	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**
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**

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	

TABLE 4 (Cont.)

Seed Mix				
Botanical Name	**Common Name**	**Pure Live Seed**	**Lbs. Per Acre**	**Collected Locally***
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 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 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 at 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

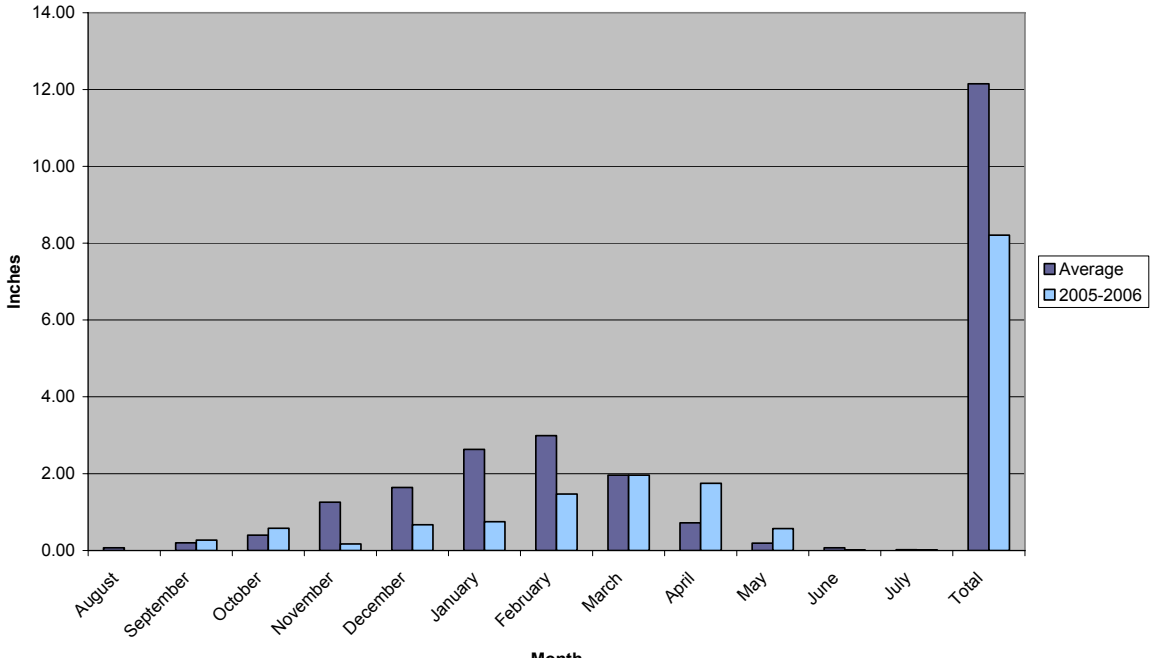
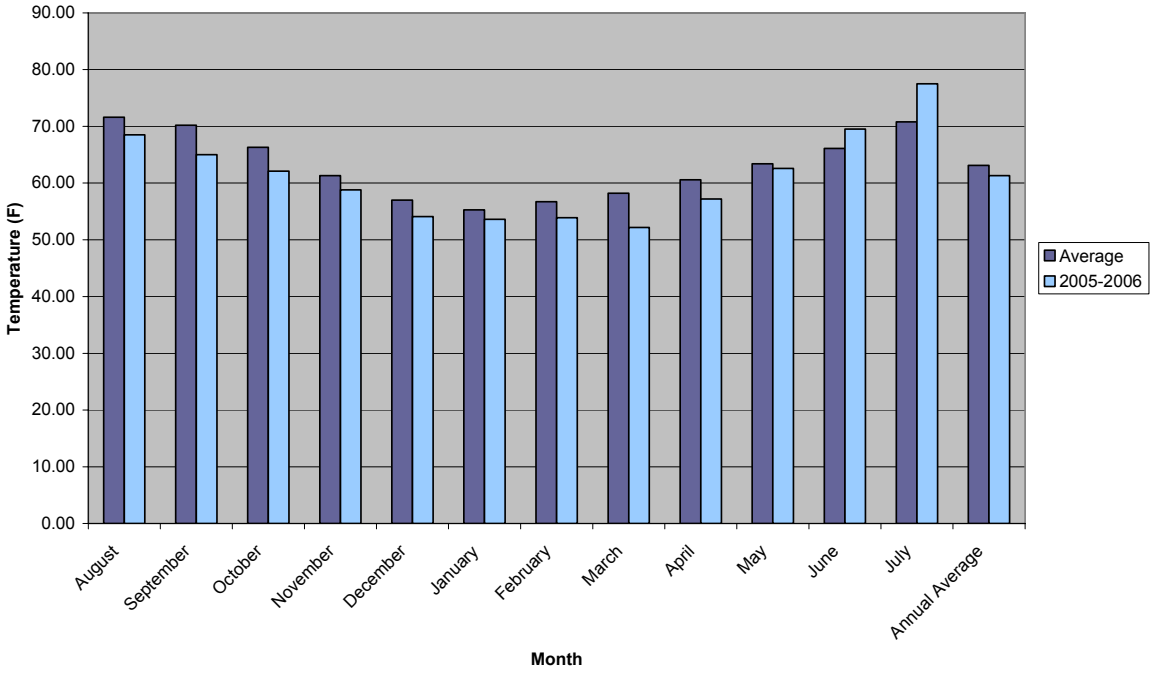


