

**VEGETATION MANAGEMENT PLAN  
FOR THE  
ESCONDIDO CREEK PRESERVE  
COUNTY OF SAN DIEGO  
DEPARTMENT OF PARKS AND RECREATION**

*Prepared for:*

County of San Diego  
Department of Parks and Recreation  
5500 Overland Avenue, Suite 410  
San Diego, California 92123  
Contact: Lorrie Bradley

*Prepared by:*

AECOM  
401 West A Street, Suite 1200  
San Diego, California 92101  
Contact: Michael Anguiano

July 2017



---

# TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
ACRONYMS AND ABBREVIATIONS .....	v
EXECUTIVE SUMMARY .....	vii
1.0 INTRODUCTION .....	1
1.1 Purpose and Need .....	1
1.2 Preserve Location and Description .....	2
1.3 Vegetation Management Goals and Objectives .....	6
2.0 ENVIRONMENTAL RESOURCES .....	9
2.1 Soils .....	9
2.1.1 Cieneba Series .....	9
2.1.2 Exchequer Series .....	10
2.1.3 Escondido Series .....	11
2.1.5 San Miguel Series .....	12
2.2 Biological Resources .....	12
2.2.1 Vegetation Communities .....	12
2.2.2 Sensitive Plant Species .....	13
2.2.3 Sensitive Animal Species .....	26
2.3 Cultural Resources .....	30
3.0 INVASIVE SPECIES MANAGEMENT .....	31
3.1 Target Invasive Nonnative Plant Species .....	43
3.1.1 Silver Wattle .....	45
3.1.2 African Fountaingrass .....	45
3.1.3 Pampas Grass .....	46
3.1.4 Blue-Eye Cape-Marigold .....	47
3.1.5 Eucalyptus .....	47
3.1.6 Fennel .....	48
3.1.7 Treasure Flower .....	48
3.1.8 Natalgrass .....	49
3.1.9 Tree Tobacco .....	49
3.1.10 Castor Bean .....	49
3.1.11 Peruvian Pepper Tree .....	50
3.1.12 Milk Thistle .....	51
3.2 Removal Methods .....	51
3.2.1 Manual Removal .....	51

---

<b><u>Section</u></b>	<b><u>Page</u></b>
3.2.2 Mechanical Removal .....	52
3.2.3 Herbicides .....	52
3.2.4 Cut and Daub .....	53
4.0 HABITAT RESTORATION .....	55
4.1 Proposed Restoration Areas .....	56
4.1.1 Trails .....	56
4.2 Restoration Methods .....	59
5.0 FIRE MANAGEMENT .....	65
5.1 Current Fire Management Practices.....	65
5.2 Fire Environment .....	65
5.2.1 Climate.....	66
5.2.2 Topography .....	68
5.2.3 Watershed Description.....	68
5.2.4 Fire History .....	69
5.2.5 Vegetation Dynamics and Fuel Loads .....	73
5.3 Fuel Management Methods.....	78
5.3.1 Grazing.....	80
5.3.2 Mowing.....	80
5.3.3 Herbicides .....	80
5.3.4 Prescribed Fire .....	80
5.3.5 Hand Tool or Mechanical Equipment Thinning .....	81
5.3.6 Fuel Breaks .....	81
5.4 Fire Response Plan.....	82
5.4.1 Fire Hazard and Current Fire Management Practices Evaluation .....	84
5.4.2 Primary Actions and Contacts for Wildfire Emergency .....	86
5.4.3 Roads/Access .....	87
5.4.4 Fuel Breaks .....	88
5.4.5 Emergency Staging Areas.....	88
5.4.6 Fire Hydrants .....	89
5.4.7 Other Water Sources .....	89
6.0 MANAGEMENT DIRECTIVES .....	91
6.1 Invasive Species Removal .....	91
6.2 Restoration .....	92
6.3 Fire Management .....	93
7.0 REFERENCES .....	101

---

**APPENDICES**

- A Plants Species Detected within the Escondido Creek Preserve
- B Special-Status Plant Species with Potential to Occur within the Escondido Creek Preserve
- C Wildlife Species Detected within the Escondido Creek Preserve
- D Special-Status Wildlife Species with Potential to Occur within the Escondido Creek Preserve
- E Invasive Species with Moderate and Low or No Priority for Removal within the Escondido Creek Preserve
- F Fire Behavior Modeling Results within the Escondido Creek Preserve

**LIST OF FIGURES**

<b><u>Figure</u></b>	<b><u>Page</u></b>
1 Regional Map.....	3
2 Vicinity Map.....	4
3a-1 Vegetation Communities/Habitats (VCM Classification) .....	15
3a-2 Vegetation Communities/Habitats (VCM Classification) .....	16
3b-1 Vegetation Communities/Habitats (Holland/Oberbauer Classification) .....	17
3b-2 Vegetation Communities/Habitats (Holland/Oberbauer Classification) .....	18
4a Special-Status Plant Species Locations .....	23
4b Special-Status Plant Species Locations .....	24
5a Special-Status Wildlife Species Locations .....	27
5b Special-Status Wildlife Species Locations .....	28
6a Invasive Plant Species Locations.....	41
6b Non-native Invasive Weeds Observed.....	42
7a Revegetation Areas .....	57
7b Revegetation Areas .....	58
8 Fire History .....	71
9 Vegetation Management Units .....	79

---

## LIST OF TABLES

<b><u>Table</u></b>		<b><u>Page</u></b>
1	Vegetation Communities and Land Cover Types .....	14
2	Sensitive Plant Species Known to Occur in the Existing Property.....	19
3	Sensitive Wildlife Species Known to Occur in the Escondido Creek Preserve .....	29
4	Cultural Resources Identified within the Preserve.....	30
5	Nonnative Plants Observed on the Preserve and Invasive Status.....	32
6	Priorities for Removal or Management of Nonnative Species .....	43
7	Chaparral Seed Mix .....	60
8	Chaparral Container Plant Species.....	61
9	Coastal Sage Scrub Seed Mix .....	62
10	Coastal Sage Scrub Container Plant Species .....	62
11	Rainfall Data for Escondido 2, California Weather Station (042863).....	67
12	Quantity of Times Burned .....	70
13	Fire Interval Data .....	70
14	Vegetation Communities and Associated Fuel Models for the Preserve.....	73
15	Fuel Management Activities by VMU.....	95

---

## ACRONYMS AND ABBREVIATIONS

AA	Air-tactical Aircraft
AMSL	above mean sea level
APN	Assessor's Parcel Number
ASMD	Area-Specific Management Directives
CAL FIRE	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
DPR	County of San Diego Department of Parks and Recreation
EF/HGFD	Elfin Forest/ Harmony Grove Fire Department
FHSZ	Fire Hazard Severity Zone
mph	miles per hour
MSCP	Multiple Species Conservation Program
Preserve	Escondido Creek Preserve
RMP	Resource Management Plan
SDG&E	San Diego Gas & Electric
VCFPD	Valley Center Fire Protection District
VCM	Vegetation Classification Manual
VHFHSZ	Very High Fire Hazard Severity Zones
VMP	Vegetation Management Plan
VMU	Vegetation Management Unit
WUI	Wildland-Urban Interface

---

This page intentionally left blank.

---

## EXECUTIVE SUMMARY

AECOM conducted an assessment of vegetation, disturbance, rare plants and invasive non-native species and prepared this Vegetation Management Plan (VMP) for the Escondido Creek Preserve (Preserve) to provide the County of San Diego Department of Parks and Recreation (DPR) with management direction of vegetation resources on the Preserve. The three main components of vegetation management for the Preserve are (1) management of invasive species, (2) restoration of impacted or disturbed habitat areas, and (3) addressing the management needs associated with fire and the vegetation on the Preserve.

The Preserve is a 608-acre open space preserve with vegetation that ranges from non-native grassland to coastal sage scrub and chaparral with some limited oak tree presence. It is located west of the City of Escondido, South of the City of San Marcos and east of the City of Encinitas. The majority of the Preserve is covered with high quality vegetation. Six special-status plant species and 36 special-status wildlife species have been documented on the Preserve.

The VMP identifies twelve high priority invasive species of plants to target for removal. Species targeted for removal range from ornamental annuals such as blue-eye cape-marigold (*Dimorphotheca sinuata*), to perennial herbs such as fennel (*Foeniculum vulgare*), shrubs such as castor bean (*Ricinus communis*) and tree tobacco (*Nicotiana glauca*), perennial grasses including pampas grass (*Cortaderia jubata*) and African fountain grass (*Cenchrus setaceus*), to trees including the silver wattle (*Acacia dealbata*) and the red-gum eucalyptus (*Eucalyptus camaldulensis*). Restoration areas identified in the VMP are limited to old abandoned roads and areas affected by fuel breaks and fire roads not necessary for the management of the Preserve. The fire management portion of the VMP discusses the closest fire stations, potential burn rates of the vegetation, and when and where the burns have occurred in the past. Management directives to address fire issues include fire suppression, maintenance of fuel modification zones annually, delineation of fuel modification areas, data sharing, illegal access control, education and outreach, reduction of ignition sources, fuels management, and post fire management and erosion control.

---

This page intentionally left blank.

---

## 1.0 INTRODUCTION

The Escondido Creek Preserve is an approximately 608-acre open space preserve located in northeast San Diego County, owned by the County of San Diego Department of Parks and Recreation (DPR). In 2011, the boundaries of the Escondido Creek Preserve encompassed approximately 346 acres of land. This portion of the Preserve is referred to hereafter as the existing property. Biological and cultural resource surveys were conducted on the existing property in 2010 and 2011, and a vegetation management plan summarizing results and recommendations was completed in 2011 (Dudek 2011a). Between 2013 and 2015, the County of San Diego purchased an additional approximately 262 acres of land, referred to hereafter as the new property. The existing and new properties are collectively referred to as the Preserve. This Vegetation Management Plan (VMP) summarizes the results from the biological and cultural resource surveys, as well as management recommendations for the Preserve.

The Preserve is included in the proposed North County Multiple Species Conservation Program (MSCP) preserve system. DPR will manage the Preserve in accordance with a Resource Management Plan (RMP), including Area-Specific Management Directives (ASMDs), currently being updated to include both the existing and new properties for the Preserve pursuant to the requirements of the MSCP.

The majority of the Preserve supports high-quality native vegetation communities; however, invasive nonnative plants are present in portions of the Preserve, outcompeting native species, and reducing the biological functions and values of these communities. In discrete locations, human disturbance has resulted in unvegetated areas subject to erosion. Over half of the existing property was most recently burned during the 1996 Harmony Fire, while the vast majority of the remaining portions of the existing property burned most recently in 1943 (Dudek 2011a). Much of the vegetation on-site has recovered during the 21-year fire-free period; although effects of the fire remain more visible in some areas. Half of the new property burned in the Cocos Fire of 2014 but it is quickly recovering.

### 1.1 PURPOSE AND NEED

The purpose of this VMP is to provide guidance for the management of the vegetation resources on the Preserve. The three main components of vegetation management for the Preserve are (1) management of invasive species, (2) restoration of impacted or disturbed habitat areas, and (3) addressing the management needs associated with fire and the vegetation on the Preserve. This information is needed to ensure that preserved vegetation on the Preserve is managed to provide habitat for wildlife shelter and breeding, foraging opportunities, and movement corridors.

---

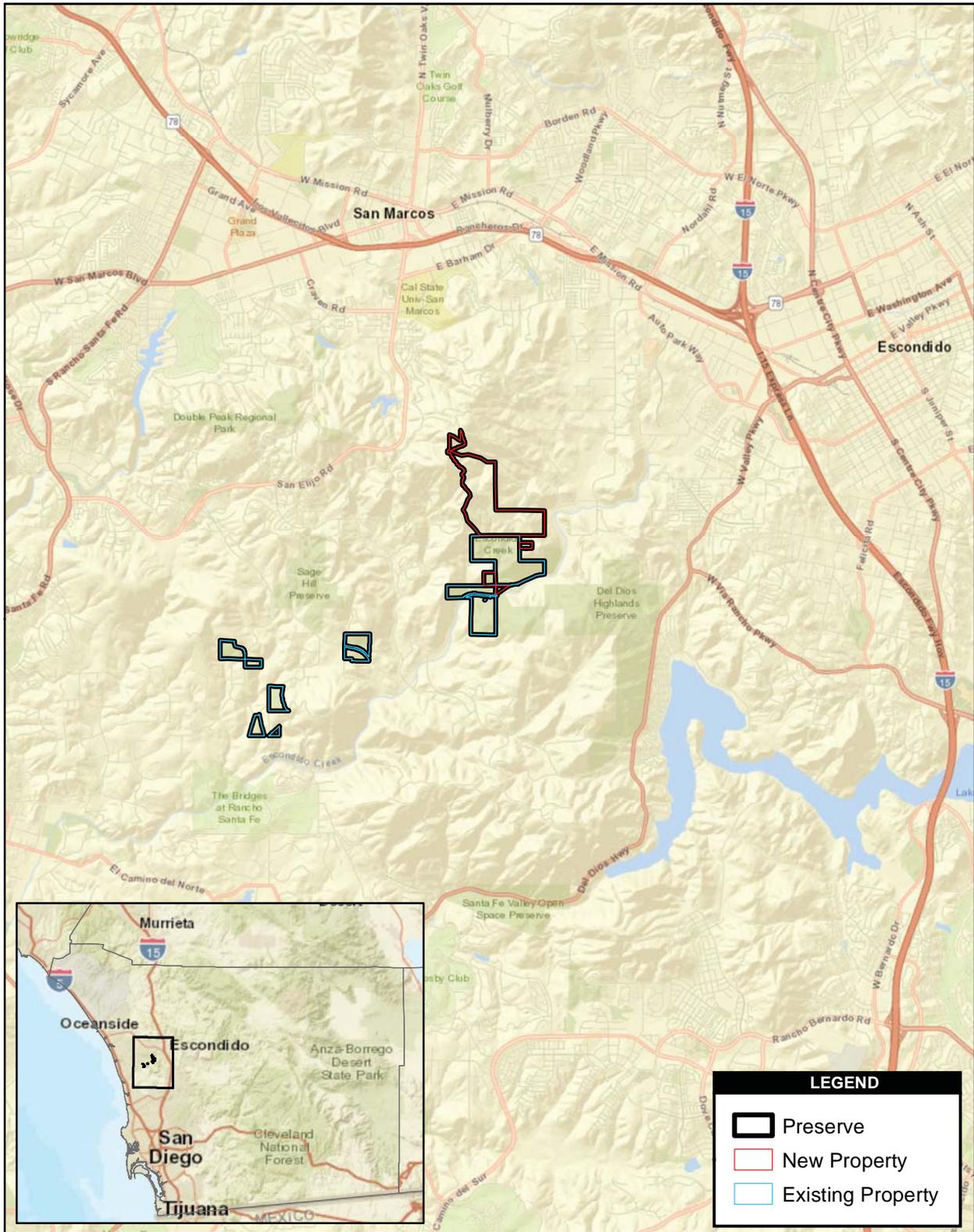
While this VMP is intended to be a standalone document, the information and recommendations presented will be used by DPR to develop ASMDs as part of the RMP that will be updated to include the new property. In addition, the VMP provides fire response personnel with critical Preserve information for emergency fire response within and immediately adjacent to the Preserve boundaries and identifies targeted fuel management actions that can be implemented as preventative measures.

Chapter 3, Invasive Species Management, lists the nonnative invasive plant species observed on the Preserve, identifies and prioritizes target species for removal, and outlines standard removal methods. Chapter 4, Habitat Restoration, identifies potential restoration opportunities within the Preserve and outlines standard restoration methods. Chapter 5, Fire Management, outlines a framework to address wildfire risk and enables environmental documentation of strategic fuels management that may be needed. The framework includes discussion of fire prevention, suppression, and post-suppression fire control activities within and adjacent to the Preserve.

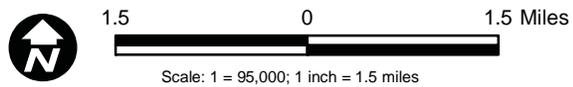
The goals, objectives, and recommendations in this VMP are consistent with the County of San Diego Vegetation Management Report (County of San Diego 2009), which discusses vegetation management factors for wildland and urban areas of unincorporated San Diego County. It is anticipated that this VMP will be revised every 5 years, as needed, in conjunction with anticipated Preserve RMP updates. This VMP may be revised on a shorter timescale if circumstances change; for example, acquisition of additional land or a wildfire event on the Preserve.

## **1.2 PRESERVE LOCATION AND DESCRIPTION**

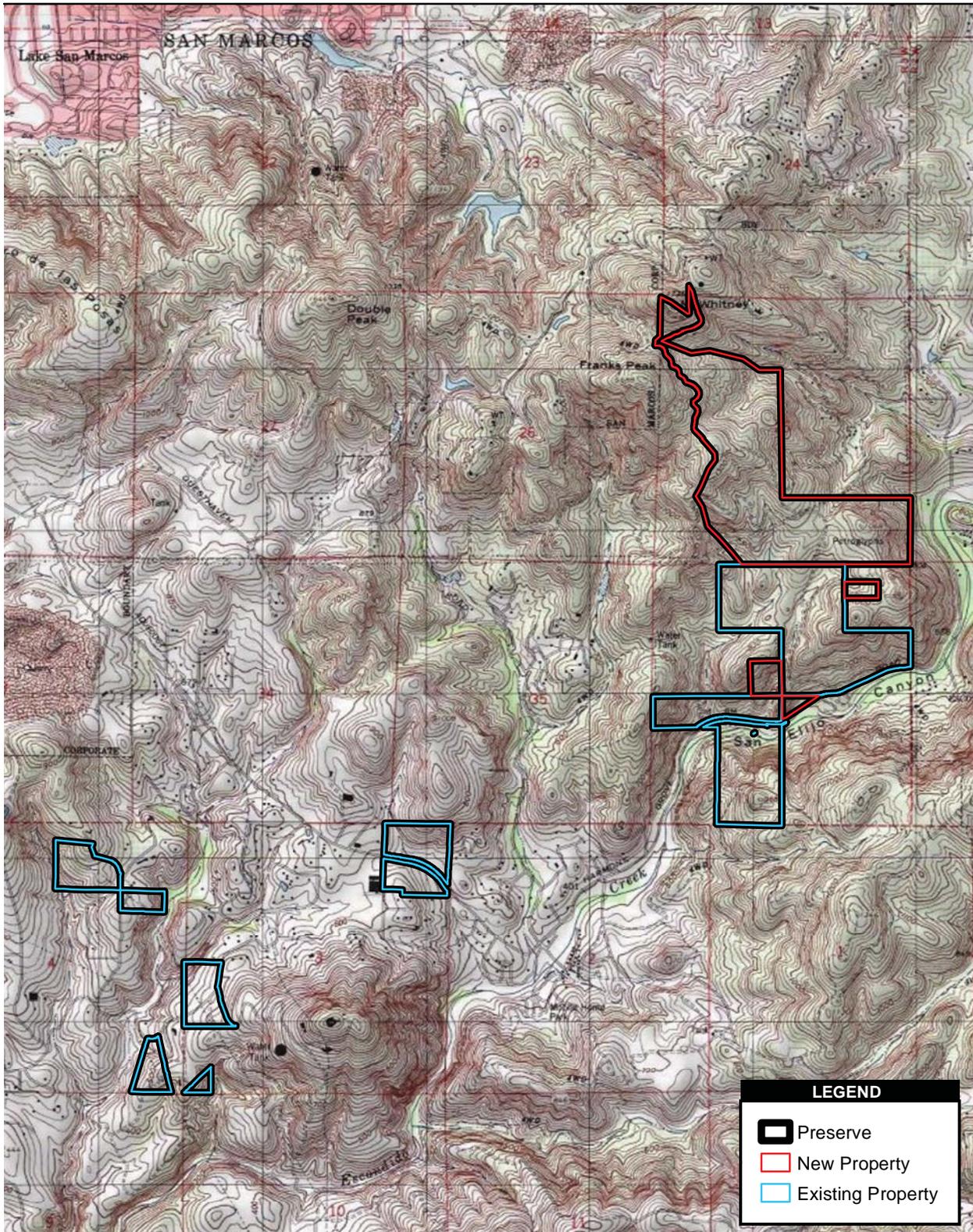
The Preserve is located in the vicinity of Escondido Creek, southwest of Harmony Grove, west of the City of Escondido, south of the City of San Marcos, and east of the City of Encinitas in the Elfin Forest community of unincorporated San Diego County, California (Figure 1). The 346-acre existing property is within the Rancho Santa Fe, California, U.S. Geological Survey 7.5-minute quadrangle and is located in Township 12 South, Range 3 West, Section 36; and Township 13 South, Range 3 West, Sections 3 and 4 (Figure 2).



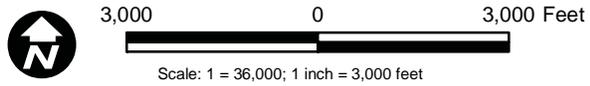
Source: ESRI, AECOM.



**Figure 1**  
**Regional Map**



Source: USGS 7.5' Topographic Quadrangle Valley Center CA 1975



**Figure 2**  
**Vicinity Map**

---

The existing property comprises of 15 Assessor's Parcel Numbers (APNs):

264-031-33	264-032-10	264-042-87	679-140-01	679-140-13
264-031-39	264-041-13	679-130-05	679-140-06	679-140-14
264-031-40	264-041-30	679-130-12	679-140-12	679-140-15

The 15 parcels that compose the existing property are spread throughout the area surrounding Elfin Forest Road and Harmony Grove Road in the vicinity of San Elijo Canyon and the upper tributaries to Escondido Creek (Figure 2). Specifically, these parcels are located along Harmony Grove Road, Elfin Forest Road, Sequest Trail, Canyon de Oro, Paint Mountain Road and Fortuna del Este. The parcels are bordered by low-density, rural residential development, orchards, nurseries, and open space. The eastern parcels are adjacent to Elfin Forest Recreational Reserve to the south and Del Dios Highlands Preserve to the east. The western parcels are located adjacent to open space parcels to the west and south managed by Olivenhain Municipal Water District and the Center for Natural Lands Management. The central parcel is adjacent to rural residential development and commercial nurseries.

The approximately 264-acre new property is located in the west-central portion of the unincorporated area of San Diego County, approximately 2.9 miles west of Interstate 15 (Figure 1). It is generally located northeast of the parcels that make up the existing property. Furthermore, it is southeast and adjacent to the City of San Marcos and approximately 1.5 miles southwest of the City of Escondido, and approximately 1.25 miles northwest of Olivenhain Reservoir. Indian Ridge Road is to the north of the property, Crestwind Drive and Bresa De Loma Drive are to the east of the property, Wild Willow Hollow Road is to the south of the property, and Questhaven Road is approximately 1.1 miles west and off-site of the property (Figure 2). The new property is located in the Rancho Santa Fe Quadrangle and within Range 3 West and Township 12 South the eastern half of Section 25.

The new property is composed of six APNs:

222-130-08	222-130-27	679-130-04
222-130-19	222-130-29	679-140-07

The new property includes Mount Whitney, a 1,738-foot-tall mountain that stands at the northern portion of a northwest-trending ridge system. The majority of the new property lies on the eastern-trending slope of the ridge system with a portion of the south-facing slope in the southern portion of the property. Sparsely placed estate developments exist on the ridge to the north of the property; however, farther east, a limited amount of agriculture and a major urban development

---

exist. Land to the immediate west and south is generally undeveloped and remains in its natural state, covered with various forms of chaparral vegetation. A large part of the new property was burned in the Cocos Fire in 2014 and there are indications that parts of the property may have been scraped or cleared in the past but then recovered to a form of heavy chaparral habitat with little lasting impact.

All the properties within the Preserve are located in the draft North County MSCP Plan area. The Preserve is located in the coastal foothills of the Peninsular Ranges in northern San Diego County and is composed of moderately to steeply sloping terrain ranging in elevation from 440 feet above mean sea level (AMSL) to approximately 1,738 feet ASML on the top of Mount Whitney in the new property. The Preserve is located in the northern portion of a block of largely undeveloped land that is located generally south of San Marcos, west of Escondido, and north of City of San Diego boundaries east of Rancho Santa Fe and includes the Olivenhain Reservoir. The property and surrounding habitat serve as a block of habitat that is located between several highly developed areas that are connected to Escondido Creek, which in turn are connected to other areas of habitat.

The existing property consists primarily of southern mixed chaparral and is classified as a Very High Fire Hazard Severity Zone by the California Department of Forestry and Fire Protection (CAL FIRE 2009). The new property is designated a state responsibility area and lies partially within the service area of the Elfin Forest/Harmony Grove Fire Department (EF/HGFD) and partially in an unserved area between the service areas of the EF/HGFD, the Rancho Santa Fe Fire Protection District, and the Encinitas Fire Department. Service in this area is the responsibility of CAL FIRE, although adjacent fire agencies would likely respond during a wildfire event.

### **1.3 VEGETATION MANAGEMENT GOALS AND OBJECTIVES**

VMPs aim to develop management strategies consistent with the County of San Diego Vegetation Management Report (County of San Diego 2009), which addresses vegetation management criteria for wildland and urban areas of unincorporated San Diego County. To that end, the vegetation management goals for the Preserve are focused on environmental resource preservation and enhancement of existing native habitat. Specifically, the goals of this VMP are as follows:

- Ensure the long-term viability and sustainability of natural ecosystem function and processes.
- Protect the existing biological and cultural resources from disturbance-causing, incompatible activities within and adjacent to the Preserve.

- 
- Manage invasive nonnative plant species to ensure preservation of native vegetation communities and resources.
  - Restore and/or enhance the quality of degraded vegetation communities in a manner consistent with overall species or habitat preservation goals.
  - Develop fuel-load management methods consistent with overall Preserve management goals.

The following objectives have been formulated to achieve these long-term management goals as well as desired levels of resource protection, and public and firefighter safety on the Preserve:

1. Maximize quality of native vegetation communities and habitat for target species through management of invasive nonnative plant species:
  - Identify invasive species and their locations.
  - Investigate and report on control/ removal techniques.
  - Develop management objectives and priorities.
  - Remove or control nonnative species to the maximum extent appropriate.
2. Provide a framework for the restoration of disturbed areas within the Preserve:
  - Identify current and long-term restoration needs for specific vegetation and target species on the Preserve.
  - Identify closed trails, roads, and other areas of potential restoration.
  - Avoid or minimize adverse impacts from restoration activities to sensitive and high-value habitats.
  - Develop management objectives for the restoration areas.
  - Create a process to monitor restoration success and provide follow-up to ensure target restoration goals are achieved.
3. Provide a fire management strategy that will include planning for wildland fires:
  - Provide a description of the fire environment relating to vegetation and land use on the Preserve and in the surroundings.
  - Investigate and report on current fire management practices.

- 
- Prepare Preserve maps depicting relevant fire management data, including Preserve boundaries, topography, vegetation and fuel types, and access.
  - Establish mapped vegetation management units (VMUs) for the Preserve to facilitate fire management utilizing vegetation, topography, or other clearly discernible landscape features to delineate the unit boundaries.
  - Identify wildland–urban interface (WUI) areas and associated fuel management goals with a dual role of preventing wildfire from impacting urban areas, as well as protecting Preserve lands from fire originating in urban areas.
  - Develop management objectives through a fire response plan.
  - Provide a discussion of fire management methods such as grazing, mowing, herbicide application, and prescribed fire to reduce available fuel and invasive nonnative plants in a manner consistent with the goals for habitat preservation, enhancement, and restoration, and for cultural resource protection.
  - Prepare fire restoration management guidelines for each VMU, including discussion of prevention, suppression, and post-suppression activities.
  - Provide local fire agencies, including the CAL FIRE San Diego Unit, the Rancho Santa Fe Fire Protection District, and the San Marcos Fire Department, maps of sensitive biological and cultural resources to be avoided to the maximum extent possible.
  - Provide Preserve information about fire behavior to local fire agencies, for inclusion in wildland pre-response plans.
  - Provide appropriate contact information to responding fire personnel in the event fire management activities may affect priority resources.
  - Minimize likelihood of Preserve-wide catastrophic wildfires by limiting ignition potential, reducing fuel loads in key areas, limiting illegal access, and increasing public awareness.

---

## 2.0 ENVIRONMENTAL RESOURCES

Baseline biological and cultural resources surveys of the existing property were conducted by Dudek between August 2010 and April 2011 (Dudek 2011b). Biological field studies between August 2010 and April 2011 included vegetation mapping (including mapping invasive nonnative plants), rare plant surveys, butterfly surveys, pitfall arrays, aquatic amphibian surveys, avian point counts, bat surveys, small mammal trapping, and tracking and camera stations.

Baseline biological and cultural resources surveys of the new property were conducted by AECOM in 2015 and 2016 (AECOM 2015, 2016). Biological field studies in 2015 and 2016 included vegetation communities mapping, rare plant surveys, invasive nonnative plant species mapping, butterfly surveys and habitat assessment for Quino checkerspot (*Euphydryas editha quino*) and Hermes copper (*Lycaena hermes*) butterflies, herpetological drift fence surveys, diurnal and nocturnal avian point count surveys, active and passive bat surveys, small mammal trapping, and large and medium mammal surveys using remote camera stations.

Brief descriptions of the existing vegetation communities, sensitive plant and wildlife species, and cultural resources documented within the Preserve during the baseline surveys are provided in the following sections.

### 2.1 SOILS

The Preserve contains nine soil types belonging to five soil series. The soils mapped for the Preserve are derived from metamorphosed volcanic rock, sedimentary rock, and granitic-base rock. Metamorphosed volcanic rock, or metavolcanic rock, is known to support sensitive species of plants, including several that might be expected on the Preserve. A brief description of each soil series and the associated soil types that occur in the Preserve is provided below.

#### 2.1.1 Cieneba Series

The Cieneba series consists of excessively drained, very shallow to shallow coarse sandy loams that form in material weathered in place from granitic rock. The topsoil layer is a brown coarse sandy loam about 10 inches deep over weathered granodiorite. Cieneba soils exhibit rapid to very rapid runoff with a high to very high erosion hazard (Bowman 1973). Two soil types within this series occur on the Preserve: Cieneba-Fallbrook rocky sandy loams 9 to 30% slopes and Cieneba-Fallbrook rocky sandy loams 30 to 65% slopes.

---

According to Bowman 1973, Cieneba-Fallbrook is about 55% Cieneba coarse sandy loam and 40% Fallbrook sandy loam. Cieneba coarse sandy loam is low in fertility, is excessively drained, is moderately rapidly permeable, and has 1 inch to 1.5 inches of water availability. Fallbrook sandy loam is medium in fertility, is well drained, is slowly to moderately permeable in the subsoil, and has 3 to 5 inches of water available. Water holding capacity, permeability, and runoff are similar for both the Cieneba-Fallbrook rocky sandy loams 9 to 30% slopes and 30 to 65% slopes with runoff being somewhat less since the slopes are not as steep.

Cieneba-Fallbrook rocky sandy loams (9%–30% slopes, eroded) occupy the entire eastern portion of the existing property. Cieneba-Fallbrook rocky sandy loams (30%–65% slopes, eroded) occupy the northeastern corner of the central parcel in the existing property.