Chart 2
2005-2006 Average Monthly Temperatures for the Portuguese Bend Nature Preserve



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 will commence 1 and 2 years later respectively, than the Phase 1 tasks.

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 during select periods of time over an approximate four-week period to encourage non-native seedling emergence. The irrigation would be applied for short period of time, a few times a week to stimulate germination. 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. The City shall also have the right to require additional erosion control.

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 for each phase 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. If there are any concerns as presented by the City Manager that cannot be rectified by repairs, adjustments, and/or troubleshooting then the irrigation system may be terminated at the request of the City Manager. 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. The determination regarding the removal of the irrigation system will be made by

the City Manager in consultation with the Land Conservancy. 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 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 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

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

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

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

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

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

2007 Targeted Exotic Removal Plan for Plants

2007 TARGETED EXOTIC REMOVAL PLAN FOR PLANTS FOR THE PORTUGUESE BEND NATURE PRESERVE FOR THE RANCHO PALOS VERDES DRAFT NATURAL COMMUNITY CONSERVATION PLAN AND HABITAT CONSERVATION PLAN

Prepared for:

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APRIL 2007

2007 Targeted Exotic Removal Plan for Plants for the Portuguese Bend Nature Preserve

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2007 Targeted Exotic Removal Plan for Plants for the Portuguese Bend Nature Preserve

1.0 INTRODUCTION

The Rancho Palos Verdes Draft Natural Communities Conservation Plan and Habitat Conservation Plan (Draft NCCP/HCP) requires that as managers of the Portuguese Bend Nature Preserve (PBNP) the Palos Verdes Peninsula Land Conservancy (Land Conservancy) implement a Targeted Exotic Plant Removal Plan for Plants (TERPP), as specified in Section 6.3.2.5 of the Plan. As of the writing of this plan, the Draft NCCP/HCP Implementing Agreement has not been signed by the regulatory agencies, and therefore, the Draft NCCP/HCP is technically not officially executed. However, the City of Rancho Palos Verdes and the Land Conservancy are continuing to coordinate with the resource agencies to complete this plan.

This report describes the methodology of the proposed TERPP. Within the framework described in this report, each year, five acres or 20 TERPP sites are to be identified as locations where the removal of exotic plants would have a beneficial effect on the habitat in the area. All removals will be evaluated for erosion concerns. These concerns will be addressed as necessary.

An integrated management approach (i.e., the least biologically intrusive control methods) at the most appropriate period of the growth cycle will be used to achieve the desired goals. Both mechanical and chemical methods of control may be used. Only herbicides compatible with biological goals are permitted, and all work is to be supervised by a licensed Qualified Applicator. Plant material removed from PBNP lands will be disposed of in offsite facilities. However, for small or isolated populations and for annual species that had not yet produced seeds and pose no threat of regrowth, the plant material may be left at the site to decompose naturally.

The California gnatcatcher (*Polioptila californica californica*) breeding season is from February 15th to August 31st. During this time period, TERPP locations and project extent will be selected to avoid or minimize impacts to potential gnatcatcher habitat. TERPP sites with homogonous cover of invasive plant species, absent of any coastal sage scrub habitat, will be exempt from gnatcatcher surveying where access to the removal site is possible without entering potential nesting habitat.

In rare instances, when removal projects are selected in coastal sage scrub habitat and there is no direct access via a trail to the removal site, minimization measures will be employed. These measures will consist of a biological survey for nesting sites of the gnatcatcher and cactus wren

(*Campylorhynchus brunneicapillus*). If any nesting sites are detected, all work will remain as least 100 feet away from the nesting locations.

2.0 ASSESSMENT OF EXOTIC PLANTS IN PORTUGUESE BEND NATURE PRESERVE

This assessment includes an inventory of exotic species present and an evaluation of the priority of selected species for control efforts. The inventory lists exotics currently known to exist in the Preserve. However, new species may be added if they are identified, and species that are no longer seen as a threat may be deleted from the list.

Prioritization will be based on the following criteria (see attached flow charts):

1. Degree of threat to native vegetation
2. Feasibility of eradication
3. Invasiveness of exotic species

2.1 Degree of Threat to Native Vegetation

Degree of threat is based on proximity to native vegetation. In some cases, the exotic species may be located adjacent to the PBNP, but is considered a threat due to the ease of seed mobility.

High priority

The exotic species is categorized as high priority if it poses an immediate threat to:

- rare or endangered native plants or biological communities
- undisturbed examples of natural communities
- areas supporting species of animals known to depend upon native vegetation that is threatened by exotic species

Medium priority

The exotic species is categorized as medium priority if it will threaten an area as described above within 1-2 years

Low priority

The exotic species is categorized as low priority if it will be more than two years before it poses a threat to an area as described above.

2.2 Feasibility of Eradication

Each infestation of exotic plants will be evaluated to determine the feasibility of eradication.

Localized exotic plants are the most amenable to control efforts. It may even be possible to completely eradicate these species if management is initiated quickly.

Some exotic plant species that have become established in the PBNP may not be controllable throughout their entire range, but their impacts can be decreased by controlling these species in selected areas, particularly high priority natural areas.

It may be possible to confine some widespread exotic species to certain portions of the PBNP.

High priority

The exotic species is present in localized populations with a good possibility for eradication. This may include isolated stands of the species that are easily eradicated or that pose an immediate threat to native habitat due to their aggressive nature.

Medium priority

The exotic species is controllable but only in selected areas, or the species is confinable to certain areas of the PBNP. This category also includes species that are controllable Preserve-wide, even though this effort may require removal from one area at a time.

Low priority

The exotic species is present in large contiguous stands with little possibility of eradication, or the seed bank of the exotic is considered well established.

2.3 Invasiveness of Species

Lists of exotic species found within the PBNP are located at the end of this report (*Table 1-3*). Exotic species are ranked as highly invasive (*Table 1*), moderately invasive (*Table 2*), or non-invasive (*Table 3*) based on state wide rating systems provided by the California Invasive Plant Council (Cal-IPC) and California Department of Food and Agriculture (CDFA). These recommendations by Cal-IPC and CDFA have been modified slightly to reflect the observed impact of invasiveness seen within the PBNP by Land Conservancy biologists. Exotic species found in the PBNP, but not found on either State list are categorized based on local knowledge of their invasiveness in this area. Non-native species that are not considered to be invasive are included in the exotic species lists (*Table 3*), but have been omitted from the priority ranking flowcharts (*Figures 1-3*).