Cieneba-Fallbrook soils make up roughly 15% of the soils on the new property, with roughly 10% of the new property covered with the soil type Cieneba-Fallbrook rocky sandy loam, 30 to 65% slopes, eroded. Rock outcrops cover about 10% of the surface and large boulders cover about 10%. The other soil type in the Cieneba series that occurs on the new property includes the Cieneba-Fallbrook rocky sandy loams 9 to 30% slopes, eroded. Rock outcrops cover about 5% of the surface and large boulders cover about 10%.

### **2.1.2 Exchequer Series**

Exchequer series soils are well-drained, shallow to very shallow silt loams formed in material weathered from hard metabasic rock. The topsoil layer is yellowish-red, slightly acid silt loam about 10 inches deep over hard metabasic rock. Two soil types within this series occur on the Preserve: Exchequer rocky silt loam (30%–70% slopes) and Exchequer rocky silt loam (9%–30% slopes). Exchequer rocky silt loam, 30 to 70% slopes is steep to very steep soil on mountainous uplands consisting of shallow and very shallow, well-drained silt loams that formed on material weathered from hard metabasic rock (metavolcanic rock). Exchequer rocky silt loam (9%–30% slopes) soil is only 10 inches deep. Fertility is very low, permeability is moderate, and water holding capacity is 1 to 2 inches. Runoff is rapid to very rapid and erosion hazard high to very high. Exchequer rocky silt loam, 9 to 30% slopes is sloping to moderately steep, and is 8 to 17 inches deep over rock. Runoff is medium to rapid, and erosion hazard is moderate to high.

In the existing property, rock outcrop covers about 10% of the surface. Exchequer rocky silt loam (30%–70% slopes) and Exchequer rocky silt loam (9%–30% slopes) occupy much of the western parcels on the existing property. Exchequer series make up roughly 85% of the soils on the new property, with roughly 55% of the new property covered with the soil type Exchequer

---

rocky silt loam, 30 to 70% slopes. The other 30% of the new property is covered by the soil type Exchequer silt loam, 9 to 30% slopes.

### **2.1.3 Escondido Series**

Escondido series soils are well-drained, moderately deep to deep very fine sandy loams formed in material weathered from metamorphosed sandstone. The topsoil layer is dark brown, slightly acid very fine sandy loam about 6 inches deep over neutral very fine sandy loam. Escondido series soils consist of moderately deep to deep, well-drained very fine sandy loams that formed in material weathered in place from metamorphosed sandstone. Two soil types within this series occur on the Preserve: Escondido very fine sandy loam (5%–9% slopes) and Escondido very fine sandy loam (9%–15% slopes).

The soil type Escondido very fine sandy loam eroded consists of various forms of very fine sandy loam to 29 inches over fractured, hard, metasedimentary rock. Fertility is medium, permeability is moderate, and water holding capacity is 3 to 5.5 inches. Runoff is medium and erosion hazard is moderate.

Escondido very fine sandy loam (5%–9% slopes) occurs in the northwestern portion of the central parcel on the existing property. The Escondido soil series also constitutes a small area, roughly a quarter of an acre, in the northeast corner of the eastern lobe of the new property.

### **2.1.4 Huerhuero Series**

Huerhuero series soils are moderately well-drained loams that derived from sandy marine sediments. The topsoil is strongly acid (pH 5.3) pale-, yellowish-, grayish- or strong-brown in color and sandy-loam to loam in texture, and from 5 to 30 inches thick. Below this is an alkaline pan of clay or heavy clay loam. The subsoil extends 68 inches deep, grading into a sandy loam texture. Huerhuero soils support tarweeds and annual grasses and forbs. Due to the clay subsoil, Huerhuero loams may support special-status plant species that require or prefer clay soils, such as Blochman's dudleya (*Dudleya blochmaniae* spp. *blochmaniae*) and long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), among others (Dudek 2011b). Huerhuero loam (5–9% slopes, eroded) occurs along Elfin Forest Road in the central parcel of the existing property and supports. This soil type is not present within the new property.

---

### 2.1.5 San Miguel Series

San Miguel series soils are well-drained, shallow to moderately deep silt loams with clay subsoil that are derived from metavolcanic rock. San Miguel soils also form a complex with Exchequer soil series. Exchequer series soils are well-drained, shallow silt loams derived from weathered hard metabasic (metamorphosed basalt), or mafic, rock. Both soils have medium to rapid runoff, and a moderate to high erosion potential. The San Miguel silt loam has slow permeability, and the Exchequer has moderate permeability. Fertility is very low for both soil types. The soil profile pH ranges from strongly acid to slightly acid (5.0–6.5) (Bowman 1973). As a metavolcanic soil, San Miguel series soils may support special-status plant species that require this unique soil type, such as San Miguel savory (*Satureja chandleri*) (Dudek 2011b). San Miguel rocky silt loam (9%–30% slopes) and San Miguel-Exchequer rocky silt loams (9%–70% slopes) occur within the central parcel of the existing property, as well as within portions of the western parcels. This soil type is not present within the new property

## 2.2 BIOLOGICAL RESOURCES

### 2.2.1 Vegetation Communities

Vegetation mapping was conducted for the existing and new properties by AECOM in July 2015. Vegetation community classification for the existing and new property was based on two separate systems: the Vegetation Classification Manual (VCM) (Sproul et al. 2011) and the Holland classification system (Holland 1986 as modified by Oberbauer et al. 2008). The vegetation mapping was conducted according to the VCM and then cross-walked to the Holland/Oberbauer classification system.

The predominant vegetation communities within the Preserve are shrublands consisting of *Adenostoma fasciculatum* - (*Eriogonum fasciculatum*, *Artemisia californica*, *Salvia mellifera*) Association (Chamise - California Buckwheat - California Sagebrush - Black Sage Association), *Adenostoma fasciculatum*-*Xylococcus bicolor*-*Ceanothus tomentosus* Association (Chamise/Mission Manzanita-Ramona Ceanothus Association), *Adenostoma fasciculatum*-*Xylococcus bicolor*-*Ceanothus verrucosus* Association (Chamise-Mission manzanita-Wart-stem Ceanothus Association), *Artemisia californica*-*Eriogonum fasciculatum*-*Malosma laurina* Association (California Sagebrush - Laurel Sumac Association), and *Ceanothus verrucosus* Association (Wart-stem Ceanothus Association).

---

In addition, six other plant alliances, associations, or semi-natural stands and four other cover types were mapped within the Preserve (Table 1). Vegetation communities according to the VCM and Holland/Oberbauer classification system are included as Figures 3a and 3b, respectively.

### **2.2.2 Sensitive Plant Species**

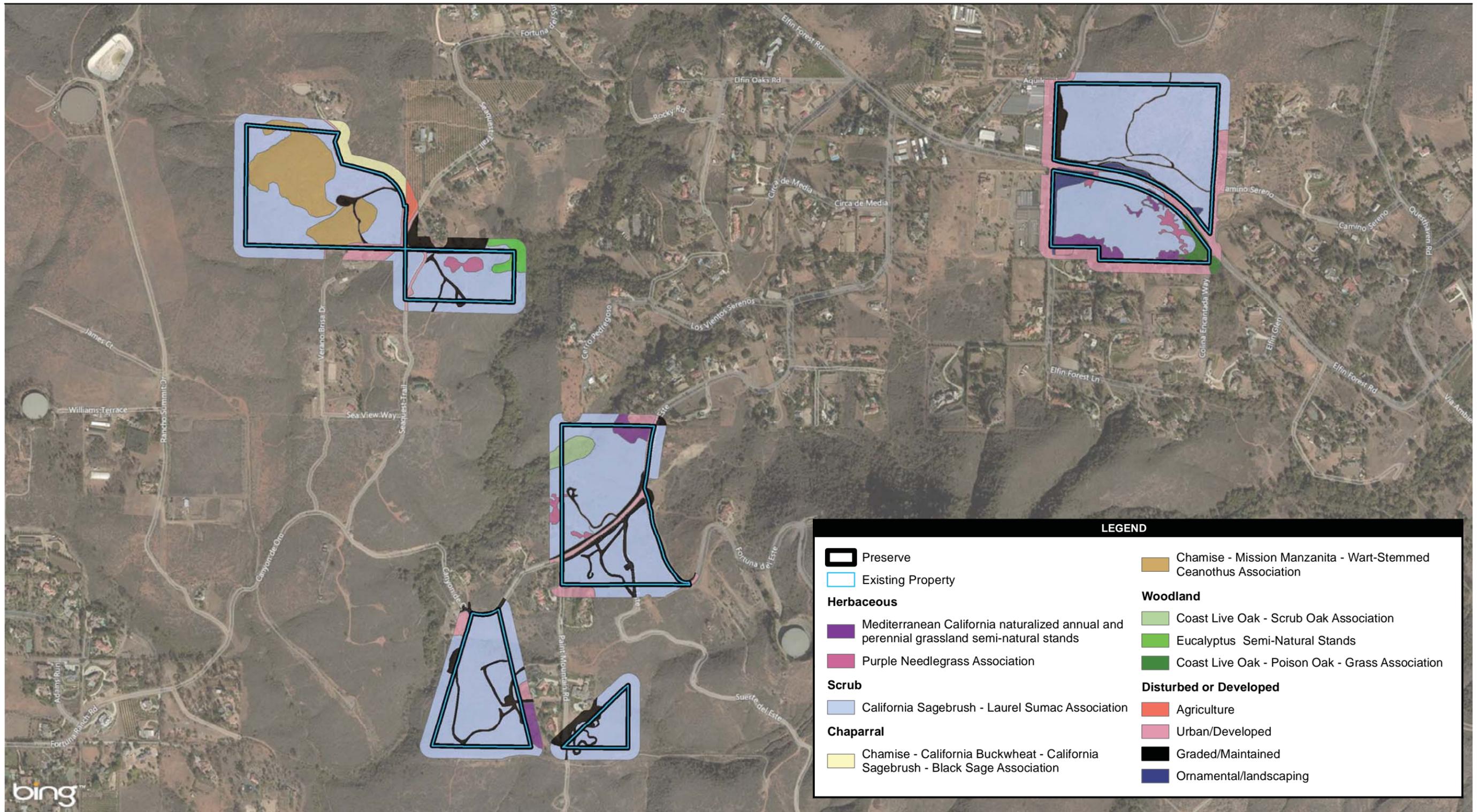
The Preserve has been surveyed extensively for rare plants that may be expected, particularly considering that the soil is derived from metavolcanic rock, a substrate that has been shown to support rare plant species. Rare plant surveys were conducted on the existing property in August 2010 and April 2011, and on the new property in July 2015 and April and October of 2016.

Six special-status plant species were documented within the existing property and are identified below in Table 2 (Dudek 2011a). Sensitive plant species locations are presented in Figure 4. A comprehensive list of plant species detected within the Preserve is included in Appendix A. A table of the special-status plant species with potential to occur on the Preserve is included in Appendix B.

**Table 1. Vegetation Communities and Land Cover Types**

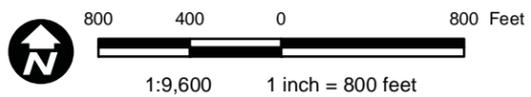
VCM Alliance/Association	VCM Common Name	Holland Classification	Acres <sup>1</sup>
<b>Herbaceous</b>			13.68
Mediterranean California naturalized annual and perennial grassland semi-natural stands	Mediterranean California naturalized annual and perennial grassland semi-natural stands	Non-Native Grassland	12.17
<i>Stipa pulchra</i> Association	Purple Needlegrass Association	Native Grassland	1.51
<b>Shrublands</b>			555.03
<i>Adenostoma fasciculatum</i> - ( <i>Eriogonum fasciculatum</i> , <i>Artemisia californica</i> , <i>Salvia mellifera</i> ) Association	Chamise - California Buckwheat – California Sagebrush – Black Sage Association	Coastal Sage Chaparral Transition	46.85
<i>Adenostoma fasciculatum</i> - <i>Xylococcus bicolor</i> - <i>Ceanothus tomentosus</i> Association	Chamise - Mission Manzanita – Ramona Ceanothus Association	Southern Mixed Chaparral	118.87
<i>Adenostoma fasciculatum</i> - <i>Xylococcus bicolor</i> - <i>Ceanothus verrucosus</i> Association	Chamise- Mission Manzanita – Wart-Stemmed Ceanothus Association	Southern Maritime Chaparral	175.73
<i>Artemisia californica</i> - <i>Eriogonum fasciculatum</i> - <i>Malosma laurina</i> Association	California Sagebrush - Laurel Sumac Association	Diegan Coastal Sage Scrub	97.63
<i>Ceanothus verrucosus</i> Association	Wart-Stemmed Ceanothus Association	Southern Maritime Chaparral	115.94
<b>Riparian</b>			9.17
<i>Platanus racemosa</i> - <i>Quercus agrifolia</i> Association	Sycamore - Coast Live Oak Association	Southern Riparian Woodland	0.91
<i>Quercus agrifolia</i> <i>Toxicodendron diversilobum</i> Grass Association	Coast Live Oak-Poison Oak-Grass Association	Southern Coast Live Oak Riparian Forest	6.35
<i>Salix lasiolepis</i> Association	Black Willow Association	Southern Willow Scrub	1.91
<b>Woodlands</b>			3.30
<i>Eucalyptus (globulus, camaldulensis)</i> Semi-Natural Stands	Eucalyptus-Semi Natural Stands	Eucalyptus Woodland	1.42
<i>Quercus agrifolia</i> / <i>Quercus (berberidifolia, acutidens)</i> Association	Coast Live Oak/Scrub Oak Association	Coast Live Oak Woodland	1.79
<i>Quercus agrifolia</i> <i>Toxicodendron diversilobum</i> Grass Association	Coast Live Oak/Poison Oak/Grass Association	Open Coast Live Oak Woodland	0.08
<b>Other Cover Types</b>			26.95
Agriculture	Agriculture	Orchard	0.65
Urban/Developed	Urban-Developed	Developed Land	6.42
Graded / Maintained	Graded - Maintained	Disturbed Habitat	17.56
Ornamental / Landscaping	Ornamental - Landscaping	Non-Native Vegetation	2.32
<b>Total</b>			<b>608.14</b>

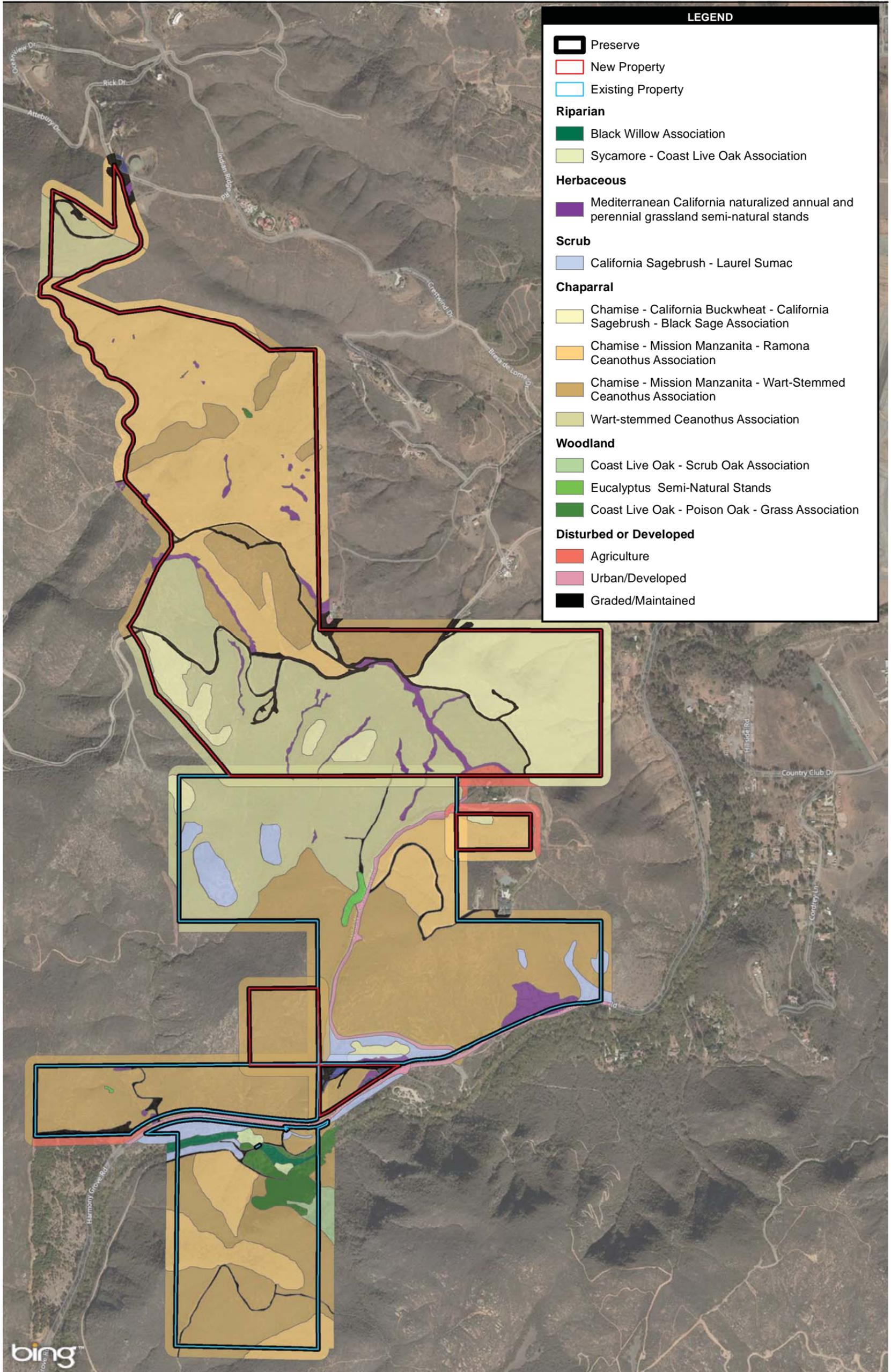
<sup>1</sup> Numbers may not sum due to rounding after summation.



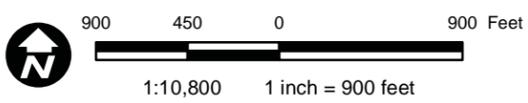
**Figure 3a-1**  
**Vegetation Communities/Habitats**  
**(VCM Classification)**

Source: ESRI; AECOM.

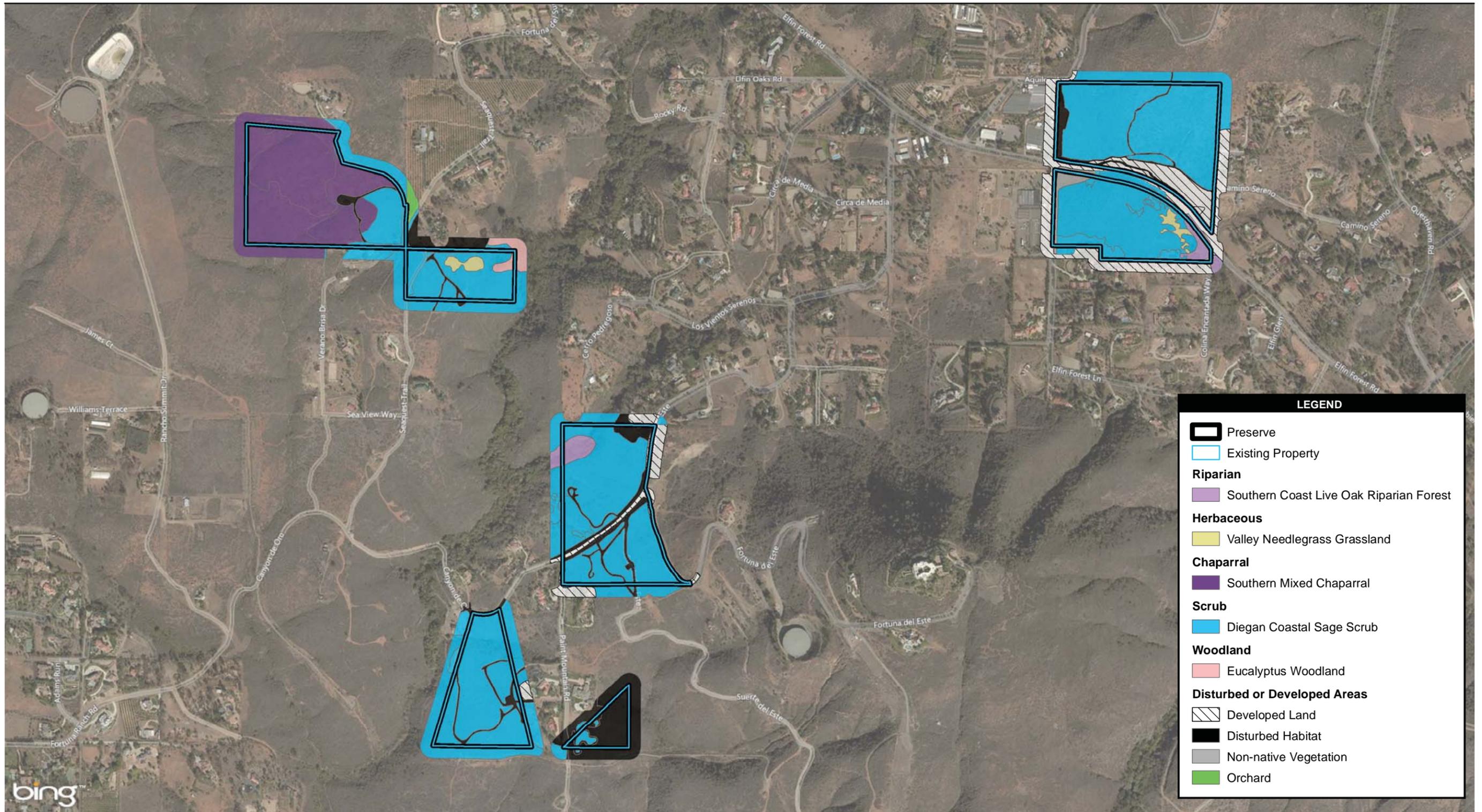




Source: ESRI; AECOM.

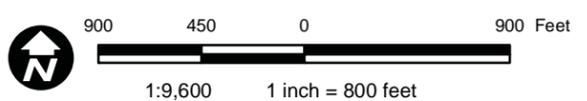


**Figure 3a-2**  
**Vegetation Communities/Habitats**  
**(VCM Classification)**

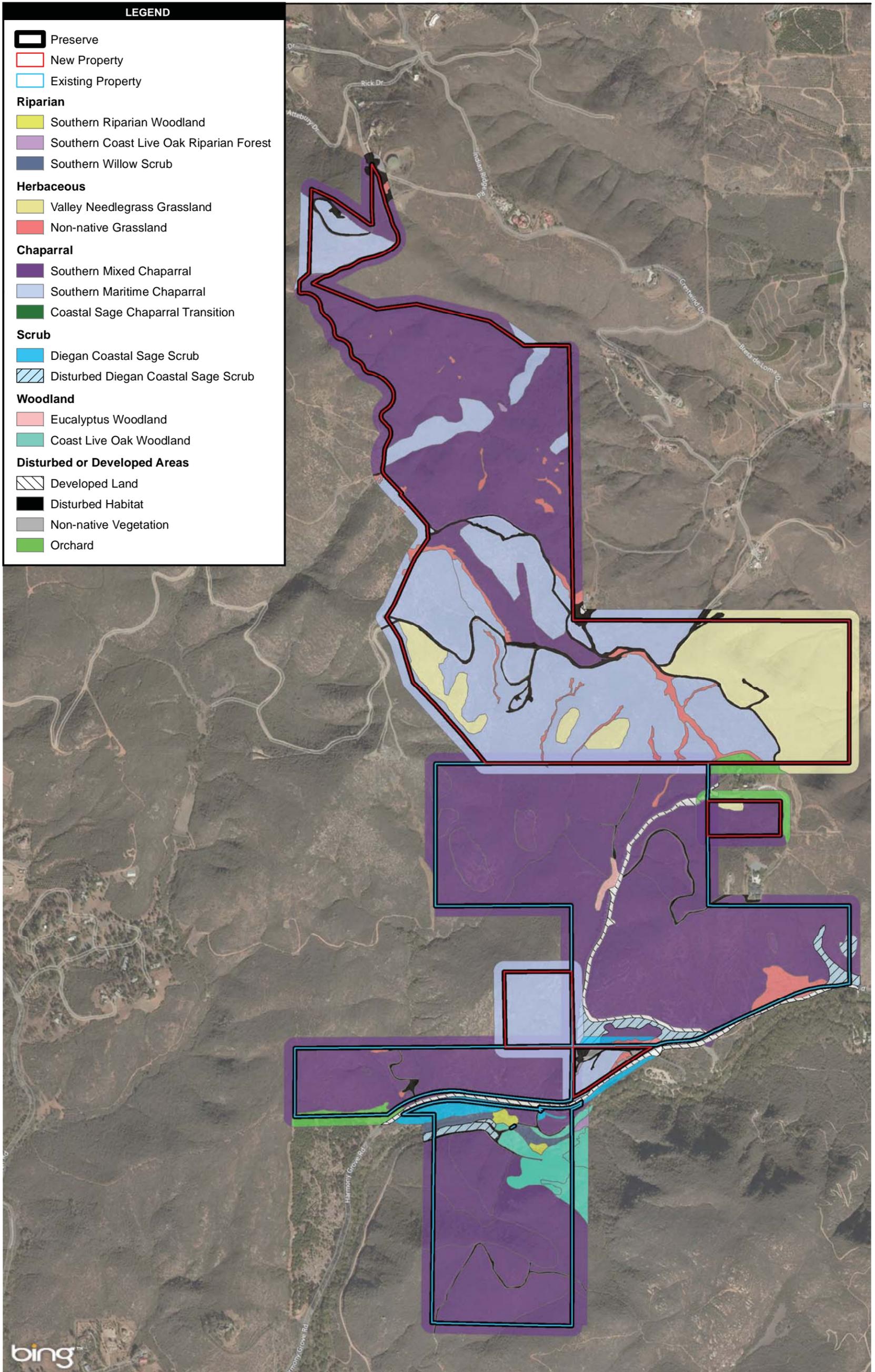


LEGEND	
	Preserve
	Existing Property
<b>Riparian</b>	
	Southern Coast Live Oak Riparian Forest
<b>Herbaceous</b>	
	Valley Needlegrass Grassland
<b>Chaparral</b>	
	Southern Mixed Chaparral
<b>Scrub</b>	
	Diegan Coastal Sage Scrub
<b>Woodland</b>	
	Eucalyptus Woodland
<b>Disturbed or Developed Areas</b>	
	Developed Land
	Disturbed Habitat
	Non-native Vegetation
	Orchard

Source: ESRI; AECOM.



**Figure 3b-1**  
**Vegetation Communities/Habitats**  
**(Holland/Oberbauer Classification)**



**Figure 3b-2**  
**Vegetation Communities/Habitats**  
**(Holland/Oberbauer Classification)**

**Table 2. Sensitive Plant Species Known to Occur in the Existing Property**

Common Name	Scientific Name	Status <sup>1</sup>
San Diego (Palmer's) sagewort	<i>Artemisia palmeri</i>	CNPS List 4.2, County List D
Wart-stemmed ceanothus	<i>Ceanothus verrucosus</i>	CNPS List 2.2, County List B, Proposed Watch List
San Diego marsh-elder	<i>Iva hayesiana</i>	CNPS List 2.2, County List B
Southwestern spiny rush	<i>Juncus acutus</i> var. <i>leopoldii</i>	CNPS List 4.2, County List D
San Diego Goldenstar	<i>Muilla clevelandii</i>	CNPS List 1B.1, County List A
Ashy spike-moss	<i>Selaginella cinerascens</i>	CNPS List 4.1, County List D

<sup>1</sup>California Rare Plant Rank (CRPR) is used by the California Native Plant Society to classify plants on a scale of concern –

1B: Plants rare, threatened, or endangered in California and elsewhere

2: Plants rare, threatened, or endangered in California, but more common elsewhere

3: Plants more information is needed – a review list

4: Plants of limited distribution – a watch list

Threat Ranks –

0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

On the new property, the only plant observed that is considered sensitive was wart-stemmed ceanothus (*Ceanothus verrucosus*). It is one of the dominant members of the vegetation on the property. Two species were detected that were formerly considered sensitive but have since been rejected because they are less restricted. They are golden ear drops (*Ehrendorferia chrysantha* [formerly *Dicentra*]), found along the southeastern boundaries of the property, and fire poppy (*Papaver californicum*), found in scattered locations in the central portion of the property.

The precipitation in the 2014–2015 rainfall season, during which the new property was surveyed, was 9.39 inches or 62% of normal for Escondido (Weather Collector 2017). However, the rain that did fall provided for many annual plants to germinate and flower early in the season. Overall, plant growth during the spring of 2015 was not substantial and the earliest that surveys could have been performed that year was in July, after the majority of the plants, especially annuals, had declined. A great deal of anticipation for a potentially significant El Nino rainfall season existed in the end of 2015 and early 2016. However, the significant rains, except for one storm in January, did not materialize, and February, the month when some of the most important plant growth normally occurs due to rainfall, was warm and dry.

While it was a lower than normal rainfall season, during the season of 2015-2016, Escondido received 12.5 inches or 83% of normal (Weather Collector 2017), an adequate exhibition of the native annual plants was displayed for an understanding of the location and numbers of any sensitive annual or herbaceous species that are likely to occur there. The perennial shrubs and trees were also detectable because their visibility is less dependent upon level of seasonal rainfall though many are still in the process of recovery from fire in 2014. The rainfall for the season that

---

the existing property was surveyed 2010-2011 was above normal and would not have posed a constraint for plant surveys.

The following rare plants were considered to have a high potential to occur on the Preserve or were found:

**San Diego (Palmer's) Sagewort (*Artemisia palmeri*) – Detected on Existing Property**  
CNPS List 4.2, County List D

San Diego sagewort (also known as Palmer's sagewort) is an aromatic herb typically located in perennial creeks and drainages near the coast (Reiser 1994). In California, San Diego sagewort is found only in San Diego County (CNPS 2010). This species is found in a wide range of habitat types including chaparral, coastal scrub, riparian forest, riparian scrub, and riparian woodland in sandy, mesic conditions between 50 and 3,000 feet in elevation (CNPS 2010). San Diego sagewort is most often found in a riparian context. San Diego sagewort grows within a shaded understory beneath willow, sycamore, or cottonwood canopy. Occasionally it also is present beneath Coast live oak (*Quercus agrifolia*) canopy, but in decidedly mesic circumstances (Reiser 1994). On the existing property, several large populations (hundreds of individuals) of San Diego sagewort, as well as scattered individuals of San Diego sagewort, were observed along Escondido Creek and its tributaries north and south of Harmony Grove Road. In addition, approximately 30 individuals occur south of Canyon de Oro Road.

**Encinitas Baccharis (*Baccharis vanessae*) – Not Detected, High Potential to Occur on New and Existing Properties**

USFWS: Threatened, California Department of Fish and Wildlife (CDFW): Endangered, CRPR: List 1B.1, County List A

Encinitas baccharis is a perennial deciduous shrub in the aster family (*Asteraceae*), with slightly sticky leaves. It bears staminate and pistillate flowers on separate plants in August through November (CNPS 2010; Dudek 2011b). Encinitas baccharis is endemic to San Diego County and occurs from 197 to 2,362 feet AMSL (CNPS 2010). This species occurs in maritime chaparral, mixed chaparral, and cismontane woodland (CNPS 2010). This species is threatened by development and recreation (CNPS 2010). Encinitas baccharis was previously observed within the adjacent Del Dios Highlands Preserve (TAIC 2008) and may occur within the eastern parcels of the existing property. It has potential to occur in the chaparral habitat within the eastern portion of the new property. It is found elsewhere in San Diego County on soils derived from Santiago Peak Metavolcanic rock, the same rock that exists on the new property. Although suitable habitat for this species exists on the Preserve, it was not found.