TABLE 1
Highly Invasive Species

Scientific Name	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

TABLE 1
Highly Invasive Species

Scientific Name	Common name
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

TABLE 2
Moderately Invasive Species

Scientific Name	Common Name
Acacia cyclops	Acacia
Acacia species	Acacia
Aegilops cylindrica	Jointed goat grass
Ageratina adenophorum	Eupatory
Atriplex semibaccata	Australian saltbush
Bassia hyssopifolia	Five-Hook bassia
Bromus hordeaceus (mollis)	Soft brome
Bromus catharticus	Rescue grass
Cakiel maritime	Sea rocket
Carduus pycnocephalus	Italian thistle
Carpobrotus aequilaterus	Sea Fig
Carpobrotus chilensis	Fig-Marigold iceplant
Conium maculatum	Poison hemlock
Convolvulus arvensis	Bindweed
Erodium cicutarium	Red stem filaree
Eucalyptus camaldulensis	Red gum tree
Eucalyptus globulus	Blue gum tree
Eucalyptus species	Gum tree
Hirschfeldia incana	Annual mustard
Hordeum murinum leporinum	Foxtail barley
Hordeum vulgare	Common barley
Lactuca serriola	Compass plant
Lathyrus tangianus	Tangier pea
Limonium perezii	Sea lavender
Limonium sinuatum	Sea lavender

TABLE 2
Moderately Invasive Species

Scientific Name	Common Name
Lobularia maritima	Sweet alyssum
Lolium multiflorum	Italian rye
Lolium perenne	Perennial ryegrass
Marrubium vulgare	Horehound
Medicago polymorpha	Bur clover
Medicago sativa	Alfalfa
Melilotus albus	White sweet clover
Melilotus indicus	Yellow sweet clover
Myoporum laetum	Myoporum
Olea europea	Olive
Oxalis pes-caprae	Bermuda buttercup
Pelargonium zonale	Zonal geranium
Phalaris minor	Phalaris
Phoenix canariensis	Phoenix palm
Piptatherum miliacea	Smilo grass
Pittosporum undulatum	Pittosporum
Plantago lanceolata	English plantain
Polygonum aviculare	Knotweed
Polypogon monspessulensis	Rabbitsfoot
Pyracantha sp.	Firethorn
Rumex crispus	Curly dock
Schinus molle	Mexican pepper
Schinus terebinthifolius	Brasilian pepper
Sisymbrium irio	London rocket
Trifolium hirtum	Rose clover
Washington robusta	Mexican fan palm
Vicia sativa	Spring vetch
Vulpia myuros varhirsuta	Annual fescue
Vulpia myuros var myuros	Rattail fescue

TABLE 3
Exotic, Non-invasive Species

Scientific Name	Common Name
Amaranthus albus	Tumbleweed
Anagallis arvensis	Pimpernel
Apium graveolens	Celery
Aptenia cordifolia	Baby sun-rose
Atriplex glauca	Saltbush
Bidnes pilosa	Common beggar-ticks

TABLE 3
Exotic, Non-invasive Species

Scientific Name	Common Name
Capsella bursa-pastoris	Shepherd's purse
Centranthus rubber	Red valerian
Ceratonia siliqua	Carob tree; locust bean tree
Chamaesyce maculata	Spotted spurge
Chenopodium album	Lamb's quarters
Chenopodium ambrosioides	Mexican tea
Chenopodium murale	Nettleleaf goosefoot
Conyza canariensis	Horseweed
Coronilla valentina	Coronilla
Cyperus involucratus	Umbrella plant
Digitaria sanguinalis	Hairy crabgrass
Echium fastuosum	Pride of madeira
Erodium botrys	Long-beaked filaree
Euphorbia lathyris	Gopher plant
Euphorbia peplus	Petty spurge
Filago gallica	Narrow-leaf filago
Fraxinus uhdei	Shamel ash
Gazania species	Gazania
Geranium carolinianum	Carolina geranium
Gnaphalium luteo-album	White cudweed
Koehlreuteria species	Koehlreuteria
Lamarckia aurea	Goldentop
Lantana montevidensis	Purple trailing lantana
Lathyrus odoratus	Sweet pea
Lycium species	Ornamental lycium
Lycopersicon esculentum	Garden tomato
Malephora crocea	Coppery mesemb
Melaleuca species	Melaleuca
Mesembryanthemum nodiflorum	Slender-leaved iceplant
Osteoapermu fruticosum	Trailing african daisy
Oxalis corniculata	Creeping woodsorrel
Paspalum dilatatum	Dallis grass
Pinus halepensis	Alepppo pine
Plantago major	Common plantain
Poa annua	Bluegrass
Polygonum arenastrum	Common knotweed
Senecio vulgaris	Common groundsel
Silenle gallica	Common catchfly
Triticum aestivum	Cultivated wheat
Urtica urens	Dwarf nettle
Veronica anagallis-aquatica	Water speedwell
Yucca species	Spanish bayonet

High priority

These species are highly invasive. They tend to form monotypic stands and have biological attributes that contribute to moderate to high rates of dispersal and establishment. They have severe negative impacts on physical processes, plant and animal communities, and vegetation structure.

Medium priority

These species are moderately invasive. They may have biological attributes that are conducive to high dispersal and establishment rates, but have less severe negative impacts on physical processes, plant and animal communities, and vegetation structure. Distribution may be limited to areas subject to continuing human disturbance or dependent on ecological disturbance. Medium priority is also given to invasive exotics known to spread slowly and stay in localized patches.