---

**Orcutt's Brodiaea (*Brodiaea orcuttii*) – Not Detected, High Potential to Occur on Existing Property**

CNPS List 1B.1, County List A, North County MSCP Covered Species

Orcutt's brodiaea is a perennial in the lily family (*Liliaceae*), with cylindric leaves. It bears six violet lobes in two petal-like whorls (Dudek 2011b) in May through July (CNPS 2010). Orcutt's brodiaea occurs in Riverside and San Diego counties between 98 and 5,551 feet AMSL (CNPS 2010). This species occurs in a variety of habitats, including closed-cone coniferous forest, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and mesic vernal pools with clay soils (CNPS 2010). This species is only detected during or just after its blooming period and, given its relatively wide range of potential sites in vernal moist montane and coastal locales, areas with Orcutt's brodiaea may unknowingly be developed (Reiser 1994). Orcutt's brodiaea has a high potential to occur on the existing property since it is recorded within 1 mile of the property and suitable habitat is present on-site.

**Brewer's Calandrinia (*Calandrinia breweri*) – High Potential to Occur on Existing Property**

CNPS List 4, County List D

In California, Brewer's calandrinia is found in San Diego, Los Angeles, San Bernardino, Contra Costa, Mendocino, Monterey, Mariposa, Marin, Napa, Santa Barbara, Santa Clara, Santa Cruz, San Luis Obispo, San Mateo, Sonoma, and Ventura counties (Reiser 1994). The species is a fire-follower and is typically reported in areas of recently burned chaparral and coastal sage scrub (Reiser 1994) on sandy or loamy soils (CNPS 2010). Brewer's calandrinia is apparently rare in Southern California and its populations are presumed to be declining due to loss of habitat along the coast (Reiser 1994). This species was previously observed within the adjacent Del Dios Highlands Preserve (TAIC 2008) and may occur in the southern mixed chaparral and coastal sage scrub within the eastern parcels of the existing property. It was not found on the burned portions of the new property.

**Wart-stemmed Ceanothus (*Ceanothus verrucosus*) – Detected on New and Existing Properties**

CNPS List 2.2, County List B

Wart-stemmed ceanothus is a perennial evergreen shrub in the buckthorn family (*Rhamnaceae*) that grows up to 10 feet tall. It bears white flower clusters in December through May. Wart-stemmed ceanothus occurs in San Diego and Riverside counties and Baja California, Mexico. This species occurs in chaparral below 1,247 feet AMSL (CNPS 2010). Wart-stemmed ceanothus is declining locally on the margins of San Diego's coastal cities as a result of urban sprawl (Reiser 1994).

---

Wart-stemmed ceanothus was noted throughout much of the existing and new properties as a common component of southern mixed chaparral (Figure 4). The population on the Preserve is relatively large and substantial in size, representing an important occurrence for the species in the region. Associated plant species include chamise, black sage, and Ramona-lilac.

**Summer Holly (*Comarostaphylis diversifolia* ssp. *diversifolia*) – High Potential to Occur on the Existing Property**

CNPS List 1B.2, County List A

Summer holly is a large, showy, perennial shrub found in chaparral and cismontane woodland habitats between 100–1,800 feet in elevation (Reiser 1994; CNPS 2010). This species is usually found in southern mixed chaparral on mesic north-facing slopes (Reiser 1994) and is known from records in San Diego, Riverside, and Orange counties and Baja California, Mexico (Reiser 1994). Summer holly is declining throughout its U.S. range where the species is threatened by residential development (Reiser 1994). This species was previously observed within the adjacent Del Dios Highlands Preserve (TAIC 2008) and may occur in the chaparral and cismontane woodland habitat within the eastern parcels of the existing property. Within the new property, there were shrubs that were resprouting following the Cocos Fire that could be this species but a conclusion was not possible because of the early stages of regrowth.

**Sticky Dudleya (*Dudleya viscida*) – High Potential to Occur on Existing Property**

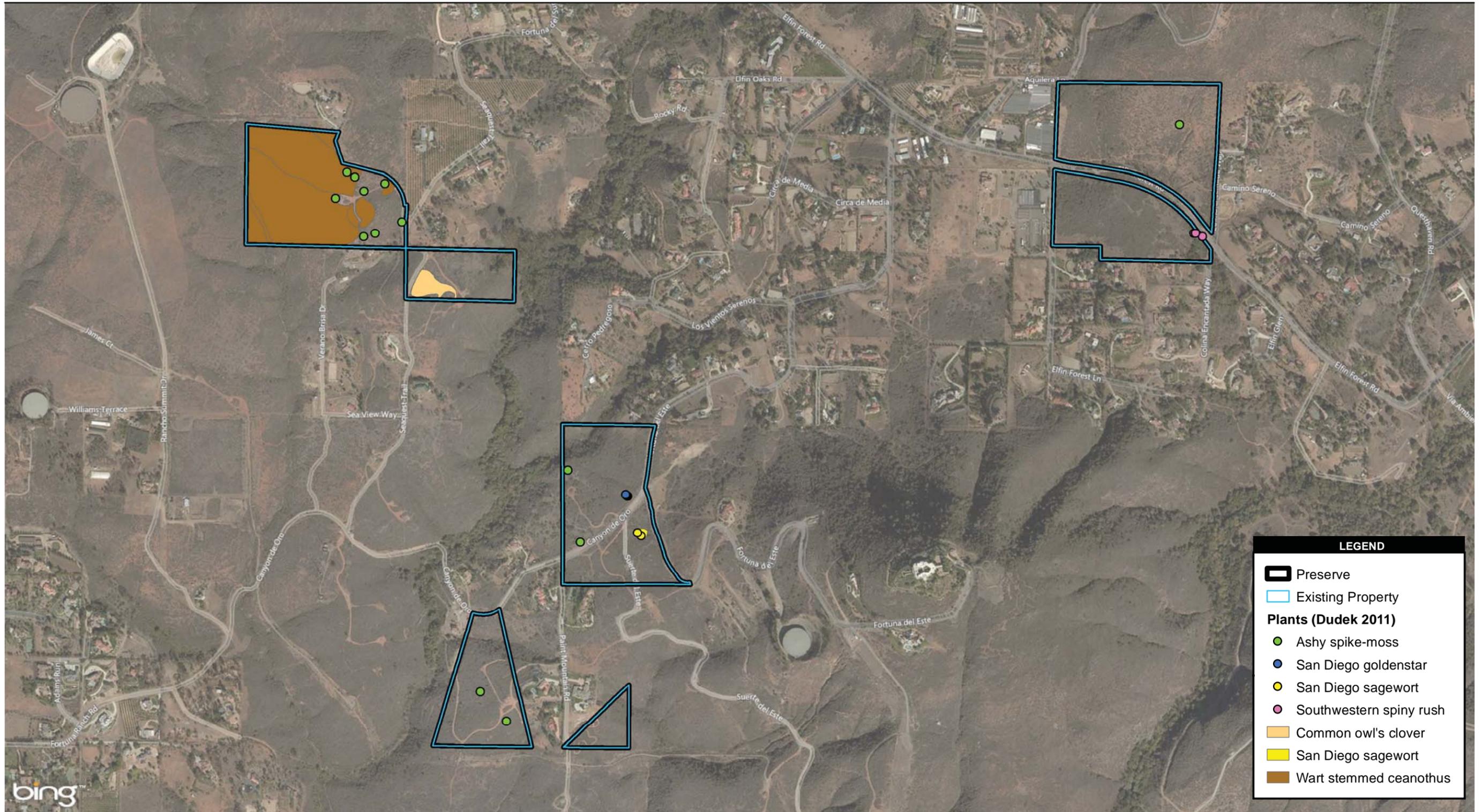
CNPS List 1B.2, County List A, North County MSCP Covered Species

Sticky dudleya is a perennial herb found in rocky coastal bluff scrub, chaparral, cismontane woodland, and coastal scrub habitats between 33–1,804 feet in elevation (CNPS 2010). This species is known from records in San Diego, Riverside, and Orange counties (CNPS 2010). Sticky dudleya is only known from approximately 20 occurrences and is threatened by development and road construction (CNPS 2010). There is a high potential for sticky dudleya to occur on the existing property because suitable rocky habitats are present and this species was observed within 1 mile of the Preserve.

**San Diego Marsh-Elder (*Iva hayesiana*) – Detected on Existing Property**

CNPS List 2.2, County List B

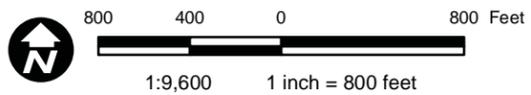
San Diego marsh-elder is a perennial shrub found in marshes and swamps and on playas between 33–1,640 feet in elevation (CNPS 2010). This species is usually found along creeks or intermittent streambeds and is endemic to San Diego County (Reiser 1994; CNPS 2010). San Diego marsh-elder is considered stable but may be threatened by the modification or degradation of coastal drainages (Reiser 1994). Approximately 60 San Diego marsh-elder individuals were observed along Escondido Creek on the Preserve on the existing property.



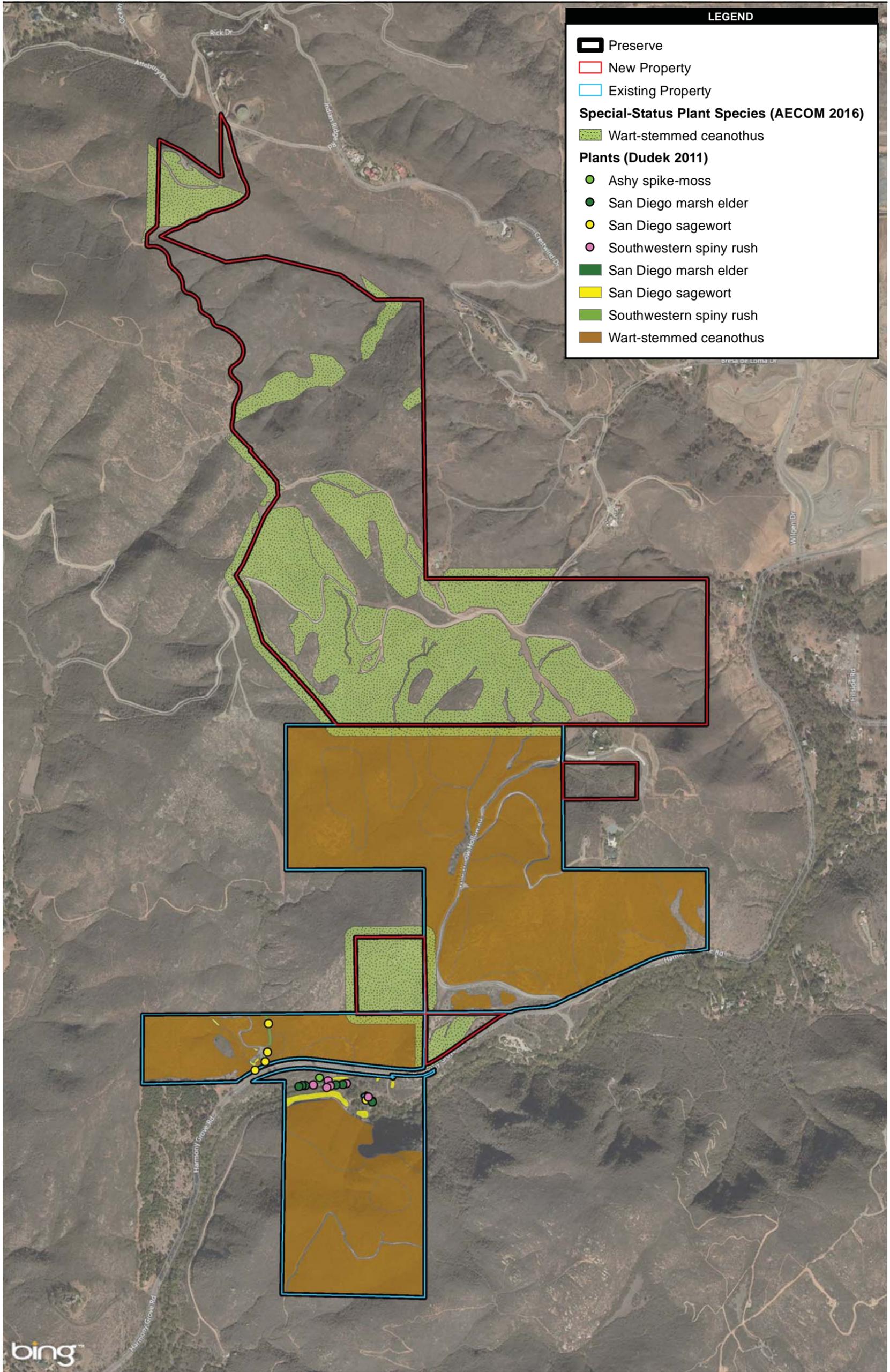
**LEGEND**

- Preserve
- Existing Property
- Plants (Dudek 2011)**
- Ashy spike-moss
- San Diego goldenstar
- San Diego sagewort
- Southwestern spiny rush
- Common owl's clover
- San Diego sagewort
- Wart stemmed ceanothus

Source: ESRI; AECOM.



**Figure 4a**  
**Special-Status Plant**  
**Species Locations**



**LEGEND**

- Preserve
- New Property
- Existing Property

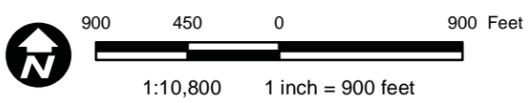
**Special-Status Plant Species (AECOM 2016)**

- Wart-stemmed ceanothus

**Plants (Dudek 2011)**

- Ashy spike-moss
- San Diego marsh elder
- San Diego sagewort
- Southwestern spiny rush
- San Diego marsh elder
- San Diego sagewort
- Southwestern spiny rush
- Wart-stemmed ceanothus

Source: ESRI; AECOM.



**Figure 4b**  
**Special-Status Plant**  
**Species Locations**

---

**Southwestern Spiny Rush (*Juncus acutus* spp. *leopoldii*) – Detected on Existing Property**  
CNPS List 4.2, County List D

Southwestern spiny rush is a rhizomatous herb in the rush family (Juncaceae) that grows up to 140 centimeters tall with sharp, ridged basal leaves (CNPS 2010; Dudek 2011b). In California, southwestern spiny rush is found in Imperial, Los Angeles, Orange, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties (CNPS 2010). This species occurs on mesic coastal dunes, alkaline seeps, and coastal salt marsh and swamps, below 2,953 feet (CNPS 2010). Southwestern spiny rush is threatened throughout its range by urbanization and flood control (CNPS 2010). Approximately 100 individuals of southwestern spiny rush were observed along Escondido Creek and its tributaries, north and south of Harmony Grove Road on the existing property. Approximately 10 individuals were observed within the central parcel of the existing property south of Elfin Forest Road.

**Robinson's Pepper-grass (*Lepidium virginicum* var. *robinsonii*) – High Potential to Occur on Existing Property**

CNPS List 1B.2, County List A

Robinson's pepper-grass occurs in San Diego, Riverside, Orange, Los Angeles, San Bernardino, and Santa Barbara counties, on Santa Cruz Island, and in Baja California, Mexico (Reiser 1994).

Robinson's pepper-grass occurs in chaparral and coastal scrub habitats between 3–2,900 feet in elevation (CNPS 2010). This annual herb grows in openings in chaparral and coastal sage scrub, generally well away from the coast in Southern California in foothill landscapes. Typically, sites where this species is observed are relatively dry, exposed locales, rather than beneath a shrub canopy or along creeks (Reiser 1994). This species was previously observed within the adjacent Del Dios Highlands Preserve (TAIC 2008) and may occur in the southern mixed chaparral and coastal sage scrub within the eastern parcels.

**Felt-leaved Monardella (*Monardella hypoleuca* ssp. *lanata*) - Not Detected, High Potential to Occur on New and Existing Properties**

CNPS List 1B.2, County List A

Felt-leaved monardella (also known as felt-leaved rock mint) has been recorded within 1 mile of the Preserve and has potential to occur within the chaparral and coast live oak woodland habitats on-site. It is found on soils derived from unusual rock types such as the Santiago Peak Metavolcanic rock material that forms the base rock throughout the new property. It also is found in other locations in San Diego County on rocky hill and ridge tops such as that on Mount Whitney and other parts of the site. Suitable habitat for this species exists on the Preserve but it was not found.

---

**San Diego Goldenstar (*Muilla clevelandii*) – Detected on Existing Property**  
CNPS List 1B.1, County List A,

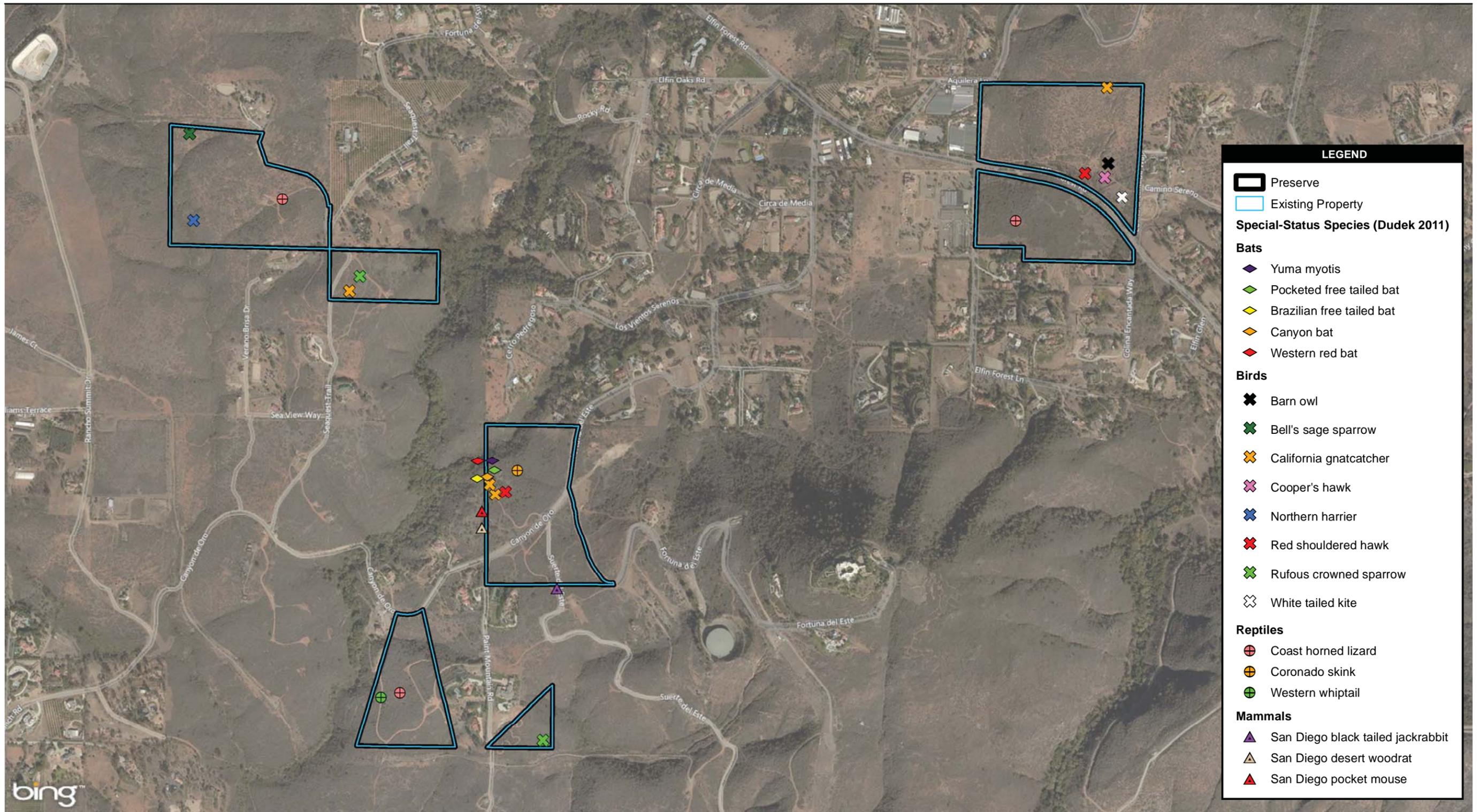
San Diego goldenstar is a perennial bulbiferous herb in the Brodiaea family (Themidaceae) that grows up to 15 centimeters tall with yellow green-striped flowers (CNPS 2010; Dudek 2011b). In California, San Diego goldenstar is found in San Diego and Riverside counties (CNPS 2010). This species occurs in clay soils in chaparral, coastal scrub, valley and foothill grassland, and vernal pools, between 164 and 1,526 feet in elevation (CNPS 2010). San Diego goldenstar is threatened by urbanization, road construction, vehicles, nonnative plants, and illegal dumping (CNPS 2010). Five individuals of San Diego goldenstar were observed north of Canyon de Oro on the existing property. This species was found in Diegan coastal sage scrub with California sagebrush, California buckwheat, and the nonnative soft brome (*Bromus hordeaceus*), and tocalote (*Centaurea melitensis*) as associated species. Because San Diego goldenstar was observed at the beginning of its typical blooming period (April–May), this population may have been larger than that detected.

**Ashy Spike-Moss (*Selaginella cinerascens*) – Detected on Existing Property**  
CNPS List 4.1, County List D

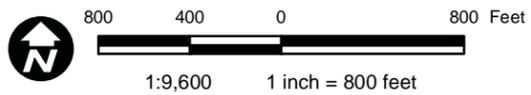
Ashy spike-moss is a perennial rhizomatous herb found in chaparral and coastal scrub habitats between 66–2,100 feet in elevation (CNPS 2010). This prostrate ground cover species is a good indicator of site degradation because it is rarely found on disturbed soils (Reiser 1994). There are records for this species in San Diego, Orange, and possibly Riverside counties, as well as Baja California, Mexico (CNPS 2010). Although ashy spike-moss is substantially declining due to urban expansion along the coast, it still occurs at a number of locales (Reiser 1994). Ashy spike-moss occurs in several locations across the existing property, often in open or rocky areas.

### **2.2.3 Sensitive Animal Species**

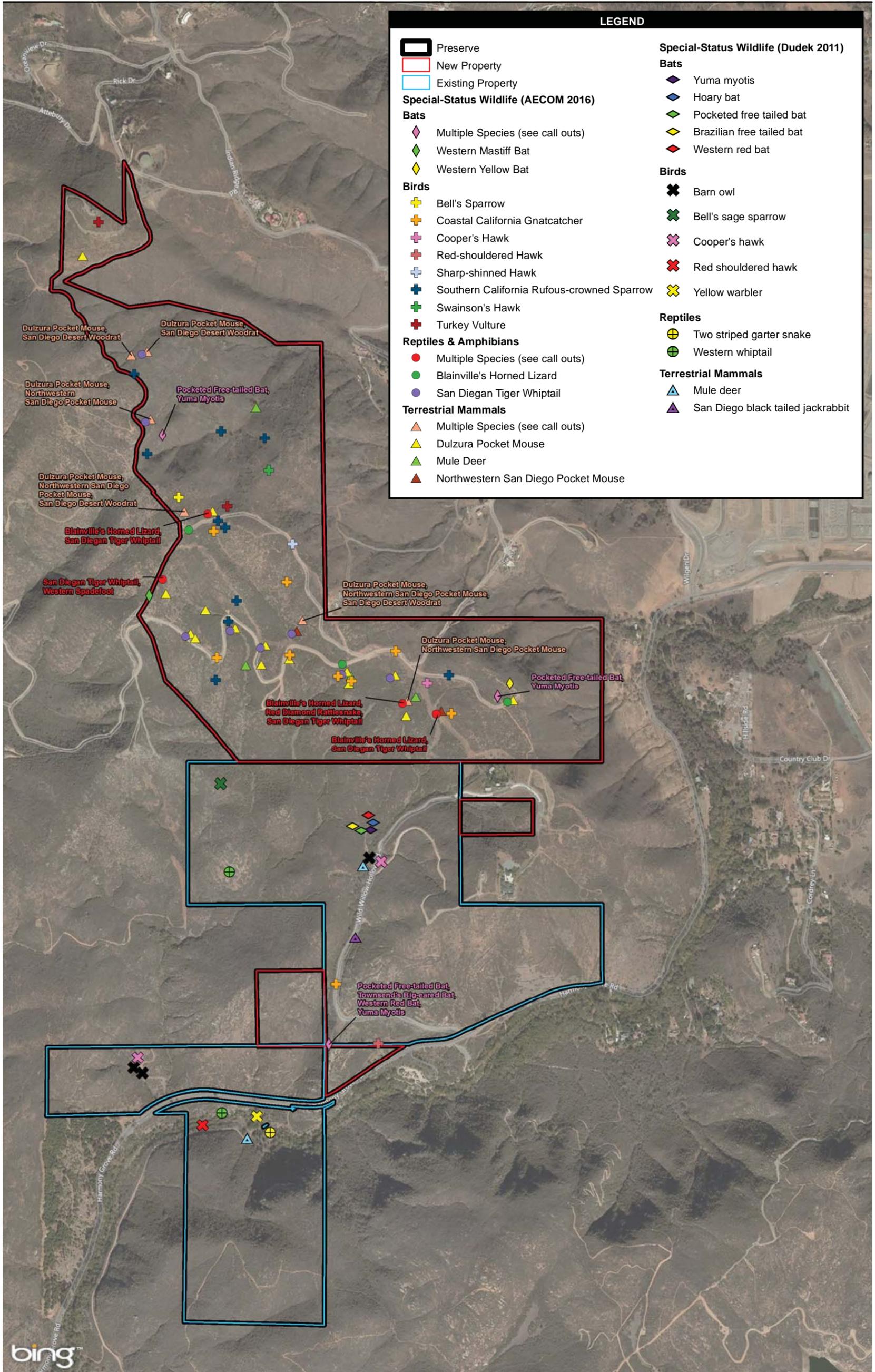
Thirty-six special-status wildlife species were observed or detected within the Preserve during baseline surveys (Figure 5). Nine of the detected species are being considered for the covered or watch list under the Proposed North County Multiple Species Conservation Program Plan. No special-status butterfly species were detected. Special-status wildlife species include seven reptile and amphibian species, 18 bird species, and 11 mammal species. A summary of the special-status wildlife species detected is provided in Table 3. A list of the wildlife species observed during baseline surveys on the Preserve is included in Appendix C. A table of the special-status wildlife species with potential to occur on the Preserve is included in Appendix D.



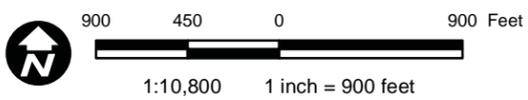
Source: ESRI; AECOM.



**Figure 5a**  
**Special-Status Wildlife**  
**Species Locations**



Source: ESRI; AECOM.



**Figure 5b**  
**Special-Status Wildlife**  
**Species Locations**

**Table 3. Sensitive Wildlife Species Known to Occur in the Escondido Creek Preserve**

Common Name	Scientific Name	Sensitivity Status <sup>1</sup>
<b>Herpetofauna</b>		
San Diegan tiger whiptail	<i>Aspidoscelis tigris stejnegeri</i>	CDFW CSC, Count Group 2
Coronado skink	<i>Eumeces skiltonianus interparietalis</i>	CDFW CSC, Count Group 2
Blainville's horned lizard	<i>Phrynosoma coronatum blainvillei</i>	CDFW CSC, County Group 2, North County MSCP Plan Watch List
Red diamond rattlesnake	<i>Crotalus ruber</i>	CDFW CSC, County Group 2, North County MSCP Plan Watch List
Two-striped garter snake	<i>Thamnophis hammondi</i>	CDFW CSC, County Group 1
San Diego ringneck snake	<i>Diadophis punctatus similis</i>	County Group 2
Western spadefoot	<i>Spea hammondi</i>	CDFW CSC, County Group 2, North County MSCP Covered Species
<b>Birds</b>		
Sharp-shinned hawk	<i>Accipiter striatus</i>	CDFW CSC, County Group 1
Cooper's hawk	<i>Accipiter cooperi</i>	CDFW CSC, County Group 1
Gadwall	<i>Anas strepera</i>	County Group 2
Great blue heron	<i>Ardea herodias</i>	County Group 2
Canada goose	<i>Branta canadensis</i>	County Group 2
Red-shouldered hawk	<i>Buteo lineatus</i>	County Group 1
Swainson's hawk	<i>Buteo swainsoni</i>	County Group 1
Turkey vulture	<i>Cathartes aura</i>	County Group 1
Northern harrier	<i>Circus cyaneus</i>	CDFW CSC, County Group 1, North County MSCP Watch List
Yellow warbler	<i>Dendroica petechia brewsteri</i>	CDFW CSC, County Group 2
White-tailed kite	<i>Elanus leucurus</i>	CDFW FP, County Group 1
Southern California rufous-crowned sparrow	<i>Aimophila ruficeps canescens</i>	CDFW WL, County Group 1, North County MSCP Watch List
Bell's sparrow	<i>Artemisiospiza belli</i>	CDFW WL, County Group 1, North County Plan Watch List
California gull	<i>Larus californicus</i>	CDFW WL, County Group 2
White-faced Ibis	<i>Plegadis chihi</i>	CDFW WL, County Group 1
Coastal California gnatcatcher	<i>Polioptila californica californica</i>	FT, CDFW CSC, County Group 1, North County Plan Covered Species
Western bluebird	<i>Sialia mexicana</i>	County Group 2
Barn owl	<i>Tyto alba</i>	County Group 2
<b>Mammals</b>		
Dulzura pocket mouse	<i>Chaetodipus californicus femoralis</i>	CDFW CSC, County Group 2
Northwestern San Diego pocket mouse	<i>Chaetodipus fallax fallax</i>	CDFW CSC, County Group 2
San Diego desert woodrat	<i>Neotoma bryanti intermedia</i>	CDFW CSC, County Group 2
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	CDFW CSC, County Group 2, North County Plan Covered Species
Western mastiff bat	<i>Eumops perotis californicus</i>	CDFW CSC, County Group 2
Pocketed free-tailed bat	<i>Nyctinomops femorasaccus</i>	CDFW CSC, County Group 2
Western yellow bat	<i>Lasiurus xanthinus</i>	CDFW CSC
Western red bat	<i>Lasiurus blossevillii</i>	CDFW CSC, County Group 2

Common Name	Scientific Name	Sensitivity Status <sup>1</sup>
Yuma myotis	<i>Myotis yumanensis</i>	County Group 2
San Diego black-tailed jackrabbit	<i>Lepus californicus bennettii</i>	CDFW CSC, County Group 2, North County MSCP Watch List
Mule deer	<i>Odocoileus hemionus</i>	County Group 2

<sup>1</sup> Federal Designations:

FT: Federally Threatened

State Designations:

CSC: California Species of Special Concern (CDFW)

FP: State Fully Protected

WL: State Watch List

County Designations:

Group 1: Animals of high sensitivity (listed or specific natural history requirements)

Group 2: Animals declining, but not in immediate threat of extinction or extirpation.