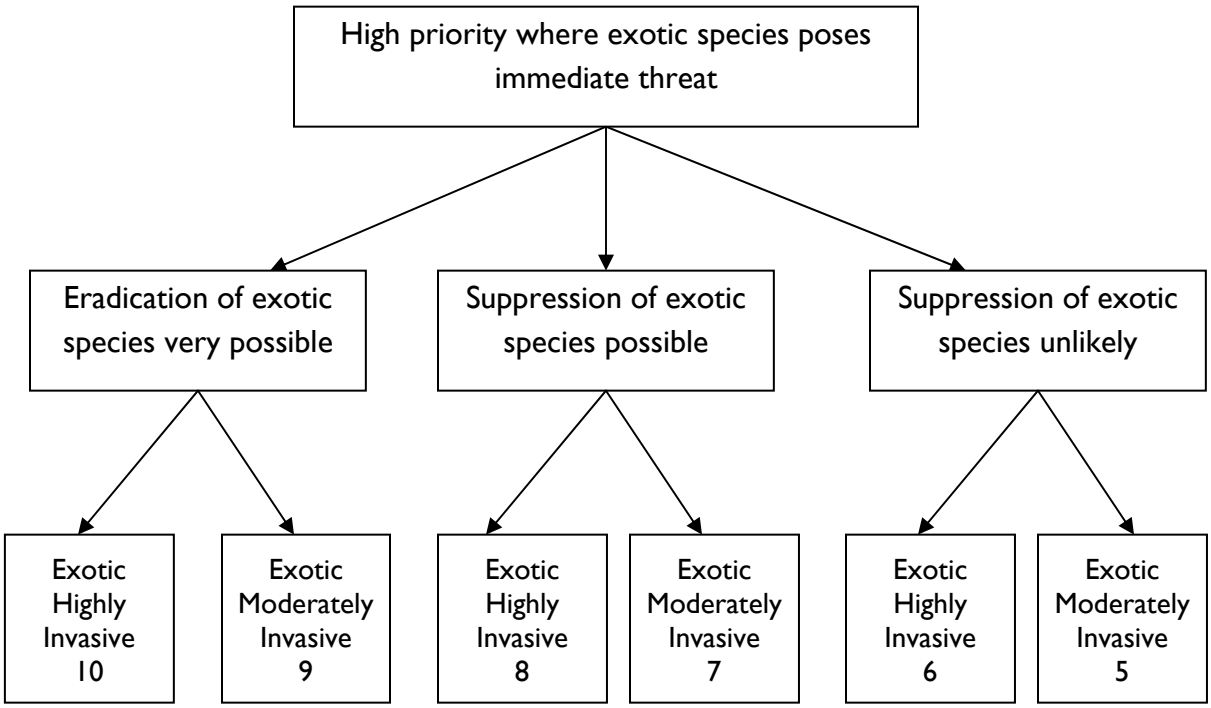
Low priority

These species are exotic, but not considered invasive. Their distribution is extremely localized and spread is slow or rare. Species in this category are not included in the priority ranking flowcharts (*Figures 1-3*).

Flow Charts

The three priority criteria are combined into a series of flow charts in *Figures 1-3*. These flow charts and corresponding scores of 1-10 are designed to provide management with guidance on when an exotic plant is an overall high, medium, or low priority for control. An overall score of 8-10, 4-7, and 1-3 indicates a high, medium, and low priority for control, respectively. Since these scores are meant as guidance, they should not replace best professional judgment.

Figure 1. Flowchart for High Priority Degree of Threat to Native Vegetation



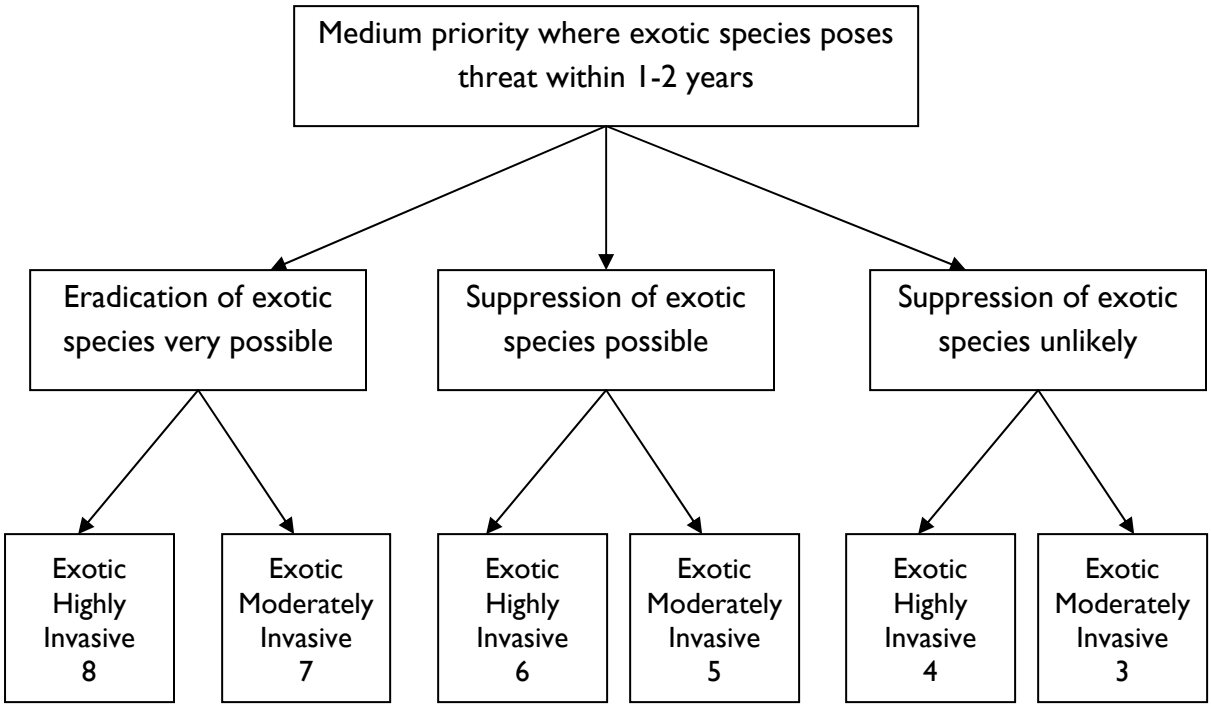
Priority Ranking for Control of Exotic Species:

1-3 = Low priority

4-7 = Medium priority

8-10 = High priority

Figure 2. Flowchart for Medium Priority Degree of Threat to Native Vegetation



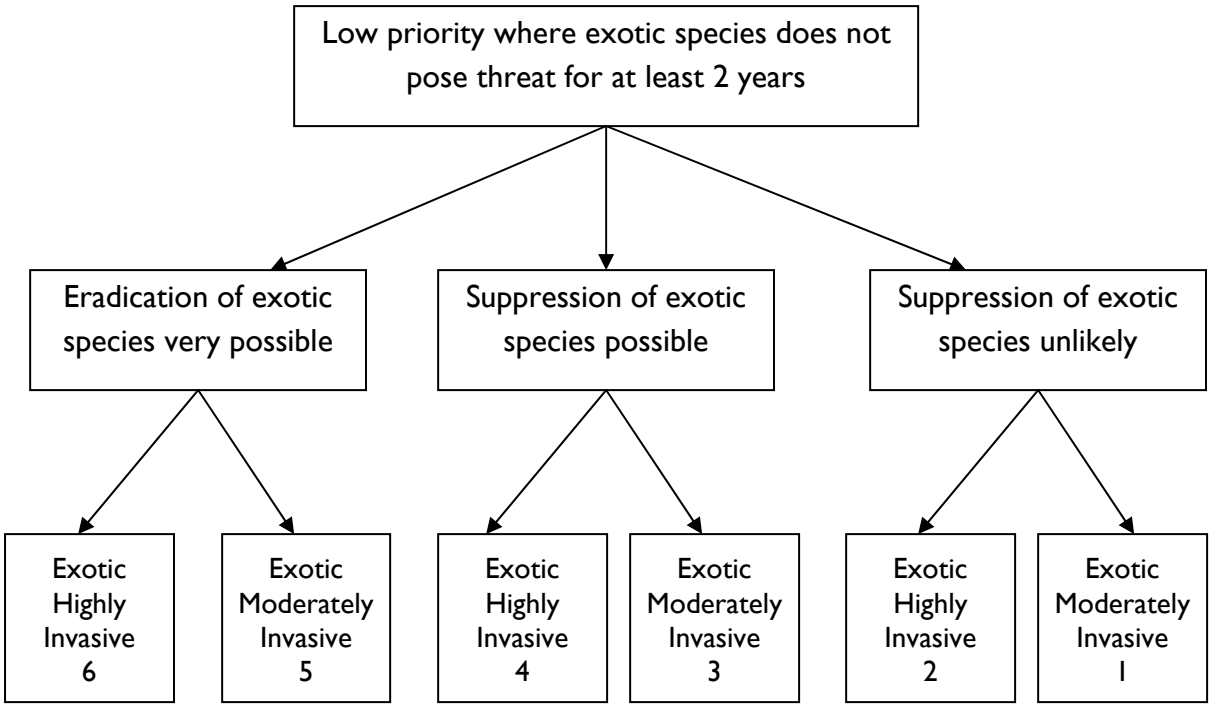
Priority Ranking For Control of Exotic Species:

1-3 = Low priority

4-7 = Medium priority

8-10 = High priority

Figure 3. 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