Draft North County Plan Covered Species: Proposed for coverage in the draft North County Plan.

## 2.3 CULTURAL RESOURCES

Cultural resources were detected within the Preserve during the cultural resources inventory (Table 4). Within the existing property, three significant or potentially significant cultural resources have been identified: a prehistoric lithic scatter (CA-SDI-17670), and historic building foundations, walls, and gates (P-37-031723, P-37-031724, ASM 2011). Within the new property, results of the background research and survey indicated that the new property contained six cultural resources (Table 4). Three are isolates not considered significant and two of the remaining three were previously recorded sites. Within the new property, all of the sites are prehistoric. Previously recorded site CA-SDI-9281 could not be relocated in the current survey; dense vegetation and steep slopes in the site area may have prevented its reidentification. The other previously recorded site, CA-SDI-34, contains two petroglyph features. This site can be assumed to qualify under California Environmental Quality Act (CEQA) criteria a, c, and d, as an important resource. The newly identified site, ECP-P-001, consists of a sparse lithic scatter.

**Table 4. Cultural Resources Identified within the Preserve**

Trinomial/Primary Number	Site Type	Time Period
CA-SDI-17670	Lithic Scatter	Prehistoric
P-37-031723	Foundation, Wall, Gate	Historic
P-37-031724	Foundation	Historic
CA-SDI-34	Petroglyphs	Prehistoric
CA-SDI-9281*	Lithic Artifact Scatter	Prehistoric
ECP-P-001	Lithic Artifact Scatter	Prehistoric
ECP-ISO-001	Metavolcanic Tertiary Flake	Prehistoric
ECP-ISO-002	Two Milky Quartz Tertiary Flakes	Prehistoric
ECP-ISO-003	Metavolcanic Hammerstone Flake/Five Glass Shards	Prehistoric/Historic

\*Not relocated during current survey effort

---

### 3.0 INVASIVE SPECIES MANAGEMENT

Invasive nonnative plant species can have significant impacts on native plant associations, ecosystem processes, and biodiversity; special management measures are needed for their removal and control. Invasive nonnative plants are often adapted to disturbance conditions. Annual invasive species often germinate early and outcompete or otherwise harm sensitive species. They can generate flammable thatch material that provides unnatural levels of fuel for fires and can alter natural fire regimes by increasing frequency and intensity of wildfire (Bell 2009).

A total of 72 invasive nonnative plant species were identified during baseline surveys on the Preserve, including both perennial and annual species (Dudek 2011a) (Figure 6). A total of 20 and 69 nonnative plant species have been detected on the existing and new property, respectively. Table 5 lists the nonnative species observed during surveys of the Preserve and their associated California Invasive Plant Council (Cal-IPC) Inventory rating.

**Table 5. Nonnative Plants Observed on the Preserve and Invasive Status<sup>1</sup>**

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
silver wattle ( <i>Acacia dealbata</i> )	Moderate BBCD Invasiveness 15 B	N/A	N/A	N/A	X	
Sydney golden wattle ( <i>Acacia longifolia</i> )	Not rated	On Cal-IPC watch list, Red Alert 2007	N/A	N/A	X	
Tree house Leek ( <i>Aeonium arborium</i> )	Not rated	Nominated, not reviewed	N/A	N/A	X	
Century plant ( <i>Agave americana</i> )	Not rated	N/A	N/A	N/A	X	
White tumbleweed ( <i>Amaranthus albus</i> )	Not rated	N/A	N/A	N/A	X	
scarlet pimpernel ( <i>Anagallis arvensis</i> )	Not rated	On Cal-IPC watch list	N/A	N/A	X	X
Common celery ( <i>Apium graveolens</i> )	Not rated	N/A	N/A	N/A	X	
Heartleaf iceplant ( <i>Aptenia cordifolia</i> )	Not rated	Nominated, not reviewed	N/A	N/A	X	
Australian saltbush ( <i>Atriplex semibaccata</i> )	Moderate CADC Invasiveness 12 B	Prefers areas that have been heavily grazed or disturbed. Readily establishes in areas newly developed, roadsides, margins of cultivated fields, coastal marshes. Most establishment attributed to disturbance.  All CA	N/A	N/A	X	
Wild oats ( <i>Avena fatua</i> )	Moderate UADC Invasiveness 12 B	Coastal scrub, chaparral, grasslands, woodland, forest. Very widespread, but impacts more severe in desert regions.  GV, NW, SN, SW, GB, D	N/A	N/A	X	X
Australian bottle tree ( <i>Brachychiton rupestris</i> )	Not rated	N/A	N/A	N/A	X	
Black mustard ( <i>Brassica nigra</i> )	Moderate CBUD Invasiveness 11 B	Very frequent; common in sage scrub.	Yes	N/A		X

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
ripgut brome ( <i>Bromus diandrus</i> )	Moderate BBBD Invasiveness 12 B	Dunes, scrub, grassland, woodland, forest. Very widespread but monotypic stands uncommon.  CA	N/A	N/A	X	X
Soft chess ( <i>Bromus hordeaceus</i> )	Limited BACU Invasiveness 9 C	Grasslands, sagebrush, serpentine soils, many other habitats. Very widespread, but primarily in converted annual grasslands.  CA	N/A	N/A	X	X
Compact brome ( <i>Bromus madritensis</i> ssp. <i>rubens</i> )	High ABBU Invasiveness 14 B	Scrub, grassland, desert washes, woodlands. Impacts most significant in desert areas.  CA	N/A	N/A	X	X
Italian thistle ( <i>Carduus pycnocephalus</i> subsp. <i>Pycnocephalus</i> )	Moderate CABD Invasiveness 12 B	Forest, scrub, grasslands, woodland. Very widespread. Impacts may be variable regionally.  NW, SN, CW, SW	C list	N/A	X	X
Hottentot fig ( <i>Carpobrotus edulis</i> )	High AAUA Invasiveness 15 B	Invades coastal grassland, coastal scrub, dunes (1), coastal bluff scrub, maritime chaparral, oak woodlands, and the margins of wetlands (2). Was introduced into the western United States for dune stabilization in the early 1900s.  CW, NW, SW	N/A	N/A	X	
African fountain grass ( <i>Cenchrus setaceus</i> )	Moderate BABD Invasiveness 16 B	Responds and spreads following fires.  CW, GV, NW, SW, D	N/A	N/A	X	X
Malta starthistle, tocalote ( <i>Centaurea melitensis</i> )	Moderate CBBC Invasiveness 11 B	Grasslands, oak woodland. Sometimes misidentified as <i>C. solstitialis</i> . Impacts vary regionally.  CW, SW, D	N/A	Noxious	X	X
Mouse-eared chickweed ( <i>Cerastium glomeratum</i> )	Not rated	N/A	N/A	N/A	X	

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
Nettle-leaf goosefoot ( <i>Chenopodium murale</i> )	Not rated	N/A	N/A	N/A	X	
Pampas grass ( <i>Cortaderia selloana</i> )	High BAAD Invasiveness 17 A	Sandy soils, moist drainages. CA-FP, GB, D	N/A	N/A	X	X
African brass buttons ( <i>Cotula coronopifolia</i> )	Limited UCUD Invasiveness 10 C	Inhabits freshwater and salt marshes (1, 3), wetlands, vernal pools, ditches, seasonally wet places, such as the edge of rivers, lakes, and ponds, in many plant communities. Car, CW, GV, NW, SN, SW, D	N/A	N/A	X	
Blue-Eye Cape-Marigold ( <i>Dimorphotheca sinuata</i> )	Not rated	N/A	N/A	N/A	X	
Flax-leaf fleabane ( <i>Erigeron bonariensis</i> )	Not rated	Watchlist	N/A	N/A	X	
Broadleaf filaree ( <i>Erodium botrys</i> )	Evaluated but not listed; Limited impacts, Low invasiveness, Very widespread distribution	Primarily a weed of disturbed sites, but can be locally a more significant problem in wildlands. CA-FP	N/A	N/A	X	X
Redstem filaree ( <i>Erodium cicutarium</i> )	Limited DCDD Invasiveness 10 C	Many habitats. Widespread. Impacts minor in wildlands. High-density populations are transient. CA	N/A	N/A	X	X
Red gum, river red gum ( <i>Eucalyptus camaldulensis</i> )	Limited CCUD Invasiveness 6 C	Mainly Southern California urban areas. Minor impacts, invasiveness, and distribution. NW, GV, CW, SW	N/A	N/A	X	X
Fennel ( <i>Foeniculum vulgare</i> )	High ABCD Invasiveness 12 B	Grasslands, scrub. CA-FP	N/A	N/A	X	X
Treasure flower ( <i>Gazania linearis</i> )	Moderate CBUD Invasiveness 13 B	Reported to invade in San Francisco Bay area. Need more information. CW, SW	N/A	N/A	X	

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
Round-leaf geranium ( <i>Geranium rotundifolium</i> )	Not rated	N/A	N/A	N/A	X	
Crete hedypnois ( <i>Hedypnois cretica</i> )	Not rated	Cal-IPC Watch List	N/A	N/A	X	X
Arizona cypress ( <i>Hesperocyparis arizonica</i> )	Not rated	N/A	N/A	N/A	X	
bristly ox tongue ( <i>Helminthotheca echioides</i> )	Limited, Limited Impacts, Moderate invasiveness, Moderate distribution,	Coastal prairie, scrub, riparian woodland. Widespread locally. Abiotic impacts unknown. CA-FP	N/A	N/A	X	
Short-pod mustard, summer mustard ( <i>Hirschfeldia incana</i> )	Moderate CBUB Invasiveness 12 B	Scrub, grasslands, riparian areas. Impacts not well understood but appear to be greater in Southern California. CW, GV, NW, SN, SW	N/A	N/A	X	X
Hare barley ( <i>Hordeum murinum leporinum</i> )	Moderate UCCD Invasiveness 11 B	Degraded grasslands. All CA	N/A	N/A	X	X
Smooth cat's ear ( <i>Hypochaeris glabra</i> )	Limited UCDD Invasiveness 11 B	Scrub and woodlands. Widespread. Impacts appear minor. Some local variability. CA-FP	N/A	N/A	X	X
Prickly lettuce ( <i>Lactuca serriola</i> )	Evaluated but not listed Impacts none, Invasiveness limited, moderate distribution	Primarily an agricultural and roadside weed.	N/A	N/A	X	
Golden-Top ( <i>Lamarckia aurea</i> )	Not Rated	N/A	N/A	N/A	X	X
Notch-leaf marsh-rosemary ( <i>Limonium sinuatum</i> )	Not Rated	Other species in genus on Watch List.	N/A	N/A	X	

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
Narrow-leaf cottonrose ( <i>Logfia gallica</i> )	Not rated	N/A	N/A	N/A	X	
Old Man Cactus ( <i>Lophocereus schottii</i> )	Not rated	N/A	N/A	N/A	X	
Island ironwood ( <i>Lyonothamnus floribundus asplenifolius</i> )	Not rated	N/A	N/A	N/A	X	
White horehound ( <i>Marrubium vulgare</i> )	Limited UBCD Invasiveness 10 C	Grasslands scrub, riparian areas. Widespread. Rarely in dense stands. Impacts relatively minor.  CA-FP, DMoj	N/A	N/A	X	X
Natalgrass ( <i>Melinis repens</i> ssp. <i>repens</i> )	Not listed	N/A	N/A	N/A	X	
Tree tobacco ( <i>Nicotiana glauca</i> )	Moderate UCBD Invasiveness 13 B	Coastal scrub, grasslands, riparian woodland. Abiotic impacts unknown. Impacts vary locally. Rarely in dense stands.  CA-FP, D	N/A	N/A	X	X
Olive tree ( <i>Olea europaea</i> )	Limited UCDD Invasiveness 11 B	In other areas, displaces native species, reduces light availability. However, occurs only in small patches or as single trees in California and does not have any perceived impacts.  CaR, CW, GV, NW, SN, SW, D			X	X
Prickly pear, mission fig ( <i>Opuntia ficus-indica</i> )	Not listed	N/A	N/A	N/A	X	X
Geranium ( <i>Pelargonium hortorum</i> )	Not listed	N/A	N/A	N/A	X	
Cultivated timothy ( <i>Phleum pratense</i> )	Not rated	Nominated but not reviewed.	N/A	N/A	X	
Canary Island date palm ( <i>Phoenix canariensis</i> )	Limited CCUD Invasiveness 13 B	Mainly found in wildlands of Southern California.	N/A	N/A		X
Aleppo pine ( <i>Pinus halepensis</i> )	Not rated	Nominated not reviewed.	N/A	N/A	X	X

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
English plantain ( <i>Plantago lanceolata</i> )	Limited UCUU Invasiveness 9 C	Many habitats. Turf weed primarily. Low density and impacts in wildlands.  CA-FP	N/A	N/A	X	X
California sycamore ( <i>Platanus racemosa</i> )	Not rated	N/A	N/A	N/A	X	
Rabbitfoot polypogon, rabbitfoot grass ( <i>Polypogon monspeliensis</i> )	Limited DCDD Invasiveness 9 C	Margins of ponds and streams, seasonally wet places, edge of coastal dunes. Widespread. Impacts appear minor.  CA	N/A	N/A	X	
Miniature jade plant ( <i>Portulaca afra</i> )	Not rated	N/A	N/A	N/A	X	
Fragrant everlasting cudweed ( <i>Pseudognaphalium luteoalbum</i> )	Not rated	N/A	N/A	N/A	X	
Castor bean ( <i>Ricinus communis</i> )	Limited UBCD\ Invasiveness 15 B	Grows fast and forms dense monoculture that displaces native vegetation in riparian zones	N/A	N/A	X	X
Curly dock ( <i>Rumex crispus</i> )	Limited DBCD Invasiveness 10 C	Grasslands, vernal pool, meadows, riparian. Widespread. Impacts appear minor.  CA	N/A	N/A	X	X
Prickly Russian thistle ( <i>Salsola tragus</i> )	Limited DCDD Invasiveness 11B	Most studies refer to <i>Salsola</i> as an early seral stage plant, implying that it is easily displaced by later seral stage plants, and therefore causes a lesser impact on overall plant communities. <i>Salsola</i> can have both positive and negative effects on the growth and establishment of native plants. The net effect is yet to be determined.  All CA	N/A	N/A	X	X

Species	Cal-IPC Rating <sup>2</sup>	Cal-IPC Comments <sup>3</sup>	Federal Invasive and Noxious Plant List <sup>4</sup>	CA Noxious Weeds <sup>5</sup>	Present in the New Property	Present in the Existing Property
Peruvian pepper tree ( <i>Schinus molle</i> )	Limited UCUD Invasiveness 11 B	Is more widespread than Brazilian pepper tree in California. In Riverside County, slopes are covered by <i>Schinus molle</i> . However, in Contra Costa County it is present but not very invasive. Appears to vary greatly by location.  CaRk, CW, GV, NW, SN, SW, D	N/A	N/A	X	X
Common groundsel ( <i>Senecio vulgaris</i> )	Not rated	N/A	N/A	N/A	X	
Common catchfly ( <i>Silene gallica</i> )	Not rated	N/A	N/A	N/A	X	X
Blessed milkthistle ( <i>Silybum marianum</i> )	Limited DCDD Invasiveness 10 C	Grasslands, riparian. Widespread, primarily in disturbed areas. Impacts can be higher locally.	N/A	N/A	X	X
London rocket ( <i>Sisymbrium irio</i> )	Moderate CBUD Invasiveness 11 B	Scrub, grasslands. Widespread. Primarily in disturbed sites. Impacts vary locally.  GV, SW	N/A	N/A	X	
prickly sow thistle ( <i>Sonchus asper</i> ssp. <i>asper</i> )	Not rated	Evaluated but not listed. Limited impacts. Moderate invasiveness. Moderately widespread distribution. Primarily an agricultural weed.	N/A	N/A	X	X
Common chickweed ( <i>Stellaria media</i> )	Not rated	N/A	N/A	N/A	X	X
Organ pipe cactus ( <i>Stenocereous thurberi</i> )	Not listed	N/A	N/A	N/A	X	
Tamarisk ( <i>Tamarix ramosissima</i> )	High AAAD Invasiveness 17 A	Saltcedar forms dense stands in many riparian areas around the state, particularly in Southern California, where it infests most riparian communities.	Yes	Yes		X
Giant yucca ( <i>Yucca elephantipes</i> )	Not rated	N/A	N/A	N/A	X	
Corn ( <i>Zea mays</i> )	Not rated	N/A	N/A	N/A	X	

N/A = not applicable

<sup>1</sup> **Source:** Cal-IPC Inventory Database, updated April 2012. Overall rating listed for southwest region, factoring impact, invasiveness, distribution, and documentation level.

<sup>2</sup> **Cal-IPC Rating Categories**

---

**High:** Species have severe ecological impacts, are conducive to moderate to high rates of dispersal/establishment, and most are widely spread.

**Moderate:** Species have substantial and apparent, but generally not severe, ecological impacts; are conducive to moderate to high rates of dispersal, although establishment is generally dependent on ecological disturbance; and distribution may range from limited to widespread.

**Limited:** Species are invasive, but their ecological impacts are minor on a statewide level (or there was not enough information to justify a higher score); they have low to moderate rates of invasiveness and are generally limited, but may be locally persistent and problematic.

Letter codes represent Impact score, respectively: Impacts abiotic ecosystem processes, impact on plant community, impact on higher trophic levels and impact on genetic integrity (U Unknown, A High, B Moderate, C Rare, and D None)

Invasiveness 0–20 points based on a variety of factors and Total Invasiveness Score A, B, C, D based on tendency to disperse and spread.

<sup>3</sup> California Floristic Provinces listed in Cal-IPC Invasive Plant Inventory as being occupied by the invasive species

CA Invasive in all provinces  
CA-FP California Floristic Province area  
CaR Cascade Range  
CW Central West California  
GV Great Valley  
NW Northwest California  
SN Sierra Nevada  
SW Southwest California  
GB Great Basin Province  
MP Modoc Plateau  
SNE Sierra Nevada East  
D Desert Province in California  
DMoj Mojave Desert  
DSon Sonoran Desert in California

<sup>4</sup>Sources: Cal-IPC 2017; U.S. Department of Agriculture Natural Resources Conservation Service 2014; California Department of Food and Agriculture Plant Health & Pest Prevention Services 2014

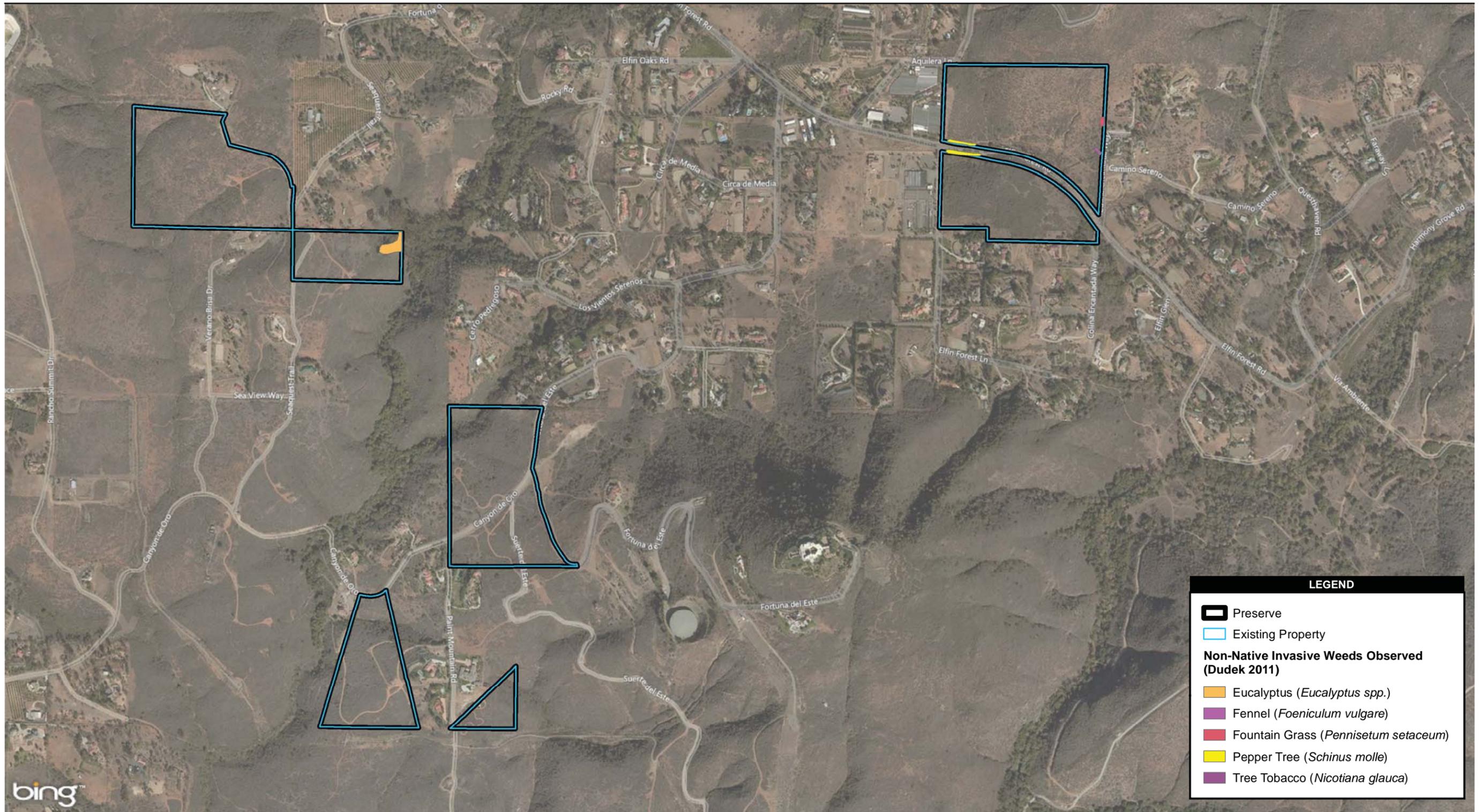
---

During the mapping efforts on the Preserve, the intention was to identify the most invasive species and their locations and determine which portions of the property have the highest potential for concentrations of weedy species. Annual species exhibit large fluctuations in populations resulting from particular seasonal rainfall conditions. Common annual weeds such as wild oats (*Avena fatua*), and various species of brome grasses (*Bromus* spp.) and plants such as filaree (*Erodium* spp.) that are widespread on the property were not mapped and are not targeted for removal. As discussed above, nonnative grassland is considered a natural vegetation community under the County's MSCP. However, the larger, woody species such as the silver wattle (*Acacia dealbata*), fennel (*Foeniculum vulgare*), and red gum (*Eucalyptus camaldulensis*), as well as the ornamentals on the southern parcel, are examples of species for which general mapping was done during the field surveys.

Nonnative plants are present throughout the Preserve, but the greatest numbers are found along roads and trails and around grassy areas. One area of particular interest is located in the southern triangular parcel that is adjacent to Harmony Grove Road (Figure 6). A number of nonnative plants with ornamental interest have been planted in a loose configuration among the native plants here. Red gum trees (*Eucalyptus camaldulensis*), Aleppo pine (*Pinus halepensis*), century plant (*Agave americana*), and olive trees (*Olea Europa*) have been planted among some more obscure species such as Arizona cypress (*Hesperocyparis arizonica*), mission cactus (*Opuntia ficus-indica*), and a variety of succulent and drought-tolerant species including the Australian bottle tree (*Brachychiton rupestris*) and island ironwood (*Lyonothamnus floribundus* ssp. *asplenifolius*).

The nonnative annual species found on the Preserve generally represent widespread plants that have been established in this region for many years. Nonnative shrubs and trees are less prevalent on the Preserve. A number of these nonnative species, though they may be invasive and do not represent the natural habitats on the Preserve, would not be recommended for removal. First, removing nonnatives on the Preserve without controlling the source populations would represent only a temporary control. Second, a number of the species have been present so long in the California landscape that they have truly become "naturalized." It would be impossible to remove wild oats and any of the brome grasses completely; however, it would be possible to restore portions of the Preserve that were originally shrublands but were modified by clearing or other disturbance to become grassy areas dominated by nonnative species, such as around some of the areas that were fuel breaks for the 2014 fire.

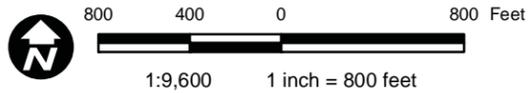
It is likely that, under conditions prior to European contact, some of the lowland areas, particularly on the southern portion of the new property, would have been inhabited by low shrubs, likely dominated by California buckwheat (*Eriogonum fasciculatum*). Overall, the site does not exhibit a great deal of disturbance over the past two decades except for the previously



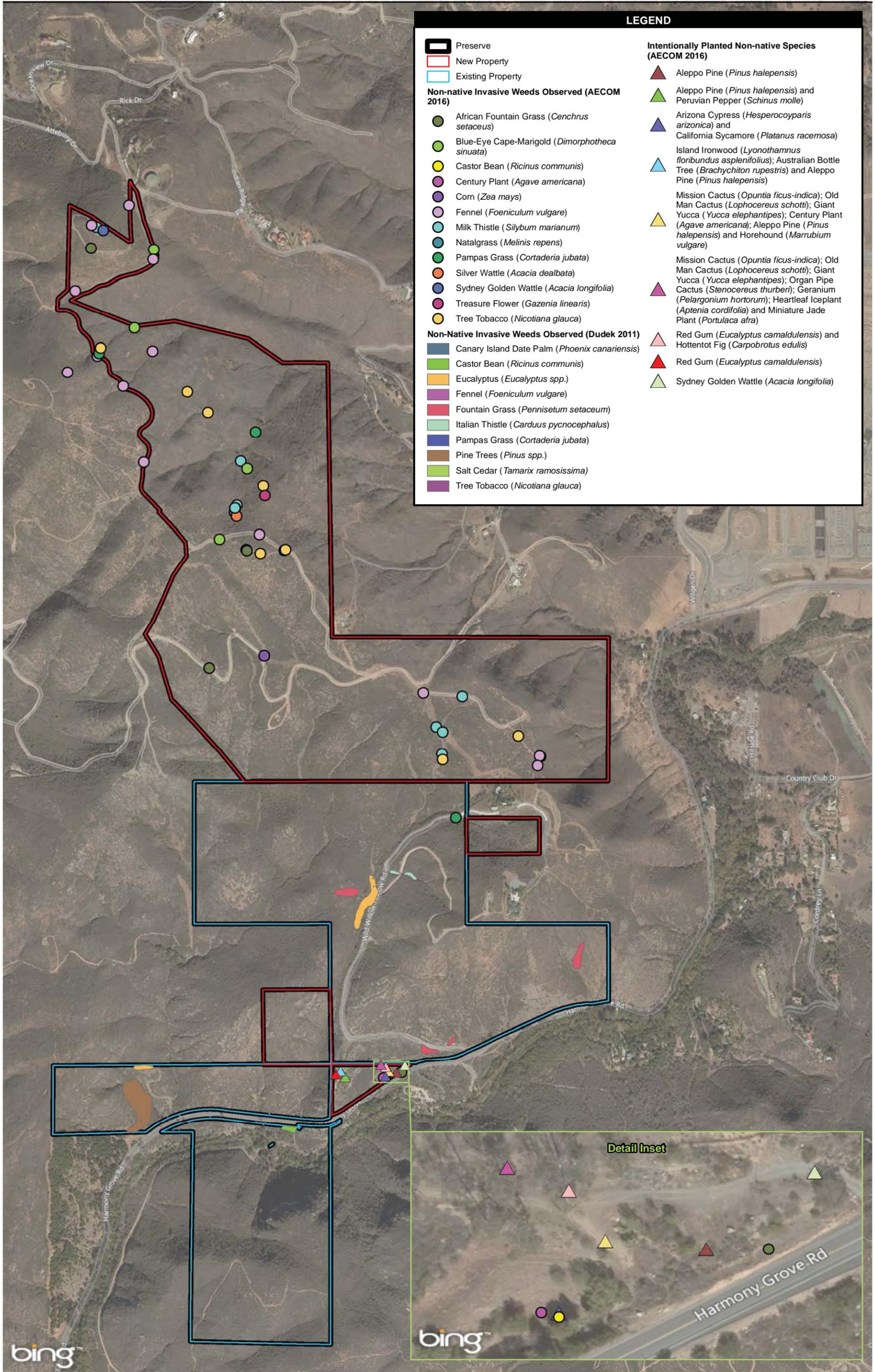
**LEGEND**

- Preserve
- Existing Property
- Non-Native Invasive Weeds Observed (Dudek 2011)**
- Eucalyptus (*Eucalyptus spp.*)
- Fennel (*Foeniculum vulgare*)
- Fountain Grass (*Pennisetum setaceum*)
- Pepper Tree (*Schinus molle*)
- Tree Tobacco (*Nicotiana glauca*)

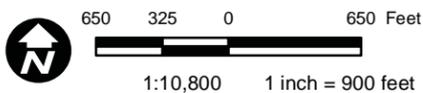
Source: ESRI; AECOM.



**Figure 6a**  
**Non-native Invasive Weeds Observed**



Source: ESRI; AECOM.



**Figure 6b**  
**Non-native Invasive Weeds Observed**

mentioned fuel break areas. In the absence of specific action to maintain the grassy habitat as open land, shrubs will likely reclaim and fill in the grassy areas eventually, leaving only a few small areas of grassland habitat. Therefore, it will not be necessary to remove many of the nonnative grasses because they will be much reduced through the recovery of the shrub vegetation.

Mustard is also well established with short-pod mustard (*Hirschfeldia incana*) being the dominant species on the Preserve. Complete removal of mustard, a large annual with seeds that may remain beneath the soil for up to 50 years, would be difficult.

### 3.1 TARGET INVASIVE NONNATIVE PLANT SPECIES

Target invasive nonnative plant species identified for the Preserve along with their removal/management priority are provided in Table 6, and the target species for removal are shown in Figure 6. A removal priority ranking system was established for these target species to assist management efforts. The criteria used for assigning removal priority rankings for the invasive nonnative species included an evaluation of the Cal-IPC rating, the current cover and distribution in the Preserve, the potential for invading sensitive habitat, and the potential for increasing fire intensity. These species and associated management/control recommendations are presented below along with a removal priority ranking. The priority for removal of nonnative species depends highly on how large the population of the nonnative species is. If it is a relatively small, discrete population, it might be suggested for removal because it appears to be manageable. In the case of the new property, there are a number of ornamental species that have been planted on the southern parcel. For the most part, these species are listed as moderate priority for removal. Ultimately, they should be removed, but their existence at the present time does not appear a threat to the surrounding vegetation. Additional discussion for each high priority species is provided in the following text. Species ranked as high priority are recommended for control as soon as possible; species ranked as moderate priority are recommended for control as soon as high priority species are under control. Species ranked as low priority are recommended for control after high and moderate priority species are under control.

**Table 6. Priorities for Removal or Management of Nonnative Species**

Common Name	Scientific Name	Removal/Management Priority
Silver wattle	<i>Acacia dealbata</i>	High
African fountain grass	<i>Cenchrus setaceus</i>	High
Pampas grass	<i>Cortaderia jubata</i>	High
Blue-Eye Cape-marigold	<i>Dimorphotheca sinuata</i>	High

Common Name	Scientific Name	Removal/Management Priority
Red gum	<i>Eucalyptus camaldulensis</i>	High*
Fennel	<i>Foeniculum vulgare</i>	High
Treasure flower	<i>Gazania linearis</i>	High
Natal grass	<i>Melinis repens</i>	High
Tree tobacco	<i>Nicotiana glauca</i>	High
Castor bean	<i>Ricinus communis</i>	High
Peruvian pepper tree	<i>Schinus molle</i>	High
Milk thistle	<i>Silybum marianum</i>	High
Sydney golden wattle	<i>Acacia longifolia</i>	Moderate
Tree house leek	<i>Aeonium arborium</i>	Moderate*
Century plant	<i>Agave americana</i>	Moderate*
Heartleaf iceplant	<i>Aptenia cordifolia</i>	Moderate*
Australian bottle tree	<i>Brachychiton rupestris</i>	Moderate*
Hottentot fig	<i>Carpobrotus edulis</i>	Moderate
Arizona cypress	<i>Hesperocyparis arizonica</i>	Moderate*
Short-pod mustard	<i>Hirschfeldia incana</i>	Moderate
Old man cactus	<i>Lophocereus schottii</i>	Moderate*
Island ironwood	<i>Lyonothamnus floribundus asplenifolius</i>	Moderate*
Olive tree	<i>Olea europaea</i>	Moderate*
Mission cactus	<i>Opuntia ficus-indica</i>	Moderate*
Geranium	<i>Pelargonium hortorum</i>	Moderate*
Aleppo pine	<i>Pinus halepensis</i>	Moderate*
Miniature jade plant	<i>Portulaca afra</i>	Moderate*
Organ pipe cactus	<i>Stenocereous thurberi</i>	Moderate*
Tamarisk	<i>Tamarix ramosissima</i>	Moderate
Giant yucca	<i>Yucca elephantipes</i>	Moderate*
Corn	<i>Zea mays</i>	Moderate
White tumbleweed	<i>Amaranthus albus</i>	Low
Italian thistle	<i>Carduus pycnocephalus</i>	Low
Tocalote	<i>Centaurea melitensis</i>	Low
Bristly ox-tongue	<i>Helminthotheca echioides</i>	Low
Prickly lettuce	<i>Lactuca serriola</i>	Low
Notch-leaf marsh-rosemary	<i>Limonium sinuatum</i>	Low
Canary island date palm	<i>Phoenix canariensis</i>	Low
English plantain	<i>Plantago lanceolata</i>	Low
California sycamore	<i>Platanus racemosa</i>	Low
Curly dock	<i>Rumex crispus</i>	Low
Prickly Russian-thistle, tumbleweed	<i>Salsola tragus</i>	Low
Prickly tow-thistle	<i>Sonchus asper</i>	Low
Scarlet pimpernel, poor man's weatherglass	<i>Anagallis arvensis</i>	None
Common celery	<i>Apium graveolens</i>	None
Australian saltbush	<i>Atriplex semibaccata</i>	None
Wild oats	<i>Avena fatua</i>	None
Purple false brome	<i>Brachypodium distachyon</i>	None
Ripgut brome	<i>Bromus diandrus</i>	None
Soft brome	<i>Bromus hordeaceus</i>	None
Red brome	<i>Bromus madritensis</i>	None
Mouse-ear chickweed	<i>Cerastium glomeratum</i>	None
Nettle-leaf goosefoot	<i>Chenopodium murale</i>	None
African brass buttons	<i>Cotula coronopifolia</i>	None
Flax-leaf fleabane	<i>Erigeron bonariensis</i>	None

Common Name	Scientific Name	Removal/Management Priority
Broadleaf filaree/long-beak filaree/Storksbill	<i>Erodium botrys</i>	None
Red-Stem Filaree/storksbill	<i>Erodium cicutarium</i>	None
Round-leaf geranium	<i>Geranium rotundifolium</i>	None
Crete weed	<i>Hedypnois cretica</i>	None
Hare barley	<i>Hordeum murinum leporinum</i>	None
Smooth cat's ear	<i>Hypochaeris glabra</i>	None
Golden-top	<i>Lamarckia aurea</i>	None
Narrow-leaf cottonrose	<i>Logfia gallica</i>	None
White horehound	<i>Marrubium vulgare</i>	None
Cultivated timothy	<i>Phleum pratense</i>	None
Rabbitfoot grass	<i>Polypogon monspeliensis</i>	None
Fragrant everlasting cudweed	<i>Pseudognaphalium luteoalbum</i>	None
Common groundsel	<i>Senecio vulgaris</i>	None
Common catchfly	<i>Silene gallica</i>	None
London rocket	<i>Sisymbrium irio</i>	None
Common chickweed	<i>Stellaria media</i>	None

\* Plants that were apparently purposefully planted.

### 3.1.1 Silver Wattle

One individual of this tree (*Acacia dealbata*) was found near the center of the new property and should be removed (Figure 6). This individual tree was not of large size; however, this species is known to send out roots up to several meters away that can resprout after the main trunk is removed.

Complete removal of the tree may require treatment with herbicide and repeated removal of resprouts. This individual can be cut and treated with Roundup. It can be treated any time but treatment would be most effective during the active growing season in spring. The tree should be cut and the stump painted with a Roundup solution. If runners are observed, their foliage should be treated with Roundup spray. The area around the stump should be monitored to ensure that additional sprouts do not emerge.

### 3.1.2 African Fountaingrass

African fountaingrass (*Pennisetum setaceum*) is a smaller clumping grass that has spread in large part due to its popularity as an ornamental plant. This species possesses an ability to displace well-established native upland vegetation communities and will colonize disturbed areas, but will also invade areas of naturally occurring vegetation, such as coastal sage scrub and sandy/rocky outcroppings on slopes. Fountain grass is well adapted to fire and can increase in density following a burn.

---

On the existing property, a total of approximately 1.0 acre of fountain grass has been mapped primarily along or near Harmony Grove Road and Elfin Forest road within the Preserve (Figure 6). On the new property, this species occurs along the road up to Mount Whitney as well as along a trail near the center of the new property and along the main access road through the property to the west. It is not widespread on the new property at this point.

Since the majority of the African fountaingrass stands occurring on the new property are located on steep, sparsely vegetated slopes, herbicide treatment would be preferable to hand-pulling due to soil disturbance. African fountaingrass is a rapidly spreading species that is feasible to remove at this early stage of invasion of the new property. Recommended control for this species includes treatment with an appropriate herbicide prior to the development of mature seed heads. Should control not occur prior to maturation of seed, it is recommended that the seed heads be removed, bagged, and disposed of off-site, with the remaining grass clump receiving an herbicide treatment.

### **3.1.3 Pampas Grass**

Pampas grass (*Cortaderia jubata*) is a large clumping grass, about 6 to 8 feet tall. This aggressive, spreading, ornamental species produces significant amounts of biomass that is extremely flammable increasing the potential for fire ignition and/or spread. This species produces an abundance of seed, which is light, and can be wind-blown into the surrounding areas.

On the existing property, pampas grass was observed within southern mixed chaparral in the northern portion, totaling approximately 175 square feet (Figure 6). On the new property, this species was observed in one location along an east-trending drainage in the north-central portion of the property adjacent to the oak tree located there. Prior to the 2014 fire, the stand was quite significant both up and downstream from the oak. The grass grows from a large, woody root mass that did survive the fire; however, the fire seemed to have reduced the mass of the perennial root base.

Treatment and removal of pampas grass involves either hand digging or pulling/wincing plants out of the ground. If complete removal of the plant is not feasible, they may be cut to near the ground surface and treated with an appropriate herbicide. Treatment is recommended to occur prior to seed-set, and if viable seed is present at the time of treatment, plumes should be carefully cut and bagged to prevent seed spread. It typically requires multiple treatments and may require digging out the root system if it continues to regenerate.

---

### 3.1.4 Blue-Eye Cape-Marigold

Blue-eyed cape-marigold (*Dimorphotheca sinuata*) has been commonly used as a plant to provide cover to road cuts and freeway edges. It occasionally escapes into the natural environment. The fruits do not have a pappus so wind dispersal is not a major means for it to spread.

This species was observed in a few locations on the new property, mostly in the northern portion, and should be removed, although only a few individual plants were found at each location (Figure 6).

The populations that occur on the new property are currently quite small, which would facilitate removal of the species using mechanical hand tools. If the populations become too large to be manageable by hand, chemical treatment may be necessary. Because it has not yet become a serious pest, there is not much information on treatment for its removal. However, other comparable species have been treated with a 3% solution of Glyphosate (PHPPS 2017). Because it is an annual species, it is most important that it be treated in winter or early spring before seed is set and dispersed.

### 3.1.5 Eucalyptus

On the existing property, eucalyptus were observed in a small drainage in the northernmost region of the property, along sections of Harmony Grove Road, Elfin Forest Road, and a parcel south of Elfin Forest Road. Eucalyptus trees cover approximately 2.0 acres (Figure 6). The majority of the eucalyptus trees within the existing property include red gum (*Eucalyptus camaldulensis*) and blue gum (*Eucalyptus globulus*), with a few numbers of other eucalyptus species also present. On the new property, red gum (*Eucalyptus camaldulensis*) occurs along the road in the southern parcel.

While the Cal-IPC inventory categorizes eucalyptus species as having overall ratings of “limited” or “moderate,” they are ranked as a high priority for removal/control in the Preserve because of their tendency to displace native vegetation communities, the extent of their presence, and observed recruitment of new saplings. They are a large, nonnative species that has the capability of reproducing in Southern California. In addition, this species is also of concern for fire hazard since its physical characteristics (resin content) can increase fire intensity, transition ground fire to crown fires, and propagate spot fires through the dislodging of canopy material during windy conditions. Therefore, the best treatment for eucalyptus removal is through mechanical removal and herbicidal treatments. Eucalyptus trees may be cut and sprayed with the appropriate herbicide, or trees may be removed with the use of girdling and herbicidal treatment.

---

Herbicides should be applied within the first 1 to 2 minutes following cutting. Trees can be girdled past the xylem/phloem and treated with an appropriate herbicide. Follow-up herbicidal treatment may be necessary since sucker growth may occur. Removal can occur at any time of year. There are questions in Southern California about the value of eucalyptus as raptor nesting locations and whether the trees should be removed. The conclusion is that the more natural situation may be preferable due to the value of native trees and shrubs in providing nest sites for smaller birds that might be displaced by eucalyptus (Suddjian 2004).

### **3.1.6 Fennel**

Fennel (*Foeniculum vulgare*) is a perennial herb common throughout California. It can drastically alter the composition and structure of many plant communities, including grasslands, coastal scrub, riparian, and wetland communities. In addition, it can also alter fire regimes creating an intense, fast-moving fire. Fennel reproduces by root crown and seed. In some locations, particularly parts of Marine Corps Base Camp Pendleton, fennel is a widespread invasive that has altered landscapes or prevented the recovery of native vegetation from disturbance.

On the existing property, fennel was observed primarily adjacent to Harmony Grove Road, and in the northernmost portion of the property (Figure 6). Approximately 0.05 acre of this species was observed in total. On the existing property, this species occurs in a number of locations, predominantly along the major access roads.

Recommended control methods include cutting of the plants to near the ground, and treatment with an appropriate herbicide. Control should be performed prior to seed-set; however, if viable seed is present at the time of control, seed heads should be bagged and disposed of appropriately off-site. Follow-up herbicide applications may be necessary for control. Cutting, mowing, and chopping the plants with no herbicide treatment can leave the roots intact and ready to regrow. Repeated cuts may assist in killing the plants, but the interval between the cuts must be short. Cutting while plants are producing seed will promote rather than reduce dispersal. Prescribed burning by itself is not an effective means for removal of the plants, but fall burning with herbicide sprays during the following two springs can reduce fennel cover by 95 to 100% (Bossard et al. 2000). Roundup sprayed on the plants is reported to reduce fennel cover by 75 to 80%. Use of Roundup would be most effective during the spring active growing season.

### **3.1.7 Treasure Flower**

Treasure flower (*Gazania linearis*) was observed growing in the north-central portion of the new property. A relatively low number of plants were growing there, which should be removed to

---

reduce spreading potential. Due to their small number, this can be performed by hand and can occur at any time.

### **3.1.8 Natalgrass**

Natalgrass (*Melinis repens* ssp. *repens*) is a pink-colored grass that apparently spreads by wind. This species is an invasive pest in a number of locations worldwide including Australia, French Polynesia, and Florida.

Natalgrass was found growing in a few locations on the new property including, along the west side road and in the central portion of the property. It is a relatively recent invader. However, due to its ease at dispersing to the isolated portions of the property, even if it was removed, it would reinvade. It currently does not form dense stands in potential habitat areas. Efforts should be carried out to ensure that it remains only in low numbers. It can be controlled through physical removal and chemical control (Sylvan Kaufman 2014) during the spring active growing season, particularly prior to seed set.

### **3.1.9 Tree Tobacco**

Tree tobacco (*Nicotiana glauca*) is an invasive tree/shrub that was first introduced in California as an ornamental but has escaped and frequently colonizes areas of soil disturbance in a variety of upland habitats. It is a prolific seed producer and has a high rate of spread.

On the existing property, approximately 400 square feet of tree tobacco was observed, scattered along Harmony Grove Road, and in the southernmost parcel within the preserve (Figure 6). It tended to be located within previously disturbed habitat and had a limited presence in established natural habitat. On the new property, it was observed in low numbers growing in scattered locations through the property, mainly along roads and trails but also drainages. None of the locations supported a high number of individuals.

Mechanical removal is recommended initially, with an appropriate herbicide applied to remaining stump and plant parts if necessary. Follow-up treatments may be necessary. Control through the use of Roundup appears to work as foliar spray, drizzle, or cut stump application (Oneto et al. 2005) during the spring active growing season.

### **3.1.10 Castor Bean**

Castor bean (*Ricinus communis*) is a shrub-sized flowering plant used in commercial production for castor oil and other highly poisonous materials. It was also used as an ornamental plant in

---

subtropical and Mediterranean climates, such as Southern California. This perennial nonnative can become aggressive when proper growing conditions are present, creating monotypic stands, and displacing native vegetation along wetland margins, or moderately dry upland areas. It produces a substantial tuberous root, in which it can store moisture and energy through times of drought, and/or if aboveground plant parts are damaged, removed, or stressed. Castor bean spreads by seed and will resprout from a cut root. Seeds can be carried to new locations by moving water. The seeds are also stimulated by fire.

On the existing property, castor bean was observed in one location, along the southern side of Harmony Grove Road, covering approximately 0.15 acre (Figure 6). On the new property, a few plants were found in the southernmost parcel along Harmony Grove Road (Figure 6).

While its current footprint is discrete within the Preserve, and Castor bean is rated as “limited” by Cal-IPC, it is ranked as a high priority for control due to its relatively close proximity to the Escondido Creek riparian corridor, as well as its difficulty to completely control. Given its substantial tuberous root system, it can take multiple, regular herbicide treatments to achieve control. Recommended control for this species includes cutting and removal of aboveground plant parts prior to seed maturity for larger specimens that have developed a thick stem or trunk, and hand pulling for smaller seedlings and juveniles. Pulling the plants by hand when small or in wet soil is feasible in moist areas and during the winter rainy season. Application of an appropriate herbicide is recommended for remaining stumps and plant parts, as these can regenerate. If the soil is so dry that the plants break off, chemical treatment is needed. Foliar spraying with 2% Glyphosate can be used to kill mature shrubs during the spring season of most active growth. Cut stump treatment with saws and 25% Glyphosate can also be used to kill mature shrubs at any time of year. Removed invasive plants should be properly disposed of at off-site facilities.

### **3.1.11 Peruvian Pepper Tree**

Peruvian pepper tree (*Schinus molle*) is a widespread ornamental species in Southern California. It has been planted in numerous locations, including old historic sites. Its copious release of small peppercorn-like fruits and aromatic leaves cover the ground. It has a potential to become invasive.

On the existing property, peppertree is present along Elfin Forest Road within a Preserve parcel that forms a monotypic canopy (Figure 6). This area appears to be planted as ornamental vegetation. It has also been planted on a portion of the southern parcel of the new property (Figure 6).

---

Pepper trees can easily be cut to remove the aboveground biomass but are notorious for being able to resprout and send out root runners to nearby locations. It takes an effort of treatment to prevent the roots from reestablishing trees. Cutting the stump and treating it with Glyphosate and spraying Glyphosate onto the new growth of the root sprouts can eventually eliminate the tree, but individuals may require several treatments. Treatment can occur any time of the year. Spraying Glyphosate on new shoot growth can also occur any time of the year that the new growth is occurring but it would probably be most prolific in spring.

### **3.1.12 Milk Thistle**

Milkthistle (*Silybum marianum*) is a large, prickly-spiny thistle that can grow in dense thickets creating an impenetrable mass. It grows as an annual or biennial. It may be toxic to grazing animals though it is grown in some areas as an herbal medicine.

On the new property, it grows on a north-facing slope in a grassy area. It is also found on the southern portion of the northern block of parcels. Its removal should be a high priority. It can be dug up, but the seeds must be gathered as well and it must be monitored for consecutive seasons to ensure that new seeds do not germinate. Removal would be best prior to flowering and seed set during the late winter months.

## **3.2 REMOVAL METHODS**

The selection of the appropriate removal methodology should be determined with consideration of many variables, including the time of year, severity of infestation, presence of sensitive plants and wildlife, degree of intermixing of invasive species with sensitive native habitats, access, and proximity to surface water. General recommendations for the Preserve are provided below.

### **3.2.1 Manual Removal**

Manual vegetation removal (e.g., hand pulling, grubbing, and hoeing) is a low-impact but labor-intensive method of controlling invasive nonnative plant species within a focused area. Manual removal should be incorporated where herbicide application alone is inadequate, or proximity of sensitive plant species prevents safe application (e.g., overspray or drifting of herbicides). Weeds or nonnative plants in early stages of growth may be routinely pulled or removed when found along trails or in other areas of the Preserve. It may be applicable to smaller annual or biennial species such as the blue-eyed cape-marigold, treasure flower, and wild corn, but also prickly lettuce and bristly ox tongue. Using hand tools, it is possible to remove the tap roots of species as well as underground rhizomes for some herbaceous perennial species. Invasive nonnative plant material that may be feasible to remove using this method should be collected in air-tight

---

containers to prevent respread of seeds and other parts of the invasive weeds on the Preserve, and disposed of in a manner that does not promote spread or infestation of the species into new areas of the Preserve. It may be possible to contain the removed plant material on the Preserve for decomposition; however, that will take a concerted effort and might involve composting inside containers in which solar heat or heat from decomposition kills all potential propagules such as seeds and plant parts. If the plant material cannot be contained on the Preserve to decompose without regenerating, it should be carefully removed from the Preserve to a green waste facility or landfill.

### **3.2.2 Mechanical Removal**

Larger trees such as eucalyptus, wattles (*Acacia dealbata* and *A. longifolia*), Peruvian pepper tree, and Canary Island date palm (*Phoenix canariensis*) would most effectively be removed with chain saws and other mechanical devices. Since none of these species are extensive on the Preserve, it may be possible to chip the cut material on the Preserve and dispose of it on-site. However, monitoring would still be necessary to ensure that no seeds remain in the chipped material and no stems resprout from the cut stumps. For control of some of the woody perennial trees and shrubs, it might be necessary to add herbicide application to the cut stump shortly after cutting to provide the best available situation for the absorption of the chemicals by the vascular system of the tree or shrub. Stumps remaining on-site after cutting and herbicide application are not recommended for removal or grinding, but should be left to decompose in place.

### **3.2.3 Herbicides**

The application of herbicides to control target invasive species may be used on its own, or as a secondary treatment following manual or mechanical removal for controlling sprout growth and regeneration. Several types of herbicides may be effective on invasive species. Roundup (Glyphosate) has been used effectively on a number of plants, but additional herbicides can also be used on specific groups of species. The application of herbicide to control target invasive species may be used on its own, in limited areas in addition to cut root systems of trees. In a natural setting, it is difficult to apply the herbicides in a widespread manner without affecting adjacent native vegetation. Therefore, herbicide use should be limited to localized applications rather than foliar applications to eliminate the possibility for drift and impacts to neighboring desirable species.

A wide range of herbicides are available for such types of treatment whether application to a plant with a perennial root, spot treatments, or broadcast treatment of larger areas. Herbicide labels and material safety data sheets list susceptible target plant species and provide proper

---

direction in the use and handling of the products. Herbicides should be applied by state-licensed applicators.

### **3.2.4 Cut and Daub**

Cut and daub treatment is recommended for larger invasive plants to control regrowth and to kill the portion of the plant remaining below ground. Cut and daub involves the cutting of invasive plant stalks and then the direct application of an appropriate herbicide directly to the freshly cut stump. Other related methods include drill and fill where holes are drilled into the trunk of a tree and herbicide is injected; or the glove method, where an herbicide-soaked glove is used to apply directly to plant foliage or freshly cut stumps. It is critical that the herbicide treatment occur immediately after the plants are severed so that the herbicide is carried into the plant tissue. If enough time elapses to allow the cut surface of the severed plant to dry out, a fresh cut should be made prior to herbicide application.

---

This page intentionally left blank.

---

## 4.0 HABITAT RESTORATION

The goal of habitat restoration is to reestablish or enhance the biological functions and values of vegetation communities that have been degraded by either human or natural causes. Restoration methods range from active revegetation (involving soil preparation and planting), to passive management (involving weed control and allowing time for natural recruitment to occur). Active restoration may assist the recovery of an area that has been disturbed and is showing difficulty in recovering. Any proposed restoration activity should utilize current, accepted techniques and avoid/minimize impacts to sensitive species or native vegetation communities. Any proposed revegetation activities should use only local native species.

The purpose of restoration within the Preserve is to reclaim native vegetation community acreage lost or compromised due to human or other induced disturbance involving the clearing or grading of native vegetation. Restoring disturbed areas will provide an overall increase of acreage of native vegetation, connectivity of existing native vegetation, and erosion control in areas of disturbance. Restoration of these areas is important to the integrity of the surrounding vegetation communities, as cleared areas can provide opportunity for nonnative species to colonize (many nonnative annuals are flashy fuels that can increase fire danger), provide opportunity for erosion by exposing the soil surface, reduce acreage of native vegetation communities, and sever connectivity among vegetation communities.

In severe cases, fires may cause a change in vegetation that requires restoration of habitats. The Preserve has been subjected to a number of fires over the years. Within the last two decades, the Preserve has been subjected to two major fires. The Harmony Fire of 1996 burned 358 acres predominantly on the west side of the Preserve. The Cocos Fire of 2014 burned 125.09 acres on the northern and eastern sides of the new property within the Preserve. The Cocos Fire did not affect the existing property. Prior to those fires, a major fire occurred in 1943 that burned 427 acres. The new property was examined on the ground as well as through review of Google Earth aerial photographs to determine if the fires or other impacts or disturbances that may require restoration may have occurred. Google Earth images were examined from the following dates and the results are discussed below:

May 31, 1994	January 26, 2003	February 29, 2008	November 13, 2013
September 29, 1996	December 18, 2003	May 24, 2009	December 20, 2013
May 21, 2002	June 11, 2005	April 24, 2010	May 15, 2014
October 17, 2002	October 10, 2005	August 23, 2010	December 2014
November 5, 2002	January 21, 2006	October 27, 2012	April 14, 2015
December 31, 2002	January 31, 2008	November 2, 2012	March 22, 2016

---

## 4.1 PROPOSED RESTORATION AREAS

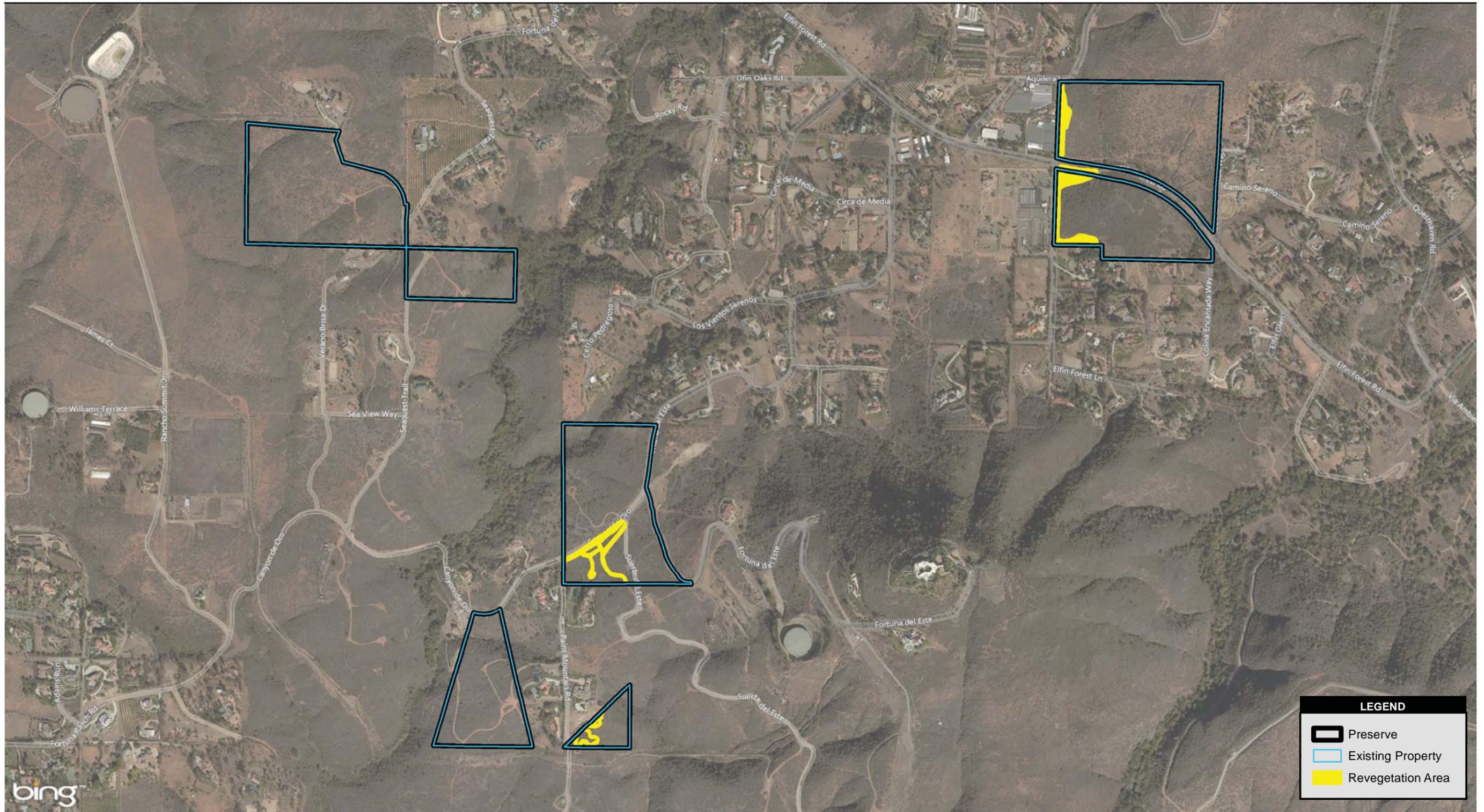
The Preserve is generally composed of high-quality native vegetation communities, and habitat restoration needs are limited within the Preserve. In general, the Preserve does not exhibit significant areas of heavy disturbance from past human activities based on the review of historic Google Earth imagery and on the ground surveys. However, several discrete areas of disturbed habitat, including old dirt road spurs, graded turnarounds, road shoulders, and nonnative plant removal areas are recommended for restoration. Restoration methods include active revegetation (including planting of native species) and passive management, which may involve weed control or simply monitoring natural recruitment of native shrubs in the area. Restoration activities should use only local native species from the general area and should follow accepted techniques to avoid impacts to native vegetation that already exists on the Preserve.

Within the existing property, 2.9 acres of disturbed habitat are proposed for restoration as illustrated in Figures 7a and 7b. Within the new property, approximately 1.5 acres of disturbed habitat are proposed for restoration as illustrated in Figure 7b. While 2014 Cocos Fire burned a significant portion of the new property, it is proceeding through a natural recovery process and this area is not recommended for restoration at this time. The role of restoration on a natural preserve is to reestablish natural functions of areas that have been affected by human causes.

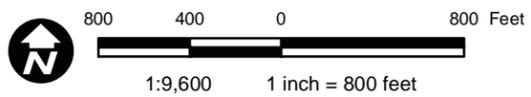
### 4.1.1 Trails

The level of restoration for a particular property that is being maintained as a preserve should also take into account ultimate goals for public access. Numerous vehicle trails exist on the Preserve as a result of access to SDG&E transmission towers. There are also a few walking trails that pass through portions of the Preserve; however, they are generally narrow and support close growing shrubs that will quickly close in if the unmaintained trails are closed off. Additionally, existing game trails will likely remain due to continued use by wildlife.

The main access road for the new property, sometimes marked as Way-Up Trail, traverses from Questhaven Road to the west onto the site, serving as an access for SDG&E transmission towers. It extends through the southern portion of the main parcels and includes loops and forks to access the tower pads. Eventually, in an unimproved state, it reaches a paved portion of Wild Willow Hollow Road that extends to the south to connect with Harmony Grove Road. An alternate access route occurs to the north that traverses along the west side of the new property and connects with Washingtonia Drive. However, that access may be required to remain locked because of right-of-way issues.

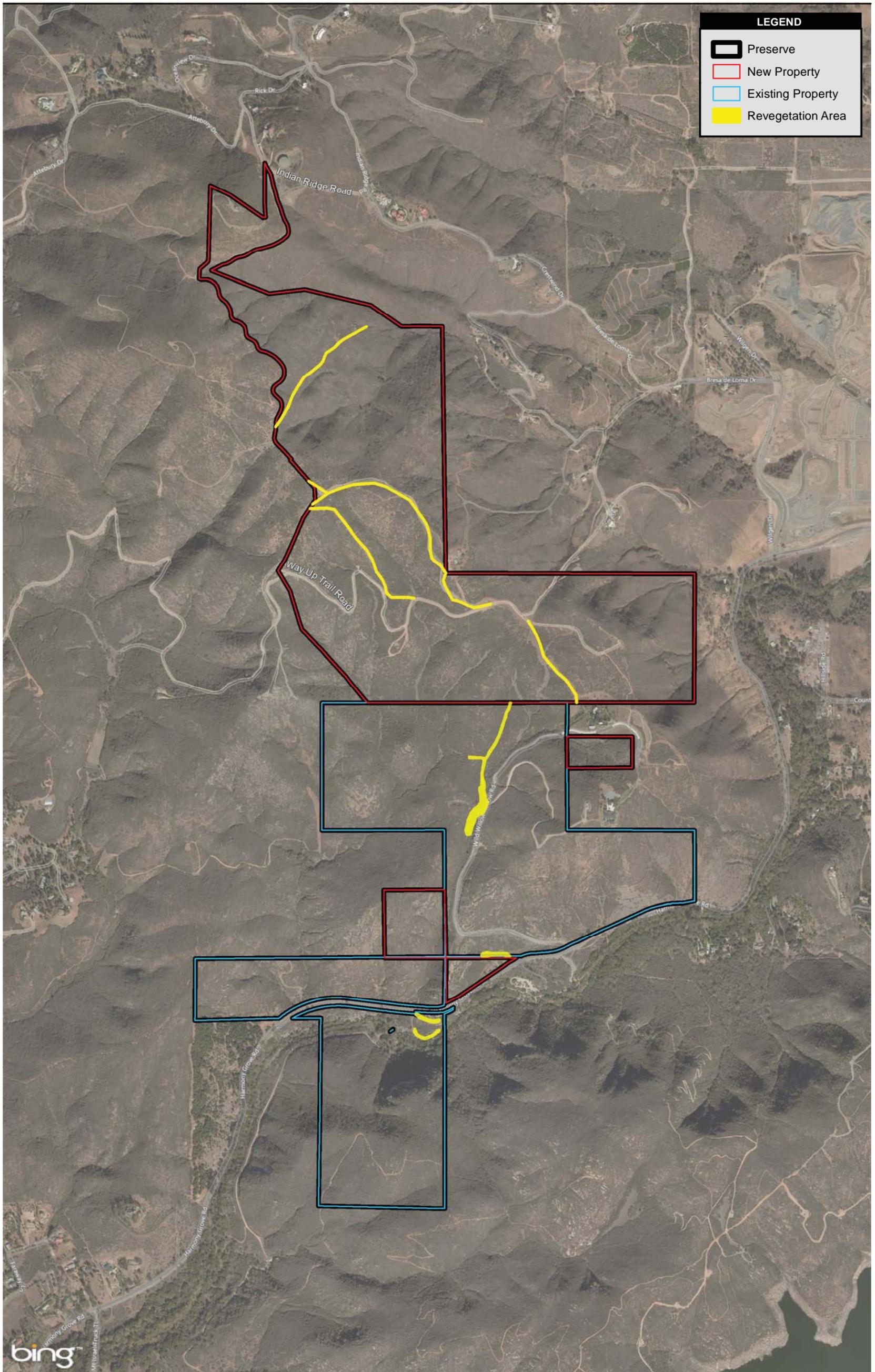


Source: ESRI; AECOM.



LEGEND	
	Preserve
	Existing Property
	Revegetation Area

**Figure 7a**  
**Revegetation Areas**



**Figure 7b**  
**Revegetation Areas**

Source: ESRI; AECOM.

1,000 500 0 1,000 Feet

1:12,000 1 inch = 1,000 feet

---

Overall, the Preserve has not been exposed to high levels of disturbance that needs restoration. A few roads and trails and old fuel breaks exist on the Preserve that should be restored, as they are not important for access through or into the Preserve nor are they involved with maintaining the SDG&E transmission towers. Figure 7b illustrates the old roads and trails and fuel breaks that should be restored within the new property. From the north, an old dirt road that is partially being reclaimed by natural vegetation growth extends to the northeast on the new property. It should be restored or monitored carefully to ensure that the natural revegetation progresses. In the central portion of the new property, a couple of old roads and an old fuel break that was apparently enhanced during the Cocos Fire should also be restored. Again, some natural restoration is taking place, but portions will likely need additional enhancement to fully recover.

## **4.2 RESTORATION METHODS**

Restoration of the historic fuel breaks and roads may occur using either passive means or active means. Passive restoration is monitoring habitats that are naturally restoring themselves. Barricades can be used to prevent unauthorized access from occurring through passive restoration areas. Weed control activities may assist in the restoration. Directed planting and seeding are not necessary because the areas are recovering and native vegetation is becoming established through natural means.

Active restoration involves preparing the soil and planting or seeding disturbed areas where native vegetation is not regrowing. On the new property, the passive restoration may be suitable for the areas previously cleared for fire breaks during the Cocos Fire. After the fire, the majority of the affected areas were subjected to a restoration process in which the soil surface was restored and shrub branches were placed over the areas with exposed soil. In most cases, these areas have seedlings of native shrubs as well as native annual plants growing on them. It is likely that they will recover without further treatment. However, in a couple of cases, the disturbance was great enough that they warrant monitoring to ensure that the natural revegetation process is proceeding. The potentially problematic area is the leg of a fire break that extends to the southern boundary of the large L-shaped parcel into an area that was already covered with nonnative annual grasses.

Two other areas proposed for restoration in the new property were as mentioned above, old roads that existed before the early 1990s. The more northerly road is in a process of natural restoration but still has evidence of the road grading. The east-west road in the central portion of the new property may have been enhanced during the Cocos Fire and may need additional restoration action. The two old road segments will likely require soil contouring to reduce erosion and

provide a stable slope for planting. In some cases, the act of creating a more stable slope will provide a surface that will be more readily vegetated by seeds dispersing onto the new property naturally. Otherwise, native plants and seed can be installed utilizing plant sources nearby. This may involve propagation of native stock collected from the area and then planting. The composition of the specific sites to be revegetated as well as plant quantities and rates should be determined on a case-by-case basis. Appropriate erosion control measures, such as placement of straw wattles and soil stabilizing mesh and burlap materials, should be installed to prevent or reduce erosion during the initial revegetation periods.

Several other old trail and road segments are proposed for restoration on the scattered parcels within the existing property. The treatment of these areas would include restoration following the same process as identified above for the new property.

Restoration of these road areas should prioritize seed application over installation of container plants. It might be possible to install container plants if installation is performed immediately prior to stormy weather with projected higher precipitation levels. Restoration would occur on areas that are most exposed and eroding. Straw wattles could be used on the larger slopes with larger watersheds from which runoff could be generated. Cross bars and straw wattles would be placed parallel with the contours. Seeding should occur after soil has been cultivated to break the compacted layer to a depth of 12 inches. No fertilizer is recommended for addition to the amendments, as this can favor establishment of faster growing, annual nonnatives. The final tilling pattern should avoid having the “rows” parallel to the fall line of the slope to reduce presence of microtopography, which may assist formation of rill or gully erosion.

Seeds should be raked into the soil to assist in reducing the exposure of the seeds to birds, rodents, and other seed predators. The seeding should occur in the fall season, before winter rains. Tables 7 through 10 provide seed mixes and plant palettes for areas of active restoration. These are native species that are common to southern mixed chaparral and coastal sage scrub found in the Preserve.

**Table 7. Chaparral Seed Mix**

Scientific Name	Common Name	%Purity	%Germination	Lbs/Acre
<i>Achnatherum coronatum</i>	giant needlegrass	70	40	2
<i>Adenostoma fasciculatum</i>	chamise	90	20	4
<i>Baccharis sarothroides</i>	chaparral broom	5	40	0.5
<i>Ceanothus tomentosus</i> var. <i>olivaceus</i>	woolly leaf ceanothus	95	65	2
<i>Eriogonum fasciculatum</i>	California buckwheat	10	65	4
<i>Eriophyllum confertiflorum</i>	golden yarrow	30	50	0.1

Scientific Name	Common Name	%Purity	%Germination	Lbs/Acre
<i>Eschscholzia californica</i>	California poppy	98	75	0.5
<i>Hazardia squarrosa</i>	sawtooth goldenbush	10	20	2
<i>Helianthemum scoparium</i>	rock rushrose	95	60	0.5
<i>Lasthenia californica</i>	California goldfields	50	60	0.5
<i>Lessingia filaginifolia</i>	sand aster	2	4	2
<i>Lotus scoparius</i>	deerweed	95	40	0.5
<i>Lupinus bicolor</i>	pygmy lupine	98	80	2
<i>Malacothamnus fasciculata</i>	chaparral mallow	15	60	4
<i>Malosma laurina</i>	laurel sumac	95	60	0.5
<i>Mimulus aurantiacus puniceus</i>	sticky monkeyflower	2	60	0.5
<i>Nassella lepida</i>	foothill needlegrass	90	60	2
<i>Plantago erecta</i>	dot seed plantain	98	75	1
<i>Rhamnus crocea</i>	spiny redberry	90	40	3
<i>Rhus integrifolia</i>	lemonade berry	90	60	4
<i>Salvia mellifera</i>	black sage	70	50	1
<i>Vulpia microstachys</i>	small fescue	90	80	1
<i>Xylococcus bicolor</i>	Mission manzanita	90	40	4
<b>Total</b>				<b>41.6</b>

**Table 8. Chaparral Container Plant Species**

Scientific Name	Common Name	Average Spacing, Feet on Center
<i>Adenostoma fasciculatum</i>	chamise	4
<i>Baccharis sarothroides</i>	chaparral broom	4
<i>Ceanothus tomentosus</i> var. <i>olivaceus</i>	woolly leaf ceanothus	5
<i>Ceanothus verrucosus</i>	wart-stemmed ceanothus	5
<i>Eriogonum fasciculatum</i>	California buckwheat	4
<i>Hazardia squarrosa</i>	sawtooth goldenbush	4
<i>Malacothamnus fasciculata</i>	chaparral mallow	6
<i>Malosma laurina</i>	laurel sumac	8
<i>Mimulus aurantiacus puniceus</i>	sticky monkeyflower	5
<i>Rhamnus crocea</i>	spiny redberry	5
<i>Rhus integrifolia</i>	lemonade berry	8
<i>Salvia mellifera</i>	black sage	5
<i>Xylococcus bicolor</i>	Mission manzanita	5

**Table 9. Coastal Sage Scrub Seed Mix**

Scientific Name	Common Name	%Purity	%Germination	Lbs/Acre
<i>Artemisia californica</i>	California sagebrush	10	65	5
<i>Encelia californica</i>	California encelia	40	60	5
<i>Eriogonum fasciculatum</i>	California buckwheat	10	65	4
<i>Eriophyllum confertifolium</i>	golden yarrow	30	50	1
<i>Eschscholzia californica</i>	California poppy	98	75	1
<i>Lasthenia californica</i>	California goldfields	50	60	1
<i>Lessingia filaginifolia</i>	sand aster	2	4	2
<i>Lotus scoparius</i>	deerweed	95	40	3
<i>Malosma laurina</i>	laurel sumac	95	60	1
<i>Mimulus aurantiacus puniceus</i>	sticky monkeyflower	2	60	1
<i>Nassella lepida</i>	foothill needlegrass	90	60	1
<i>Plantago erecta</i>	dot seed plantain	98	75	1
<i>Rhus integrifolia</i>	lemonade berry	90	60	4
<i>Salvia apiana</i>	white sage	70	35	3
<i>Salvia mellifera</i>	black sage	70	50	4
<i>Vulpia microstachys</i>	small fescue	90	80	1
<b>Total</b>				<b>38</b>

**Table 10. Coastal Sage Scrub Container Plant Species**

Scientific Name	Common Name	Average Spacing, Feet on Center
<i>Eriogonum fasciculatum</i>	California buckwheat	4
<i>Heteromeles arbutifolia</i>	toyon	12
<i>Malosma laurina</i>	laurel sumac	8
<i>Mimulus aurantiacus puniceus</i>	sticky monkeyflower	5
<i>Rhus integrifolia</i>	lemonade berry	8
<i>Salvia mellifera</i>	black sage	5

All of the proposed restoration areas in the existing property are adjacent, or reasonably near (within 100 to 200 yards) a primary or secondary road for access. On the new property, this access may be a bit more difficult but it is possible. Access may provide opportunity for irrigation, either from a tanker truck sprayer, or from existing utilities within the road right-of-ways, should they exist at the given locations. Seed application should occur prior to the onset of the winter rainy season to take advantage of the full growing season. An effective seed application technique would be to hand-broadcast seed, rake into the soil, and cover with a fine mulch seed topper at approximately ¼-inch depth. The fine mulch seed topper helps protect the

---

seed from getting eaten by birds and rodents, and also helps keep the soil moist during the rainy season.

While it should not be necessary for the most part, if container plants are installed, they should be installed in the fall at the onset of the rainy season. Without supplemental irrigation, installation of container plants would likely have limited success. Standard planting procedures should be employed for installing container plants. All container plants should be checked for viability and general health prior to installation. Holes approximately twice the size of the rootball of the plant should be dug using a shovel, post hole digger, or power auger. Holes should be filled with water and allowed to drain immediately prior to planting. Backfill soil containing amendments (such as a fertilizer tab, or equivalent), as directed by the project's biologist, should be placed in every planting hole following soaking, and container plants should be installed so that the top of the root ball is at grade or slightly above grade. Plants should be monitored for signs of stress or mortality. In the months following planting, and especially if dryer than average conditions exist, periodic hand watering may be necessary to help establish the plants. Chaparral and coastal sage scrub species that can be planted from container stock are included in Tables 8 and 10.

Weed removal in restored locations can utilize Glyphosate herbicide like Roundup and line trimmers that are mechanical. It is best to remove weeds by hand where container plants have been utilized to avoid damaging the plants with the herbicide. Establishment takes 2 to 3 years before the plants may be left to survive on their own without hand treatment and augmented watering. In the event that any of the weed species with high priority for removal become established in the restoration areas, herbicides can be used. They work well for eliminating thistles such as milk thistle (*Silybum marianum*) while they are still small rosettes. Herbicide treatment becomes less effective after the thistles reach a large size. Fennel (*Foeniculum vulgare*) can be treated the same way as the thistles are treated. If already grown, fennel can be cut and treated. Tree tobacco (*Nicotiana glauca*) can be cut and herbicide painted on the cut stems to ensure absorption by the plant.

---

This page intentionally left blank.

---

## 5.0 FIRE MANAGEMENT

### 5.1 CURRENT FIRE MANAGEMENT PRACTICES

The Preserve can be accessed via paved or maintained dirt roads. Some parcels of the Preserve contain power line access roads or other nonmaintained dirt roads/trails that can be used in fire suppression efforts. Existing dirt roads through the Preserve provide access that has been utilized in emergency situations to attack fire, set fire lines, or utilize backfires such as for the Cocos Fire and probably the Harmony Fire. It is likely that these roads have been used in the past during the fire events of the last two decades.

Fire management practices on the existing property are limited to fuel modification zones and defensible space near some, but not all, adjacent residences, and include the following:

- 30 feet of fuel treatment along either side of Canyon de Oro and Paint Mountain Road, which serve as an evacuation route
- Defensible space associated with Preserve-adjacent structures on APNs 264-041-13 and 264-042-87

Currently, no specific fire management practices are established or in place for the new property. An analysis of the fire environment has been conducted as part of this VMP. This analysis, presented in the following sections, provides the basis for evaluation of existing fire management practices and their adequacy for meeting Preserve goals and providing for public safety.

### 5.2 FIRE ENVIRONMENT

All of Southern California in the areas west of the lower desert floor is prone to fire, and fires have occurred extensively in the region of the Preserve as well as elsewhere in San Diego County. The major components that control the fire environment are climate or specific weather conditions, topography, and vegetation/fuels. The status of these components at any time and their relationship with each other affect the behavior of fire over the Preserve. A discussion of the existing conditions on the Preserve provides an understanding of the potential of fire occurring on the Preserve and its level of intensity.

Wildfires occurred naturally in Southern California prior to European contact, either ignited by natural causes such as lightning or the result of indigenous human inhabitants. In the past two decades, large human-caused fires have burned throughout the region. Long-term drought combined with control of fires over the past several decades may have aided in the accumulation

---

of fuels in natural vegetation communities (Minnich 1983; Minnich and Chou 1997; Minnich 2006). Wildfires will continue to have a major effect in native landscapes, in particular as global climate change occurs as a result of greenhouse gas buildup (San Diego Foundation 2008). Each fall, following a long summer with little or no precipitation, the vegetation reaches highly flammable conditions. Extreme weather with single-digit humidity and strong east winds and high temperatures associated with Santa Ana wind events enhance the hazardous fire conditions. Human-caused fire ignitions occur with regularity and when such ignitions take place during extreme weather conditions, rapidly moving fires are inevitable in wildland areas.

The Preserve is mapped on the CAL FIRE California Fire Hazard Severity Zone (FHSZ) map as Very High Fire Hazard (CAL FIRE 2009). This “is based on a combination of fuel/vegetation, terrain and seasonal climate. Government Code 51175-89 directs the California Department of Forestry and Fire Protection (CAL FIRE) to identify areas of very high fire hazard severity zones within Local Responsibility Areas. Mapping of the areas referred to as Very High Fire Hazard Severity Zones (VHFHSZ) is based on data and models of potential fuels over a 30-50 year time horizon and their associated expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure to buildings.”

### **5.2.1 Climate**

The climate of the Preserve is influenced by the Pacific High pressure system from the Pacific Ocean. The precipitation from this system typically occurs in winter through a series of sporadic storms that progress southward from the north. The yearly variation from this system is high, with numerous below-normal rainfall seasons. Summers are generally warm and dry, with some coastal low-cloud influence occurring in the early part of the day. The closest consistent weather station to the Preserve is the Escondido Station 2 located near the Escondido Civic Center approximately 4 miles east of the Preserve (Western Regional Climate Center 2016).

Average annual precipitation at the Escondido Station 2 is 14.93 inches of rain, with the greatest amount, 3.46 inches, falling in February (Table 11). July and August are the driest months, with only 0.08 inch of rain recorded. The summer months, from June through September, are generally dry and receive less than 0.25 inch of rain. The Preserve is located at a higher elevation and nearly 3 miles closer to the coast than the rest of Escondido, and potentially receives slightly more than the average rainfall in Escondido. The average high temperature for August is 88.6 degrees Fahrenheit (°F), but extreme temperatures associated with Santa Ana wind events can occur in September and October. Santa Ana wind events drop humidity to below 10% and may raise the temperature to well over 100°F; these periods are when wildfires typically occur. Because it is located closer to the coast than Escondido, the Preserve may also be exposed to slightly lower maximum temperatures than Escondido.

**Table 11. Rainfall Data for Escondido 2, California Weather Station (042863)**

Period of Record: May 1, 1979 through March 27, 2013													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<b>Average Maximum Temperature (°F)</b>	69.0	69.0	70.3	74.5	76.6	82.0	87.2	88.6	86.6	79.9	73.3	68.9	77.2
<b>Average Minimum Temperature (°F)</b>	43.1	44.4	47.1	50.4	54.6	58.1	62.1	63.3	61.4	55.2	46.6	41.8	52.3
<b>Average Total Precipitation (inches)</b>	3.00	3.46	2.71	1.14	0.26	0.12	0.08	0.08	0.20	0.74	1.33	1.82	14.93

The precipitation season 2004–2005 and 2010–2011 are the only two seasons that had above normal rainfall since 1998 for this region when, respectively, nearly 27 inches and more than 20 inches fell, respectively (Weather Warehouse 2014). The 2013–2014 season was the driest on record for Escondido with only 5.06 inches (Murphy 2014), the third below-normal rainfall season in a row.

Winds generally flow from the northwest, particularly in the afternoons. Due to the presence of the Pacific Ocean with its stable temperatures and the desert southwest interior, as the land heats in the interior, it creates a thermally induced low-pressure system that draws in cooler air from over the ocean, partially stimulated by the rotation of the eastern Pacific high-pressure system. During the night, as the land cools, the ocean may then draw air westward since its temperature continues to be stable. During fall, when interior high pressure may interact with offshore low-pressure gradients, offshore winds referred to as Santa Ana winds may develop with high velocity. During winter, associated with strong Pacific storms, winds from the west may be strong as well.

Fire season in this area may occur practically any month of the year and significant fires have occurred in February and May including May of 2014 under conditions of mid-90s to 103°F temperatures and gusty northeasterly winds (Office of Emergency Services 2014). However, generally, greater fire threat begins following the drying of the vegetation after spring. In fall, the fire season extends until the first significant rains, usually toward the end of October or November, but even later if rainfall is not significant.

One of the closest fuel moisture measuring stations is located on 4S Ranch, roughly 6 miles to the south. Hot dry weather during the end of August and through September lowers the moisture level significantly and it continues to decline. Average value for chamise from 2002 through 2015 indicates that fuel moisture is highest in March, April, and May, peaking at 110%, but dropping to around 60% for the period from mid-August to mid-October. Typically, the fuel moisture begins to increase again during late October (National Fuel Moisture Database 2017).

---

### **5.2.2 Topography**

The topography of the existing property includes moderate and steep slopes with elevation ranges from approximately 360 to 1,040 feet AMSL. The parcels in the northeasternmost portion of the property are characterized primarily by the steep slopes associated with San Elijo Canyon. In this area, the property includes steep north- and south-facing slopes dropping toward Escondido Creek. Elevations in this area range from 440 feet to 1,040 feet AMSL while slope measurements reach 120% (approximately 50 degrees). The parcels in the central portion of the property (adjacent to Elfin Forest Road) are characterized by north- and south-facing slopes dropping toward Elfin Forest Road and a small drainage feeding Escondido Creek to the south. Elevations in this area range from 480 feet to 760 feet AMSL while slope measurements reach nearly 85% (approximately 40 degrees). The parcels composing the southwest portion of the property are situated within three drainages that flow southward to Escondido Creek. The topography of this area is characterized by east- and west-facing slopes. Elevations in this area range from 360 feet AMSL along drainage bottoms to over 760 feet AMSL. Slope measurements in this area reach 85% (approximately 40 degrees).

The new property contains steep sloping lands to the east and south. Elevations range from 607 feet on the southeastern end of the northern segment of the new property to 1,738 feet on the top of Mount Whitney. The central portion is roughly 1,100–1,300 feet in elevation. The southern two parcels range from approximately 520 feet in elevation along Harmony Grove Road to 890 feet on the northwestern corner of the square parcel. The topography of the property will provide acceleration of wind speeds due to its proximity to the flat areas in the western side end of Escondido. The abrupt nature of the elevation increase on the property creates a wind obstruction, which results in acceleration of the wind speed at the higher ridge and Mount Whitney peak. The existing dirt vehicle access roads provided means for fighting the fire to prevent it from spreading across the entire property. Apparently, such actions have been successful in the past since both the Harmony Fire and Cocos Fire stopped within the new property. Access to the interior of the property during a fire event would be hazardous. However, if a fire was some distance away, the interior access roads on the property may be suitable for use to create backfires or fuel reduction zones just as they have in the past.

### **5.2.3 Watershed Description**

The Preserve is located within the Carlsbad Watershed and all waters from Preserve lands drain to Escondido Creek, which flows through Elfin Forest and enters the ocean through San Elijo Lagoon. Flood periods occur occasionally in this region. The greatest flood on record occurred in January 1916, during which more than 19 inches of rain fell in the City of Escondido for the month (McGlashan and Ebert 1918). Other floods occurred in 1927 and more recently in 1980.

---

The January 1916 flood is generally considered a 100-year flood, but the channel of Escondido Creek through Escondido was designed to carry a 500-year level flood.

The northeast portion of the existing property is located within San Elijo Canyon, through which water flows to Escondido Creek. A small tributary flows southward through the central portion of the property toward Escondido Creek, located approximately 2,000 feet downstream. The parcels composing the southwest portion of the existing property are situated within three small drainages that flow southward to Escondido Creek, approximately 4,000 feet downstream from the southernmost parcel in this area. Escondido Creek flows westward and terminates at the Pacific Ocean approximately 7 miles from the westernmost portion of the existing property. The headwaters of Escondido Creek are located in Bear Valley, just above Lake Wohlford (Escondido Creek Conservancy 2014). Lake Wohlford is the largest storage reservoir on the creek and is located approximately 9 miles northeast of the new property.

#### **5.2.4 Fire History**

Fire history is an important component in understanding fire frequency, fire type, significant ignition sources, and vulnerable areas. The topography, vegetation, and climatic conditions associated with the Preserve combine to create a unique situation capable of supporting large-scale, high-intensity wildfires.

Based on historical fire data from CAL FIRE and SANGIS (2014), the Preserve has been affected by five different wildfires with parts of the property burning up to three times (Tables 12 and 13, and Figure 8). The most recent fire to burn the Preserve was the Cocos Fire of May 2014. The Cocos Fire burned the eastern slope of the new property, affecting 125.09 acres. The existing property was unaffected by the Cocos Fire. Prior to that, the Harmony Fire of 1996 burned 358.51 acres of the Preserve, affecting the northern portion of the existing property, and the south and west sides of the new property. The Harmony Fire in 1986 burned a very small amount, 0.25 acre of the Preserve. The largest fire was in 1943 with 427.87 acres burned. Table 13 indicates the numbers of acres burned in each fire and the percentage of the Preserve burned in each fire.

A very small amount of the Preserve, 0.29 acre or 0.05% burned in three fires: the 1943 fire, the Harmony Fire of 1996, and the Cocos Fire of 2014. Surprisingly, a large amount, 269.39 acres or 44.30% of the Preserve, has burned only once, in either the Cocos Fire or the Harmony Fire of 1996 (see Table 13). In actuality, there was not a great deal of overlap between the Cocos Fire and Harmony Fire.

---

**Table 12. Quantity of Times Burned**

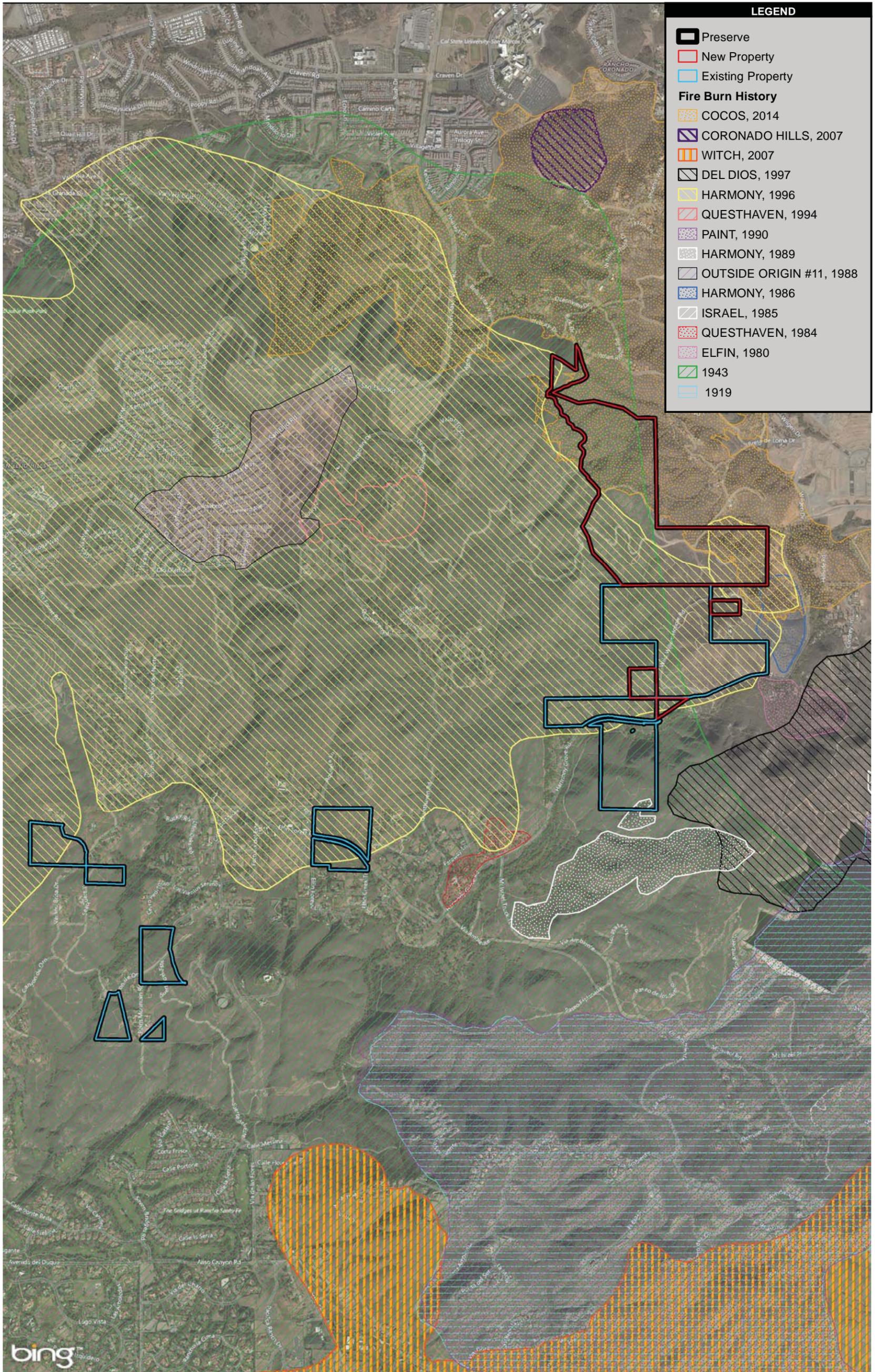
<b>Quantity of Times Burned</b>	<b>Acreage</b>	<b>Percentage</b>
0	17.34	2.85%
1	269.39	44.28%
2	321.39	52.82%
3	0.29	0.05%

**Table 13. Fire Interval Data**

<b>Fire Year</b>	<b>Fire Name</b>	<b>Interval (years)</b>	<b>Acreage Burned</b>	<b>Percent of Preserve Burned</b>
1943	Unnamed	Unknown	427.87	70.36%
1986	Harmony	43	0.25	0.04%
1989	Harmony	3	1.66	0.27%
1996	Harmony	7	358.51	58.95%
2014	Cocos	18	125.09	20.57%

Furthermore, for 17.34 acres Preserve, there is no record of a fire occurring. The majority of the land that has not seen fire occurs on the new property. It is located in a patch between the areas affected by the Cocos Fire and the Harmony Fire of 1996, in the middle of the property along a ridged top area. On average, the interval between fires for the areas that have burned is roughly 14 years for the Preserve; however, the individual portions of the Preserve have not burned that frequently since only a very small portion of the Preserve burned in three fires. Roughly 21% of the Preserve is covered with vegetation that is 2.5 years old (associated with the Cocos Fire) and 60% is covered with vegetation that is 21 years old associated with recovery since the 1996 Harmony Fire.

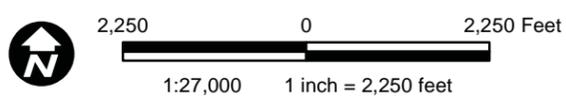
Younger-age vegetation is generally less flammable than old vegetation, particularly when the old vegetation contains large amounts of standing dead material. This is likely why there was only a limited amount of vegetation burned in both the Harmony Fire of 1996 and the Cocos Fire. As the vegetation continues to recover, even with drought conditions with few above-normal rainfall seasons, the aging process will cause the vegetation to become more susceptible to new fires, especially during extreme weather conditions of heat, wind, and low humidity.



**LEGEND**

- Preserve
- New Property
- Existing Property
- Fire Burn History**
- COCOS, 2014
- CORONADO HILLS, 2007
- WITCH, 2007
- DEL DIOS, 1997
- HARMONY, 1996
- QUESTHAVEN, 1994
- PAINT, 1990
- HARMONY, 1989
- OUTSIDE ORIGIN #11, 1988
- HARMONY, 1986
- ISRAEL, 1985
- QUESTHAVEN, 1984
- ELFIN, 1980
- 1943
- 1919

Source: SanGIS.



**Figure 8**  
**Fire History Map**

---

This page intentionally left blank.

## 5.2.5 Vegetation Dynamics and Fuel Loads

Various models have been created to assess the behavior of fire in vegetation. Fuel models have been designed to address the variables associated with the vegetation communities that occur on the Preserve. A number of studies have evaluated these and several were reviewed in order to place the vegetation types into fuel models (Anderson 1982; Scott and Burgan 2005; Weise and Regelbrugge 1997, Andrews et al. 2008, Andrews 2009). Fuel model categories often utilized in the BehavePlus model are indicated in Table 14. These vegetation classifications follow the Holland/Oberbauer categories from Figure 3b. The model categories are included here for information purposes since the County standard model was used for the analysis in this plan as described in Appendix F.

Chaparral and sage scrub contain high levels of stem and leaf resin and they often retain dead plant material in addition to supporting a growth form that carries fire with high intensity. During extreme severe weather conditions of low humidity, high heat, and wind, the National Weather Service declares a Red Flag Warning indicating severe weather hazard for fires. During those conditions, fires may occur in most vegetation and will even burn younger-age vegetation, particularly if it has a high level of annual weed growth, though it might burn with lower intensity than if it was older. If nonnative invasive species become established, the frequency of fires in the overall area can be affected because high levels of dried annual fuels can become easily ignited (Brooks et al. 2004).

**Table 14. Vegetation Communities and Associated Fuel Models for the Preserve**

<b>Vegetation Community Land Cover<sup>1</sup></b>	<b>Fuel Model<sup>2</sup></b>	<b>Acres</b>	<b>Percentage</b>
Coast Live Oak Woodland / Open Coast Live Oak Woodland	TU5	1.88	0.31%
Eucalyptus Woodland	TU5	1.42	0.23%
Southern Coast Live Oak Riparian Forest	TU5	6.35	1.04%
Southern Riparian Woodland	TU5	0.91	0.15%
Southern Willow Scrub	TU5	1.91	0.31%
Southern Mixed Chaparral / Southern Maritime Chaparral	SH5	410.55	67.51%
Coastal Sage-Chaparral Transition	SH 4	46.85	7.70%
Diegan Coastal Sage Scrub	SCAL18	97.63	16.05%
Valley Needlegrass Grassland	GR2	1.51	0.25%
Nonnative Grassland	GR2	12.17	2.00%
Disturbed Habitat/Agriculture	GR1	18.22	3.00%
Urban Developed	--	6.42	1.06%
Non-Native Vegetation	SH4	2.32	0.38%
<b>Total<sup>3</sup></b>		<b>608.14</b>	<b>100%</b>

<sup>1</sup> Holland Code is basis for models.

<sup>2</sup> Does not include graded/maintained or urban developed land.

<sup>3</sup> Number may not sum due to rounding after summation.

---

## Vegetation Dynamics

Vegetation contributes the greatest amount to fire behavior and modeling. Vegetation is dynamic in terms of varying over time. Succession of vegetation as it regrows following previous fires and drought are major factors that affect vegetation at any given time. The biomass on the Preserve will continue to increase over time as the shrubs grow larger following the Cocos Fire from only 3 years ago and the Harmony Fire that occurred 20 years ago. Fires with short intervals may affect regrowth of shrub vegetation, particularly in areas with fine soils. However, even though fires have recently occurred on portions of the Preserve, the shrubs have been growing strongly to replace those burned in the fires.

The new property is generally isolated from major urban development except for a relatively recently built housing development roughly 0.6 mile to the north. More rural estates are located on its east side but there is also urban development on the east side approximately 0.8 mile away. It is probably more typical that ignitions from the housing area would burn upslope to the west to affect the new property; however, during a strong east wind, any fire that was ignited on the new property itself or on any land many miles to the east could be carried to the west onto the new property and downslope toward the nearby rural residential development. Fuel treatments may be necessary to prevent fire from entering the new property from the west or east as well as being carried through the new property into the surrounding areas.

One off-site pad at the end of Bresa de Loma Drive is quite close to the new property where a dwelling was apparently begun, but a large area has been cleared around the site. No part of the new property exists within 250 feet of any structure. However, all of the new property could be considered as part of the WUI because it is entirely identified as VHFHSZ.

The northeastern portion of the existing property is adjacent to the new property and would be evaluated in the same manner as described above. However, the existing property is more embedded into areas with adjacent housing that could be a source for fire in the Preserve properties. The western parcels may be more likely affected by fire coming from the west than from the east due to the presence of a large number of houses in the east. The southwestern parcels are on the downslope of a large hill with a large dwelling on the top and an east wind-driven fire could also pass that area onto the Preserve parcels. The central parcel in the existing property has houses on the west, east, and south. This would have an effect of slowing most wildfires other than those that burn through the surrounding houses, which could be possible during a major east wind event. The northeast corner could also be a source for east wind-driven fire onto the property.

---

Using the standardized model in the County Report Format and Content Requirements Wildland Fire and Fire Protection (County of San Diego 2010) in which the Preserve is considered a Transitional Zone area, the County ran two scenarios for the BehavePlus model: Fuel Model 1 and Fuel Model 4. Model 4 represents more of an extreme condition than Model 1. Under Model 4, the maximum rate of spread of fire during extreme conditions may reach 1,600 feet per minute with 87-foot flame lengths. However, under the more moderate Model 1, maximum rate of spread is 730 feet per minute with flame lengths of 13 feet (see Appendix F).

Southern mixed chaparral and southern maritime chaparral make up the dominant vegetation on the Preserve, covering approximately 410 acres or 68% of the Preserve. Sage scrub-chaparral mix covers approximately 47 acres or 8% of the Preserve. Diegan coastal sage scrub covers approximately 98 acres or 16% of the Preserve. Woodlands and riparian composed of eucalyptus, coast live oak woodland, open coast live oak woodland, southern coast live oak riparian forest, southern riparian woodland, and southern willow scrub cover approximately 12 acres or 2% of the Preserve. Native and nonnative grassland covers approximately 14 acres or 2% of the Preserve mostly within flat-bottomed drainages. Disturbed land, nonnative vegetation, and agriculture cover approximately 21 acres or 3% of the Preserve in the areas that have been heavily altered. Developed areas constitute approximately 6 acres or 1% of the Preserve associated with the graded roads and pads for the transmission towers.

Changes in the vegetation communities on the Preserve will occur with the lack of disturbance. The vegetation, particularly the shrubs, will continue to build biomass as they grow and, in many cases, retain dead material that may have broken off or been killed by drought.

### **Chaparral Fire Effects**

The majority of the Preserve, approximately 410 acres or 68%, is covered with mixed chaparral, a combination of broad-leaved species such as wild lilac (*Ceanothus tomentosus* and *Ceanothus verrucosus*) and narrow-leaved species such as chamise. Shrubs generally grow to around 10 feet tall. Most are evergreen though they may lose a number of their leaves during extended dry periods. Following fires, plants such as mission manzanita (*Xylococcus bicolor*), scrub oak (*Quercus* sp.), and toyon (*Heteromeles arbutifolia*) may resprout from underground root crowns that survive the burning of the upper part of the shrub. Others like *Ceanothus* only reproduce by seed. Chamise, one of the most dominant shrubs, reproduces by both seed and resprouting (Conrad 1987; Keeley 1987).

The average fire interval on the Preserve is roughly 17.5 years for the areas that have burned as indicated from the fires that have occurred over the past 98 years. Historic fire frequency is more likely to have been in the range of 50 to 100+ years (Conard and Weise 1998; Zedler 1995). The

---

number of ignitions in modern times is the result of the greater population in the region and higher probabilities for ignitions to occur.

Fires usually consume the aboveground portion of the plants. Charred skeletons of the hard woody plants may stand for many years after the fire. The resprouting shrubs begin new growth relatively quickly following a fire. Following the winter rains, germination of the seed-reproducing species such as wild lilac and *Ceanothus* takes place. Large numbers of annual wildflowers such as phacelias (*Phacelia grandiflora*, *Phacelia parryi*, *Phacelia*, California poppy (*Eschscholzia californica*), fire poppy (*Papaver californica*), annual monkey flower (*Mimulus brevipes*), and ground pinks (*Linanthus dianthiflorus*) grow. Short-lived perennials such as golden eardrops (*Ehrendorferia chrysantha*) also appear. Geophytic plants such as death camas (*Toxicoscordion fremontii*), wild hyacinth (*Dichelostemma pulchella*), and Mariposa lilies (*Calochortus splendens*, *Calochortus weedii*) send up flowering stalks for the first few springs following a fire. Annual weeds may also spread into chaparral habitats during these periods; however, on the Preserve, the chaparral shrubs appear to be stable or advancing more than the weedy species are advancing even with the effects of fire.

Following a fire, the chaparral vegetative biomass will continue to increase for many decades unless a fire consumes the vegetation in the meantime. Some chaparral species live longer than others. Some of the obligate seeding wild lilac and other *Ceanothus* are thought to decline after long periods of time without fire though they are still represented in a seed bank that persists for very long times (League 2005). Other chaparral species may continue to grow unabated for additional decades to old ages. Periods of drought or stress may cause temporary die-back on some of the chaparral shrubs, and, in an area where wood decay is slow, the dead material accumulates until another fire occurs. Little seed reproduction of any kind occurs in chaparral between fire intervals (Zedler 1995).

### **Coastal Sage Scrub Chaparral Transition Effects**

Approximately 47 acres or 8% of the Preserve is mapped as Coastal Sage Scrub-Chaparral Transition. It includes both chaparral species, predominantly chamise (*Adenostoma fasciculatum*) and representatives of coastal sage scrub including, in particular, California sage brush (*Artemisia californica*) and California or flat-topped buckwheat (*Eriogonum fasciculatum*). Coastal sage scrub in general does not burn as intensely as chaparral because of the lower level of biomass present. Therefore, burn behavior for this vegetation classification would be similar to that of mixed chaparral but a bit less intense due to the lack of hard-stemmed, broad-leaved shrubs with high levels of biomass.

---

## **Riparian and Woodland Effects**

Woodlands and riparian composed of eucalyptus, coast live oak woodland, open coast live oak woodland, southern coast live oak riparian forest, southern riparian woodland, and southern willow scrub cover approximately 12 acres or 2% of the Preserve. Coast live oak trees are generally resistant to fires due to their thick bark though some mortality occurs for adult trees due to stresses from disease or drought that has weakened the trees (Steinberg 2002). The level of flammable understory growth also plays a role in determining how much mortality trees undergo during fires. Following a fire, upper branches typically resprout, producing new growth. If the main trunk is damaged, the trees may also resprout from the base. The level of mortality and affected ability to resprout depend on a number of factors, including the severity of the weather conditions such as heat and humidity, and the intensity of the fire resulting from understory, adjacent vegetation, and level of standing dead material in the area. While large oak trees are resistant to damage from fire, younger trees are much more susceptible to damage from fires (Plumb 1980). Recovery of trees from fires may take several years. The trees that burned in the Cocos Fire appear to be recovering without significant issues at this time. Riparian trees, including willows and cottonwoods, will resprout following a fire from root bases so that their growth is renewed.

## **Diegan Coastal Sage Scrub Fire Effects**

Diegan coastal sage scrub covers approximately 98 acres or 16% of the Preserve. Following fire, typical sage scrub succession includes a predominance of annual herbs during the first year. Non-native species may dominate a landscape after wildfire due to their success in establishing quickly and outcompeting many native species. Non-native species tend to decline in subsequent years without fire or other disturbances as shrubs establish and attain greater cover. Perennial herb understory species, which may grow from resprouts, show low recruitment from the soil seed bank. Unlike herbaceous annuals, the overall diversity of perennial understory herbs remains constant the first few years following fire. New species continue to become established in recovering sage scrub, reaching a peak at 5 to 10 years after a fire. After the peak in species diversity, there is a general decline in perennial understory herb species, possibly attributable to shading effects from dominant shrubs (Wills 2000; Keeley and Keeley 1984).

Lack of fire will allow shrub cover to return to burn areas over time. Recovering shrub cover is less likely to burn in the first 20 years during typical weather conditions but will burn under extreme fire events (Moritz 2003). Shrub cover will continue to increase in volume, and, within approximately 7 years, the fire hazard will increase corresponding with fuel age (Keeley 2005). Changes in land use will also affect the vegetation distribution pattern. For example, the encroachment of nonnative plants is likely based on the proximity of residential development and ornamental landscaping to the Preserve.

---

## **Grassland Fire Effects**

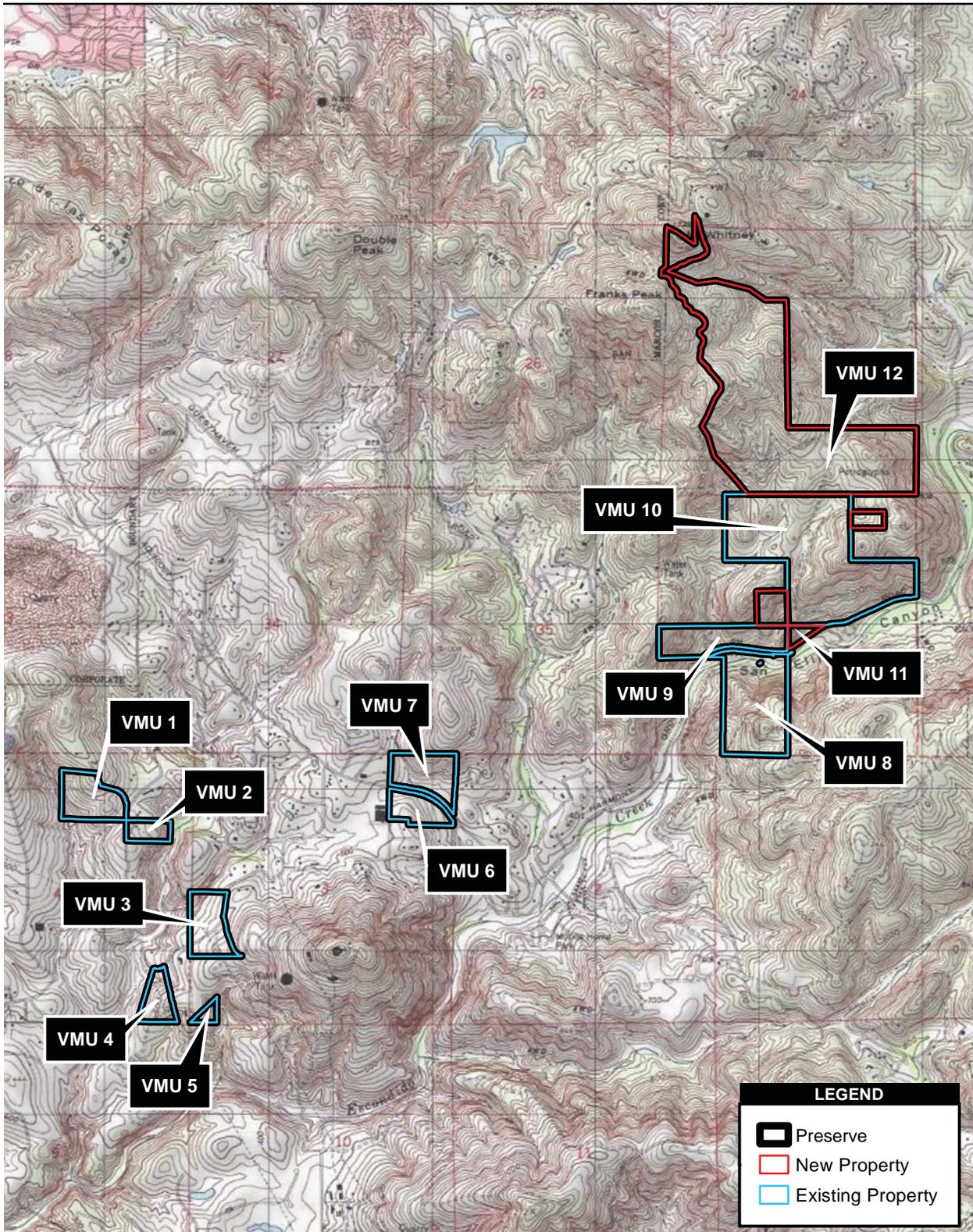
Native and nonnative grassland covers approximately 14 acres or 2% of the Preserve. Annual and perennial grassland response to fire depends on the season in which the fire occurs; the height of the vegetation depending on the rainfall of the previous season; and the variables of wind speed, temperatures, and humidity. In some cases, burning annual grassland may enhance the reproduction of native annuals and perennial grasses; however, it also may stimulate the spread of nonnative species. The best time for burning of species to enhance native species is when the native plants have dispersed their seeds but the nonnatives are still in the fruiting stage (DiTomaso and Johnson 2006). On this Preserve, the grassland habitat is predominantly confined to strips of low terrain along the bottom of several drainages in the new property. These may be natural areas for annual plants due to the soils. A few of them may have been expanded by fire-fighting operations. On the existing property, grassland occurs on the edges of a number of parcels.

## **Fire Behavior**

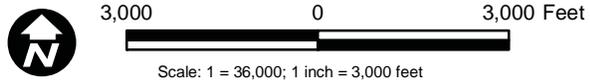
The County of San Diego Report Content Requirements (County of San Diego 2010) regarding Wildland Fire and Fire Protection provides information regarding fire behavior modeling. Fire behavior modeling provides reasonably accurate representations of how wildfire would move through available fuels in high-fire hazard areas. The Fire Behavior Model is a tool for fire authorities to estimate the behavior of fire that is moving across the vegetated landscape given certain assumptions. The Behavior Models are only an estimate and are not designed to replace eye-witness accounts or the experience of the local fire authority having jurisdiction that is familiar with wildland fire behavior. Additional information on the fire behavior assessment for the Preserve is included in Appendix F.

## **5.3 FUEL MANAGEMENT METHODS**

Successful fire management requires preplanning and utilization of fire prevention techniques and strategies. As the majority of the existing property (65%) and nearly half of the new property have been fire-free for over 20 years, management of fuels is an important component of overall Preserve management. To that end, VMUs, based primarily on parcel boundaries, topography, and access, have been delineated on the Preserve to assist with fuel management planning. Figure 9 illustrates the VMU boundaries. The existing property includes nine VMUs and the new property includes two VMUs. VMU-specific fuel reduction recommendations are provided in Section 6.3. A list of general fuel management methods and their suitability for use in the Preserve are discussed below. General fuel management methods and their suitability for use in the Preserve are also discussed below.



Source: USGS 7.5' Topographic Quadrangle Valley Center CA 1975



**Figure 9**  
**Vegetation Management Units**

---

### **5.3.1 Grazing**

Animal grazing is a tool that can be used to manage the vegetation on the Preserve, depending somewhat on whether it is intended that low-level vegetation, lower than 3 feet tall, is desired to be maintained on the Preserve. Grazing by cattle would generally not be recommended for the Preserve due to the dense vegetation on steep slopes and lack of forage that would be available without adversely affecting the vegetation. Carefully controlled goat grazing could be directed to areas where slopes are greater. However, in all cases, monitoring would be needed to ensure that the grazing animals are not dispersing nonnative weed species onto the Preserve and type converting the vegetation to a weed-based community. Furthermore, it is only a temporary control and needs to be used on a regular basis to be effective. Currently, there is no pressing need to introduce grazing. However, the method should remain an option for specific applications adjacent highly sensitive habitats, adjacent roadways, and potentially in areas that are considered fuel modification zones.

### **5.3.2 Mowing**

Controlled mowing can be a successful method for reducing fuel loads and can be compatible with Preserve management goals. Its usefulness, however, would be generally limited to areas adjacent to roads and trails. Again, it would need to be monitored to prevent it from causing a permanent conversion of the vegetation into a grass or weedy habitat. Therefore, mowing should be conducted in late spring after weedy annuals have stopped growing but have not yet produced viable seed (Bell 2009).

### **5.3.3 Herbicides**

Chemical means to control fuels/nonnative plants may be an effective method for reducing fire hazard, but it might be more appropriate for controlling specific outbreaks of weedy species and assisting in the removal of high-priority nonnative weedy species. Herbicide use for fuel vegetation management may be more problematic due to the scale needed to be effective in addressing flammability of vegetation. Herbicides could be used in specific treatments for difficult issue areas.

### **5.3.4 Prescribed Fire**

Prescribed fire occurs in two forms: (1) fire from external ignitions that may occur naturally through lightning strikes or incidental human ignitions that are allowed to burn through areas where there is no threat to life and property and (2) intentional, managed fires.

---

It is unlikely that fire from external ignitions, either natural or incidental human ignitions, would occur in a manner and under conditions that could be managed as the fire approached urban lands to the west of the Preserve. Additionally, natural fires are rare in coastal San Diego County due to a lower occurrence of lightning. Therefore, it is not likely that external ignitions would be utilized as prescribed fire. Generally, if a fire was started in the area and was not part of a particular fire management operation, the desire would be to extinguish it.

Intentionally managed fires are designed for reducing fuels primarily for public safety or habitat improvement, and are regulated by applicable laws. Where prescribed burning is feasible, it shall be conducted under permit from CAL FIRE, or under contract with CAL FIRE under the statewide Vegetation Management Program. Prescribed fire on the Preserve might be somewhat problematic due to the presence of portions of the Preserve embedded in a more urbanized landscape. Additionally, it would be necessary to create barriers on the Preserve to prevent the fire from escaping or burning portions of the Preserve where not intended. It might also pose an air quality issue in this natural habitat node within an urbanized area. Prescribed fire can only be implemented by CAL FIRE, or a similar fire authority with experience and certifications to conduct burns.

### **5.3.5 Hand Tool or Mechanical Equipment Thinning**

Thinning can reduce fuel continuity and loading by selective removal of dead and dying vegetation, reduction of vegetation density in selected locations, and nonnatives. This type of fuel reduction is most useful in the interface and intermix areas around high-value resources, such as residences. Adjacent residences would have to maintain their own defensible space off the Preserve. Extensions that could be provided on the DPR land are not currently necessary since no structures are within 250 feet of the boundary of the Preserve. If considered necessary, thinning is recommended to occur on an annual basis prior to June for fuel modification areas associated with off-site residences or other habitable structures. Thinning is appropriate anywhere in the Preserve where insect or disease outbreaks, frost, or drought has resulted in dense, dead vegetation

### **5.3.6 Fuel Breaks**

Fuel breaks provide areas of removed fuels that may play an important role in helping contain wildfires. The local fire departments and CAL FIRE attempt to minimize impacts to sensitive resources when fighting fires in wildlands. When feasible, fires are usually allowed to run to preexisting breaks, including trails and roads. These locations then serve as a defensive position for fighting the fire. Judging by the previous fire patterns, this has occurred on the Preserve in the Cocos Fire and Harmony Fire. The existing access road network through the Preserve and

---

various existing fuel modification zones outside the Preserve boundary adjacent to residences generally meet the anticipated fuel break requirements for the Preserve. However, at some point in the future, if additional property is added to the Preserve in this area and an extensive Preserve is established, there may be a need for more coordinated treatment areas around the rural residential areas and the more dense urban areas as well.

#### **5.4 FIRE RESPONSE PLAN**

While the Preserve lies in the unincorporated portion of San Diego County, it is served by two separate fire agencies through an agreement with the San Diego County Fire Authority (San Diego County Fire Authority 2017). The northern quarter of the Preserve is served by the San Marcos Fire Department and the southern three-quarters is served by the Rancho Santa Fe Fire Protection District. In addition to the two fire departments described above, the San Diego County Fire Authority has an agreement with CAL FIRE so that they can participate in any fire emergency needs and provide fire protection services on behalf of the County. The County and its partner agencies support a vast array of firefighting equipment including 10 pieces of aircraft.

The San Marcos Fire Department supports Fire Station number 4 located at 204 San Elijo Road. It is a relatively new station constructed between 2006 and 2008 that contains four truck bays and houses one paramedic engine company, one paramedic ambulance, and one Battalion Chief. Access to the new property from San Marcos Fire Station number 4 can be achieved on paved and dirt roads beginning on San Elijo Road, located only a third of a mile from the station, to Attebury Road that has gated access past the parking lot of the Double Peak School. Attebury Road proceeds to Bella Vita Way and then Washington Drive from the north, gaining access from the north. That route is approximately 1.55 miles with some potentially challenging links. An alternate route is to proceed from San Elijo Road to Questhaven Road to Way Up Trail onto the new property with a 4.5-mile route, nearly half of which is on an SDG&E dirt road. Way Up Trail is the required 20 feet in width for a fire road. From this road, to proceed northward, half-way through the new property, is a very steep and rough stretch that requires four-wheel drive. This steep stretch separates the north and south portions of the new property. Portions of the north-south road are 20 feet in width but much of it is only 12 feet in width.

The southern portion of the Preserve is within the purview of the Rancho Santa Fe Fire Protection District Elfin Forest Harmony Grove Fire Station, Station Number 6, and Station Number 5 in the Harmony Grove Village. The Elfin Forest Harmony Grove Fire Station has been serving the community with volunteers since 1972. However, on January 1, 2016, the Rancho Santa Fe Fire Protection District assumed fire protection for the area of Harmony Grove under a contractual agreement with the County of San Diego. On July 2016, the Elfin Forest/Harmony Grove Fire Department merged with the Rancho Santa Fe Fire Protection District and the station

---

became the 6th within the fire district's boundaries; however, it continues to be a volunteer station. At the station, located at 20223 Elfin Forest Road, there are between two and four volunteers and two engines, a water tender, brush rig, ambulance and a quick management patrol unit.

Station Number 5 located at 2604 Overlook Point Drive supports three regular firefighter employees and one type 1 fire engine. It also has agreements with Carlsbad and San Marcos stations.

The Elfin Forest, Harmony Grove station has access to the south portion of the new property by Wild Willow Hollow Road, 2.67 miles to the west. One mile up Wild Willow Hollow Road, the southern end of the main parcel is reached by a left turn onto a dirt road that is the southern access to the main portion of the new property. Otherwise, access from Harmony Grove Station is along Elfin Forest Road to Questhaven Road and then east on Way Up Trail on the SDG&E Tower Access Road. If one is to proceed northward through the property on this road, there is a steep, rough section that is difficult to travel. Access into the new property traverses 4.75 miles with about one quarter of it on the dirt road.

Access to the site from Rancho Santa Fe Fire Protection District Station Number 5 is approximately 2 miles to the east along Harmony Grove Road to the base of Wild Willow Hollow Road from the east.

The closest CAL FIRE station, #77, is located at 2323 Felicita Avenue, Escondido. It is farther from the site than the other stations but can be utilized to call in additional assistance.

CAL FIRE utilizes three levels of dispatch and response based upon weather conditions and time of year. The three levels are:

- Low – includes two engines with three personnel each
- Medium – includes three engines (Type III) with three personnel each, one Battalion Chief, one mid-sized bulldozer, one Type III helicopter, and one 16-person hand crew
- High – includes five engines with three personnel each, one Battalion Chief, two medium-sized bulldozers, one AA, two air tankers, and one Type III helicopter.

Dispatch levels are based on weather conditions. Low dispatch occurs during the winter months from November through May. Medium and high dispatch occur during the normally declared fire season, which is June through October. There is some variation in the timing of the dispatch levels, based entirely on weather.

---

Fire Suppression Air Support with fire retardant drops may be a component of responses to the entire Preserve especially under conditions that would accelerate wildfire spread. Under extreme conditions, or at night, air support may not be available. In these situations, response categories may become secondary to public safety.

In some cases, a fire passing through preserved lands such as the Preserve has moved into nearby urban areas. Response to a fire within the Preserve will likely include the use of existing access roads for firefighting personnel, Type I engines (limited to off-site paved roadways), Type III engines, fire crews, air attack and fire retardant, helicopters, and air tankers. As mentioned above, portions of on-site existing dirt roadways are all less than the required 20 feet in width. The central road onto the site from the north has portions that are nearly 12 feet in width but in places they are not suitable for general access by fire trucks. Fire suppression actions may include direct attack with engines, fire crews, helicopters, and firing operations. Line construction activities within the Preserve would be best carried out by hand crews. Dozers/road graders may be activated but should not be put into operation on the Preserve itself unless necessary for improving existing roads for engine access or constructing line or secondary line for preservation of high-value resources, including plant and animal species, habitats, people, or property. Following fires, vegetation rehabilitation should take place to remediate any physical disturbance that occurs due to fire suppression activities.

#### **5.4.1 Fire Hazard and Current Fire Management Practices Evaluation**

Based on specific data analysis, the Preserve includes an ongoing fire hazard that can result in significant fire intensity and spread during extreme weather events. This section presents a discussion of fire hazard situations for the Preserve. This information was collected during initial analysis and review of project data, fire behavior modeling information, and high-resolution aerial imagery, and it was integrated into the preparation of this document and associated recommendations.

1. Based on topography, vegetation, and fire history of the region, a large conflagration during Santa Ana wind conditions will likely enter the Preserve from the east, traveling down the San Elijo Canyon or through the open space to the east and north of the Preserve, as seen in the 1996 Harmony Fire, or from the northeast, as it did in the Cocos Fire. Fires during typical on-shore wind patterns are likely to enter the Preserve from the adjacent urban lands in the City of San Marcos in the vicinity of San Elijo Road outside the northwestern corner of the new property lands or along Questhaven Road to the west. Additionally, fires could spread through transportation corridors (e.g., Rancho Santa Fe Road, San Elijo Road, Elfin Forest Road, Harmony Grove Road), or open space areas south or west of the Preserve.

- 
2. The Preserve area can be primarily classified as WUI because it is generally a large patch of habitat within a matrix of urban and rural development. The Intermix threat for the existing property exists primarily in the central and western portions of the property, with more limited residential construction in the San Elijo Canyon portion of the property. As mentioned, the new property can be accessed from San Elijo Road to Questhaven Road and Way Up Trail from the west, Attebury Drive to Attebury Road to Washington Drive from the west to the north, or Elfin Forest Road to Harmony Grove Road and Wild Willow Hollow Road from the south.
  3. Potential ignitions include a variety of residential-related sources such as structure fire and yard machines to the west. Some houses in the area have maintained surrounding open areas that would limit those types of fires. During Santa Ana east wind events, the Country Club Drive area housing could be a source of fire. Accidental fire from adolescents living in the area and accessing the Preserve would be a potential source for ignitions as well. Ignition sources not associated with residential development include vehicular-associated ignitions (e.g., car fire, catalytic converter, tossed cigarette, etc.) along Harmony Grove Road, Elfin Forest Road, or Questhaven Road. Additional nonresidential ignition sources include electrical transmission lines through the Preserve, accidental fires from transient inhabitants of the area, and arson.
  4. Wildfires fueled by Santa Ana winds may move rapidly across the Preserve. Grassland, sage scrub, and chaparral fuels will be the predominant carriers of fire across the Preserve. Steep slopes and steep-walled drainages typify the topography of the Preserve. Fires in the smaller grassland areas move very quickly when carried by wind. Fires in chaparral or sage scrub fuels will move more slowly, but will produce greater flame lengths (greater than 20 feet) and associated heat output (in excess of 5,000 British thermal units).
  5. A fire originating in a structure within approximately a 1-mile radius of the Preserve could result in burning embers landing within the Preserve, potentially resulting in vegetation ignition if there is a receptive fuel bed.
  6. In general, fires that burn through the Preserve are more likely the result of ignition sources that occur outside of the Preserve lands, either far to the east, west, or potentially the north.

Based on current roadways, firefighting access is adequate for portions of the Preserve including the central and western portions of the existing property. Vegetation (sage scrub) and terrain likely to result in less-intense fire than expected exists in the San Elijo Canyon portion of the property. Firefighting in these areas of the existing property is expected to be driven primarily by structure protection efforts, given the more significant wildland urban intermix condition. For the

---

eastern portion of the existing property (San Elijo Canyon area), firefighting may be difficult due to lack of roads, or presence of only dirt roads that are not designed to accommodate typical responding fire apparatus (with the exception of the paved private road through the northeasternmost parcel). Access under wildfire conditions in this area is precarious and potentially dangerous due to narrow, steep, and dead-end roads with varying levels of traction, and vegetation (primarily chaparral) and terrain that can result in significant fire intensity and irregular spread.

The northern side of the new property is fairly accessible; however, access is limited on the east and southern portions. As mentioned above, it is likely that the existing road through the new property was used in the past as a base from which to fight fires, including the use of back fires and other techniques.

Air attack will be an important component for firefighting on the Preserve, but may not be available or usable depending on the extent of the fire event and/or the time of day and weather conditions. Firefighting in the surroundings is expected to be driven primarily by structure protection efforts, given the more significant urban interface with adjacent natural land at the bottom of the slopes. Air attack in this area may also be an important component depending on fire intensity and spread rate, but may not be available or usable depending on the extent of the fire event, the time of day, weather conditions, and proximity to overhead power lines.

The catastrophic wildfire threat for the Preserve is extreme when severe fire weather occurs, which coincide with Red Flag Warning periods. Red Flag Warnings are declared by the National Weather Service and are issued when sustained winds are greater than 25 miles per hour (mph), with gusts greater than or equal to 35 mph, and relative humidity is 15% or lower for at least 6 hours, or dry lightning occurs with more than isolated coverage (National Weather Service 2012).

Beyond these provisions, fire management practices are restricted to response and tactical suppression efforts associated with wildfires originating on or burning onto the Preserve. No active fire or fuels management plans are currently employed on the Preserve.

#### **5.4.2 Primary Actions and Contacts for Wildfire Emergency**

The following persons/agencies should be contacted in the event of a wildfire on the Preserve or for information regarding fire management activities.

---

### **San Marcos Fire Department**

#### **Fire Station 4**

204 San Elijo Road, San Marcos, CA 92078

Emergency: 911

Non-Emergency: (760) 744-1050

Website: <http://www.san-marcos.net/departments/public-safety/fire-department/departments-overview>

### **Rancho Santa Fe Fire Protection District**

#### **Fire Station 5**

2604 Overlook Point Drive, Escondido, CA 92029

Emergency: 911

Non-Emergency: (858) 756-5971

Website: <http://www.rsf-fire.org>

### **Rancho Santa Fe Fire Protection District**

#### **Fire Station 6**

20223 Elfin Forest Road, Elfin Forest, CA 92029

Emergency: 911

Non-Emergency: (858) 756-5971

Website: <http://www.rsf-fire.org>

### **CAL FIRE**

San Diego Unit

Emergency: 911

Non-Emergency – Unit Chief, El Cajon: (619) 590-3100

Website: <http://www.fire.ca.gov/>

### **5.4.3 Roads/Access**

Road access in the Preserve is variable, depending on Preserve parcel location. In general, road access is adequate in the central and western portions of the existing property, as this area is characterized by smaller parcels situated in a wildland urban intermix location. A network of paved, dirt, and power line access roads exists throughout the central and western portions of the existing property, providing direct access to all parcels, some even bisecting Preserve lands. Conversely, road access in the northeastern portions of the existing property in the San Elijo Canyon area is very limited, primarily due to terrain, hydrology, and larger contiguous Preserve areas. Primary access in this area is gained via the Mt. Israel Truck Trail (dirt), or via a paved private road providing access to a small number of residences north of Harmony Grove Road.

---

The majority of the existing property is accessible via nongated public or private roads, although gates limit public access to some Preserve parcels.

Road access to the new property is from the north off of Bella Via Way, Attebury Road, and Washington Drive, or from La Moree Road to Coronado Way to Washington Drive; the west from Questhaven Road to Way Up Trail approximately 2.15 miles east of the intersection of Way Up Trail from Questhaven Road; and the south from Harmony Grove Road to Wild Willow Hollow Road 0.85 mile north of the intersection of Wild Willow Hollow Road with Harmony Grove Road. A network of dirt access roads exists throughout the central portions of the new property; however, they do not meet the minimum 20-foot requirement for fire access vehicles due to their narrow width (generally less than 12 feet) and eroded nature. Primary access is gained from the Questhaven to Way Up Trail Road access.

#### **5.4.4 Fuel Breaks**

The existing road network throughout the Preserve area, and the existing fuel modification zones along portions of the Preserve boundary adjacent to residential residences currently serve as fuel breaks. The existing road network (paved and dirt) in the Preserve area already provides numerous breaks in fuel continuity; therefore, creation of additional fuel breaks at this time is not recommended. However, the need for fuel breaks is dependent on the specific conditions of a fire. If new fire breaks are required, the location should be coordinated with the Incident Command Team where possible. The Incident Command Team includes the District Park Manager and fire agency staff with access to location information on sensitive biological and cultural resources that should be avoided, if possible. Fuel breaks created during fire episodes should be rehabilitated after the fire has been extinguished.

#### **5.4.5 Emergency Staging Areas**

Due to the fragmented nature of the Preserve parcels, it is anticipated that fire response staging locations will vary, depending on fire location and progression. Staging areas important for incident command, and to organize, plan, and implement firefighting strategies, typically occur on areas that are protected from fire and large enough to store vehicles in transition. They usually cause higher ground disturbance from personnel, vehicles, and equipment in confined areas. Staging areas for fires that affect the Preserve will likely occur off-site in well-defended, lower hazard areas.

---

#### **5.4.6 Fire Hydrants**

Fire hydrants are located within adjacent residential development areas and on the periphery of the Preserve along existing roadways. Fire hydrants may be utilized during a fire event to refill engines, as necessary, provided agreements are in place for their use.

#### **5.4.7 Other Water Sources**

Other water sources that may be available during a wildfire event within the Preserve include:

- Olivenhain Reservoir, immediately east of the existing property and approximately 1.3 miles from the southern end of the new property, could provide helicopter dipping access.
- Lake Hodges, approximately 2.30 miles from the northeasternmost portion of the existing property and 2.25 miles to the southeast of the new property boundary, may also be available for helicopter dipping access.

---

This page intentionally left blank.

---

## 6.0 MANAGEMENT DIRECTIVES

This section provides recommendations for vegetation management within the Preserve, including management directives specifically related to invasive species management, habitat restoration, and fire management.

### 6.1 INVASIVE SPECIES REMOVAL

The short-term management directives below address high-priority invasive species removal while longer-term management directives consider invasive species for their risk of reducing vegetation community quality over time.

**Management Directive Invasive 1 – Remove and Control High-Priority Invasive Nonnative Species.** Remove aggressive, invasive nonnative plant species and those with a high fire hazard within the Preserve, including silver wattle, African fountain grass, pampas grass, fennel, tree tobacco, castor bean, Peruvian pepper tree and milk thistle, as soon as possible. These are large shrubs, trees, or highly invasive herbaceous perennials. The eucalyptus trees on the Preserve should also be removed. The two other high-priority species that should be removed as an early action when they are visible with new year's growth include the annual blue-eyed cape-marigold and herbaceous perennial treasure flower. The natal grass is also an herbaceous perennial that should be removed when encountered, but it is a fast spreading plant and may continuously spread onto the Preserve.

**Management Directive Invasive 2 – Identify and Pursue Funding for Long-term Invasive Nonnative Plant Control.** Coordinate with other agencies, nonprofit organizations, and/or volunteer groups to seek funding and implement invasive, nonnative plant removal projects for moderate and low-priority nonnative species within the Preserve.

**Management Directive Invasive 3 – Conduct Invasive Nonnative Species Monitoring.** Continue to monitor other identified nonnative species within the Preserve to determine if removal efforts are warranted in order to maintain and/or improve the quality of the existing native vegetation communities on-site.

**Management Directive Invasive 4 – Educational Outreach.** Prepare and implement an invasive nonnative plant species educational outreach program/materials to reduce use of these plants by adjacent property owners and potential land managers.

---

## 6.2 RESTORATION

The primary management directives for native vegetation community restoration include:

**Management Directive Restoration 1 – Restore Native Vegetation Community Quality and Function.** Restore the identified degraded areas to reestablish and/or enhance the biological functions and values of native vegetation communities in these areas.

**1A – Passive Restoration.** Perform weed and erosion control as needed in disturbed areas where natural recruitment of native plant species is actively occurring.

**1B – Active Restoration.** Conduct soil preparation and native planting of disturbed or degraded areas where native vegetation recruitment is not actively occurring.

**Management Directive Restoration 2 – Address Long-term Restoration Needs.** Restoration activities should occur following landscape changing disturbances that remove, damage, degrade, or alter the existing native vegetation communities. Restoration methods will be customized to the Preserve, based on the type of disturbance, and will require preparation and implementation of a restoration plan. Restoration will incorporate active revegetation, including:

- Native vegetation community establishment/creation
- Native vegetation community enhancement
- Removal of invasive plants when they are young
- Application of herbicides, pesticides, and fertilizers if needed
- Application of supplemental irrigation if needed.

**Management Directive Restoration 3 – Monitor Invasive Nonnative Plant Removal Sites.** Continue to monitor invasive species removal sites to ensure that passive natural recruitment is successfully occurring in these areas.

**Management Directive Restoration 4 – Monitor Native Vegetation Community Quality.** Continue to monitor the quality of native vegetation communities throughout the Preserve using comparative vegetation mapping over time and evaluation of potential type conversions. This is particularly important following major disturbance events such as wildfire.

**Management Directive Restoration 5 – Monitor Pests and Disease.** Monitor the presence of disease or pest levels to determine outbreaks and prescribe an active treatment, as appropriate. Monitor for the gold spotted oak borer (*Agrilus auroguttatus*) and the Kuroshio shot hole borer (*Euwallaceae* sp.).

---

## 6.3 FIRE MANAGEMENT

The long-term strategic fire management plan considers strategic fire prevention activities, fire suppression with regard to fire effects on habitat, and post-fire monitoring and rehabilitation. The long-term strategic fire plan for the Preserve must prioritize public safety while meeting habitat management goals. Management directives are as follows:

**Management Directive Fire 1 – Fire Suppression:** Fire suppression, in combination with other management methods in targeted Preserve habitat management areas, is the priority for the northern portion of the existing property (15-year old vegetation) and portions of the new property (22-year-old vegetation) composed of southern mixed chaparral. Lengthening the fire return cycle to an optimal frequency may require fuel reduction experiments, research, monitoring, and analysis as part of the overall management approach. The optimal fire frequency in southern mixed chaparral may be from 50 to 100 years or more (Conard and Weise 1998). It may be difficult to achieve the longer fire return intervals given the current and projected ignition sources that may affect the Preserve. The fire return interval on the Preserve has been a bit longer than other areas in western San Diego County. However, results of site-specific data analysis will more firmly establish the optimal return intervals to meet habitat goals, or if additional steps need to be implemented, to lengthen the return of fire.

**Management Directive Fire 2 – Maintain Fuel Modification Zones.** Annually maintain the existing fuel modification zones within the existing property (Figure 9; VMUs 3 and 4). No fuel modification zones currently exist on the new property. They may be considered along the road into the new property in order to maintain access; however, that would not be suggested at this time. Maintaining the road would serve to provide suitable management control areas at this time. Manual thinning of vegetation along the road through the new property would be an important measure at this time.

**Management Directive Fire 3 – Delineate Fuel Modification Areas.** Install and maintain inconspicuous fuel modification extent markers for all fuel modification zones within the existing property (Figure 9; VM 3) to minimize additional thinning outside intended area. Consider fuel modification areas along the northern end and southern fringes of the new property near the rural residential development that occurs outside of the property.

**Management Directive Fire 4 – Access Data Sharing.** Maintain local fire agency gate locks and report any notice of removed or missing locks to the appropriate fire agency. Signs should be installed indicating access limitations and extents (map form) and provide road quality to local fire responders. This information will be included in the responder's wildland pre-response plans, resulting in more efficient responses. Information readily accessible by responders not

---

familiar with the area, such as out-of-County or out-of-state responders, will improve firefighter safety.

**Management Directive Fire 5 – Control Illegal Access.** Continue to restrict off-highway vehicles and shooting access. These are potential ignition sources that must be managed through restricting access (e.g., continued use of fence, gates, signage) and by establishing a high-profile presence of park ranger staff. If trespassers are present, they should be removed.

**Management Directive Fire 6 – Educational Outreach.** Private property owners in the interface or intermix (located adjacent to the Preserve) should be encouraged to play an active role in reducing the potential fire hazard. It will also be beneficial if the public understands the management actions occurring on the Preserve, such as grazing, mowing, and herbicides, as applicable. As such, this VMP recommends a concerted effort to reach property owners who are situated in locations that may be affected by wildfire on the Preserve or whose properties and actions may serve as Preserve ignition sources. Educational material can be customized for these homeowners to include discussion of the importance of the Preserve. Standard measures for implementing a 100-foot fuel modification/defensible space zone can be provided from materials available from the San Diego County Fire Authority, San Marcos Fire Department, Rancho Santa Fe Fire Protection District, and CAL FIRE, as well as from the County of San Diego Department of Planning and Development Services. As part of the public education program, adjacent private property owners should be encouraged to participate to help curb illegal access and report potential problems.

**Management Directive Fire 7 – Reduce Ignition Sources:** Ignition sources are present near the Preserve. Adjacent sources include roadways with vehicular travel, especially Questhaven Road, Harmony Grove Road, Elfin Forest Road, and San Elijo Road; adjacent residences; and recreational users, among others. It is not possible to remove all sources of ignition. Rather, reducing the potential spread of wildfire onto or throughout the Preserve is recommended. Fuel modification buffers outside the Preserve edges near existing homes are provided in some instances, but will need to be provided for all adjacent ignition sources so that the source has 30 to 100 feet of fuel modification with half the fuel as an unmodified vegetation stand. Likewise, fuel reduction (especially nonnative trees) beneath nearby transmission lines, as appropriate, and along utility line access roadways/trails will reduce the likelihood of ignitions and fire spread from the line or from vehicles on the access roads.

**Management Directive Fire 8 – Conduct Recommended Fuels Management.** Conduct fuels management using the identified VMUs, as feasible and as presented in Table 15. Table 15 provides a summary of the high-value resource areas acknowledged for the Preserve and the associated fire prevention strategy recommended for achieving long-term management goals.

**Management Directive Fire 9 – Post-fire Management and Erosion Control.** Provide controls following fire events to stabilize soils in the burn area and minimize potential for erosion. Erosion control best management practices, such as mechanical rehabilitation treatments including straw mulch, hay bales, and jute rolls, should be in place as soon as possible after a fire and prior to the onset of the winter rainy season. Care should be taken to select and inspect these materials so they are not a source of invasive nonnative plants. The use of certified weed-free hay is good policy (Bell 2009). This may be particularly important along the bottom of the steep slopes on the western edge of the new property where erosion could affect adjacent land development.

**Table 15. Fuel Management Activities by VMU**

VMU	Sensitive Resources	Fuel Reduction Practice
<p><b>1</b></p> <p><u>Area:</u> 24.1 acres</p> <p><u>APNs:</u> 264-031-40, 264-031-39</p> <p><u>Access:</u> Via Seaquest Trail</p>	<p><u>Sensitive Plant Species:</u> Ashy spike-moss Wart-stemmed ceanothus</p> <p><u>Sensitive Animal Species:</u> Bell's sage sparrow Coast (Blainville's) horned lizard Northern harrier</p>	<p>VMU 1 consists primarily of southern mixed chaparral, with smaller areas of coastal sage scrub in the eastern and southwestern portions of the VMU. Chaparral is predominantly 15 years in age in the western 2/3 of the VMU, while the remaining eastern portion is 68 + years old.</p> <p>Fuel treatment in VMU 1 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>
<p><b>2</b></p> <p><u>Area:</u> 8.4 acres</p> <p><u>APN:</u> 264-031-33</p> <p><u>Access:</u> Via Seaquest Trail and power line access road within VMU.</p>	<p><u>Sensitive Animal Species:</u> Coastal California gnatcatcher Southern California rufous-crowned sparrow</p>	<p>VMU 2 consists primarily of coastal sage scrub, with smaller sections of grassland and eucalyptus woodland. All vegetation is 68 + years old.</p> <p>Fuel treatment in VMU 2 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Strategic understory shrub thinning/crown raising may be implemented along the sage scrub-eucalyptus interface to minimize the potential for crown fire occurrence, which is adjacent to an oak woodland system immediately east of the VMU. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>

VMU	Sensitive Resources	Fuel Reduction Practice
<p style="text-align: center;"><b>3</b></p> <p><u>Area:</u> 22.3 acres</p> <p><u>APN:</u> 264-041-13</p> <p><u>Access:</u> Via Canyon de Oro (which bisects VMU), Fortuna del Este, Suerte del Este, or Paint Mountain Road.</p>	<p><u>Sensitive Plant Species:</u> Ashy spike-moss San Diego goldenstar San Diego (Palmer's) sagewort</p> <p><u>Sensitive Animal Species:</u> Coastal California gnatcatcher Coronado skink Northwestern San Diego pocket mouse Red-shouldered hawk San Diego desert woodrat Yuma myotis</p>	<p>VMU 3 consists primarily of coastal sage scrub, with a small stand of coast live oak riparian forest in the northwest corner of the VMU. All vegetation is 68 + years old. Existing paved roads, power line access roads, and dirt trails bisect the VMU. DPR maintains a 30-foot-wide fuel modification zone along Canyon de Oro and Paint Mountain Road, which serve as a designated evacuation route.</p> <p>Fuel treatment in VMU 3 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Strategic understory shrub thinning/crown raising may be implemented along the sage scrub-oak woodland interface to minimize the potential for crown fire occurrence, which could negatively impact the continuation of the oak woodland system immediately west of the VMU. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, the existing dirt trails are recommended for active restoration.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>
<p style="text-align: center;"><b>4</b></p> <p><u>Area:</u> 12.8 acres</p> <p><u>APN:</u> 264-032-10</p> <p><u>Access:</u> Via Canyon de Oro or gated dirt Preserve access road at north end of VMU. Also via power line access road immediately north of 1420 Paint Mountain Road.</p>	<p><u>Sensitive Plant Species:</u> Ashy spike-moss</p> <p><u>Sensitive Animal Species:</u> Coast (Blainville's) horned lizard Coastal western whiptail</p>	<p>VMU 4 consists almost entirely of coastal sage scrub 68+ years old. Existing power line access roads bisect the VMU. DPR maintains a 30-foot-wide fuel modification zone along Canyon de Oro, which serves as a designated evacuation route.</p> <p>Fuel treatment in VMU 4 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>
<p style="text-align: center;"><b>5</b></p> <p><u>Area:</u> 3.1 acres</p> <p><u>APN:</u> 264-041-30</p> <p><u>Access:</u> At south end of Paint Mountain Road.</p>	<p><u>Sensitive Animal Species:</u> Southern California rufous-crowned sparrow</p>	<p>VMU 5 consists almost entirely of coastal sage scrub over 68+ years old. Existing dirt trails bisect the VMU.</p> <p>Fuel treatment in VMU 5 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, the existing dirt trails are recommended for active restoration.</p>

VMU	Sensitive Resources	Fuel Reduction Practice
<p style="text-align: center;"><b>6</b></p> <p><u>Area:</u> 14.1 acres</p> <p><u>APN:</u> 264-042-87</p> <p><u>Access:</u> Via Elfin Forest Road, Elfin Forest Lane, or Colina Encantada Way.</p>	<p><u>Sensitive Plant Species:</u> Southwestern spiny rush</p> <p><u>Sensitive Animal Species:</u> Coast (Blainville's) horned lizard</p> <p><u>Cultural Sites:</u> CA-SDI-17,670</p>	<p>VMU 6 consists primarily of coastal sage scrub, with smaller areas of grassland and coast live oak riparian forest in the eastern portion of the VMU, and nonnative vegetation in the western portion. Vegetation is predominantly 15 years in age in the northern 2/3 of the VMU, while the remaining eastern portion is 68 + years old.</p> <p>Fuel treatment in VMU 6 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Strategic understory shrub thinning/crown raising may be implemented along the sage scrub-oak woodland interface to minimize the potential for crown fire occurrence. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, the nonnative vegetation area is recommended for active restoration.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p> <p>The prehistoric lithic scatter within VMU 6 is nonflammable and therefore not vulnerable to wildfires. This cultural site should be avoided and protected with an appropriate buffer during thinning/fuel reduction efforts. If access to the cultural site is necessary to control nonnative species or to remove dead/dying vegetation, vegetation should be removed via manual methods. Any ground disturbance should be monitored by a San Diego County-approved archaeological and Native American monitor.</p>
<p style="text-align: center;"><b>7</b></p> <p><u>Area:</u> 23.5 acres</p> <p><u>APN:</u> 264-042-87</p> <p><u>Access:</u> Via Elfin Forest Road, Colina Encantada Way, or Aguilera Lane.</p>	<p><u>Sensitive Plant Species:</u> Ashy spike-moss</p> <p><u>Sensitive Animal Species:</u> Barn owl Coastal California gnatcatcher Cooper's hawk Red-shouldered hawk White-tailed kite</p>	<p>VMU 7 consists almost entirely of coastal sage scrub which is 15 years old. There is an existing disturbed area along the western portion of the VMU.</p> <p>Fuel treatment in VMU 7 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, the existing disturbed area is recommended for active restoration.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>

VMU	Sensitive Resources	Fuel Reduction Practice
<p style="text-align: center;"><b>8</b></p> <p><u>Area:</u> 61.4 acres</p> <p><u>APNs:</u> 679-140-01, 679-140-12, 679-140-13, 679-140-14, 649-140-15</p> <p><u>Access:</u> Via gated City of Escondido sewer easement access road along south side of Harmony Grove Road, approximately 1,250 feet west of the Elfin Forest Interpretive Center Parking Area. Also via Mt. Israel Truck Trail accessed on the east side of Via Ambiente.</p>	<p><u>Sensitive Plant Species:</u> Ashy spike-moss San Diego marsh-elder San Diego (Palmer's) sagewort Southwestern spiny rush Wart-stemmed ceanothus</p> <p><u>Sensitive Animal Species:</u> Southern mule deer Red-shouldered hawk Two-striped garter snake Coastal western whiptail Yellow warbler</p>	<p>VMU 8 consists primarily of southern mixed chaparral, with a smaller area of live oak woodland, riparian habitat, and coastal sage scrub adjacent to Escondido Creek in the northern portion of the VMU, just south of Harmony Grove Road. Vegetation is predominantly 68+ years old. An existing easement access road and several dirt trails bisect the VMU.</p> <p>Fuel treatment in VMU 8 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Strategic understory shrub thinning/crown raising may be implemented along the chaparral-oak woodland and chaparral-riparian vegetation interface to minimize the potential for crown fire occurrence. Further, dead fuel removal and invasive species removal should be conducted along the northern edge of VMU 8 where it abuts Harmony Grove Road to minimize the likelihood of ignitions. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, the dirt trails are recommended for active restoration.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>
<p style="text-align: center;"><b>9</b></p> <p><u>Area:</u> 31.5 acres</p> <p><u>APNs:</u> 679-140-01, 649-140-06</p> <p><u>Access:</u> Via gated access to old structure location, along north side of Harmony Grove Road, approximately 2,400 feet west of the Elfin Forest Interpretive Center entrance.</p>	<p><u>Sensitive Plant Species:</u> San Diego (Palmer's) sagewort Southwestern spiny rush Wart-stemmed ceanothus</p> <p><u>Sensitive Animal Species:</u> Barn owl Cooper's hawk</p> <p><u>Cultural Sites:</u> P-37-031723 P-37-031724</p>	<p>VMU 9 consists primarily of southern mixed chaparral that is 68+ years old.</p> <p>Fuel treatment in VMU 9 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Dead fuel removal and invasive species removal should be conducted along the southern edge of VMU 9 where it abuts Harmony Grove Road to minimize the likelihood of ignitions. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p> <p>The cultural sites should be avoided and protected with an appropriate buffer during thinning/fuel reduction efforts. If access to the cultural sites is necessary to control nonnative species or to remove dead/dying vegetation, vegetation should be removed via manual methods. Any ground disturbance should be monitored by a San Diego County-approved archaeological and Native American monitor.</p>

VMU	Sensitive Resources	Fuel Reduction Practice
<p style="text-align: center;"><b>10</b></p> <p><u>Area:</u> 142.8 acres</p> <p><u>APNs:</u> 679-130-05, 679-130-12</p> <p><u>Access:</u> Via private road (Wild Willow Hollow) along north side of Harmony Grove Road, approximately 500 feet east of the Elfin Forest Interpretive Center entrance. This road provides access to adjacent residences.</p>	<p><u>Sensitive Plant Species:</u> Wart-stemmed ceanothus</p> <p><u>Sensitive Animal Species:</u> Barn owl Bell's sage sparrow Cooper's hawk Southern mule deer Pocketed free-tailed bat San Diego black-tailed jackrabbit Western red bat Coastal western whiptail Yuma myotis</p>	<p>VMU 10 consists primarily of southern mixed chaparral, with a small area of nonnative grassland in the southeast portion of the VMU. A paved road and dirt spur road bisect the VMU. Vegetation is 15 years old.</p> <p>Fuel treatment in VMU 10 should be limited to invasive species removal and strategic removal of dead fuels adjacent to existing roadways. Dead fuel removal and invasive species removal should be conducted along the northern edge of VMU 10 where it abuts Harmony Grove Road to minimize the likelihood of ignitions. Establishment of nonnative plants, disease or pest-caused mortality of adjacent plants, or other means that result in increased ignition potential may require strategic thinning. In addition, several areas are recommended for passive and active restoration.</p> <p>If vegetation removal is necessary near sensitive species, sensitive species locations should be flagged and avoided to the maximum extent possible. Vegetation should be removed via manual methods in these areas.</p>
<p style="text-align: center;"><b>11</b></p> <p><u>Area:</u> 15.93 acres</p> <p><u>APNs:</u> 679-140-07, 679-130-04</p>	<p><u>Sensitive Plant Species:</u> Wart-stemmed ceanothus</p> <p><u>Sensitive Animal Species:</u> Blainville's horned lizard Red diamond rattlesnake Western spadefoot Sharp-shinned hawk Cooper's hawk Red-shouldered hawk Swainson's hawk Turkey vulture Southern California rufous-crowned sparrow Bell's sparrow Coastal California gnatcatcher Dulzura pocket mouse Northwestern San Diego pocket mouse San Diego desert woodrat Townsend's big eared bat Western mastiff bat Pocketed free-tailed bat Western yellow bat Yuma myotis Mule deer</p>	<p>VMU 11 consists of isolated parcels covered with chaparral. This vegetation is dense and rapidly recovered since the 1996 Harmony Fire into a dense chaparral community.</p> <p>Fuel treatment in VMU 11 should be limited to thinning activities to take place along the road into the new property from the south. Invasive species removal for the trees and shrubs near the southern edge with Harmony Grove Road would be the most effective treatments for this area. The eucalyptus trees on this portion of the new property should be removed.</p>

VMU	Sensitive Resources	Fuel Reduction Practice
<p><b>12</b> Area: 246.07 acres</p> <p>APNs: 222-130-19, 222-130-27, 222-130- 29</p>	<p><u>Sensitive Plant Species:</u> Wart-stemmed Ceanothus</p> <p><u>Sensitive Animal Species:</u> Blainville's horned lizard Red diamond rattlesnake Western spadefoot Sharp-shinned hawk Cooper's hawk Red-shouldered hawk Swainson's hawk Turkey vulture Southern California rufous- crowned sparrow Bell's sparrow Coastal California gnatcatcher Dulzura pocket mouse Northwestern San Diego pocket mouse San Diego desert woodrat Townsend's big-eared bat Western mastiff bat Pocketed free-tailed bat Western yellow bat Yuma myotis Mule deer</p>	<p>VMU 12 consists primarily of mixed chaparral with some transitional chaparral and grasslands. The land is mostly very steep and east-facing slope land. The majority of the vegetation is either 21 years old or 3 years of age; however, a portion of the center of this VMU consisting of approximately 16.66 acres did not burn in either the Cocos Fire of 2014 or the Harmony Fire of 1996 and existed as an area skipped over by the fire. There is apparently no record of that area burning.</p> <p>Invasive species removal with high priority include pampas grass, fennel, milk thistle, and African fountain grass.</p> <p>Fuel treatment in VMU 12 should be limited to potential thinning of vegetation along the access roads to and through the new property.</p>

---

## 7.0 REFERENCES

- AECOM. 2015. Cultural Resources Phase I Survey and Inventory, Escondido Creek Preserve, University Heights Parcel Additions, San Diego County, California. County of San Diego, Department of Parks and Recreation.
- AECOM. 2016. Biological Diversity Baseline Report for the Escondido Creek Preserve University Heights Property. County of San Diego, Department of Parks and Recreation.
- Anderson, H. E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. United States Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station Ogden, Utah General Technical Report INT-122.
- Andrews, P. L. 2009. BehavePlus Fire Modeling System Version 5.0: variables. General Technical Report RMRS-GTR-213WWW Revised. Rocky Mountain Research Station, Forest Service, United States Department of Agriculture. 112p.
- Andrews, P. L., C. D. Bevins, and R. C. Seli. 2008. BehavePlus Fire Modeling System Version 4.0: User's Guide. General Technical Report RMRS-GTR-106WWW Revised. Rocky Mountain Research Station, Forest Service, United States Department of Agriculture. 117p.
- ASM Affiliates, Inc. 2011. Archaeological Survey Report for the Escondido Creek Preserve, San Diego County, California. Prepared for the County of San Diego Department of Parks and Recreation. San Diego, California. January 2011.
- Bell, C. E. 2009. Invasive Plants and Wildfires in Southern California. University of California, Division of Agriculture and Natural Resources Publication No. 8397. August 2009.
- Bossard, C. C., M. C. Hoshovskv, and J. M. Randall. 2000. Invasive Plants of California's Wildlands. University of California Press. Berkeley, CA, Carla C. Bossard, John M. Randall, Marc C. Hoshovsky, Editors, 360 pages, 133 color photos, 76 line illustrations, 79 maps. University of California Press.
- Bowman, R. H. 1973. Soil Survey of the San Diego Area, California, Part I. United States Department of Agriculture, Soil Conservation Service and Forest Service in co-operation with University of California Agriculture Experiment Station, United States Department of Interior, Bureau of Indian Affairs, Department of the Navy United States Marine Corps. Soil Survey San Diego Area, California. 104 pages and 76 maps.

- 
- Brooks, M. L., C. M. D'Antonio, J. M. DiTomaso, J. B. Grace, R. J. Hobbs, J. E. Keeley, D. M. Richardson, M. Pellant, and D. Pyke. 2004. Effects of Invasive Alien Plants on Fire Regimes. *Bioscience* 54(7):667–688.
- California Department of Forestry and Fire Protection (CAL FIRE). 2009. Fire Hazard Severity Zones in State Responsibility Areas: San Diego County. Available at [http://frap.fire.ca.gov/webdata/maps/san\\_diego/fhszl\\_map.37.jpg](http://frap.fire.ca.gov/webdata/maps/san_diego/fhszl_map.37.jpg). Accessed September 17, 2014.
- California Department of Food and Agriculture Plant Health & Pest Prevention Services. 2014. California Noxious Weeds. Available at [http://www.cdfa.ca.gov/plant/ipc/weedinfo/winfo\\_table-sciname.html](http://www.cdfa.ca.gov/plant/ipc/weedinfo/winfo_table-sciname.html).
- California Invasive Plant Inventory (Cal-IPC). 2017. Cal-IPC Database. Available at <http://www.cal-ipc.org/paf/>. Accessed January, 2017.
- California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10dec). California Native Plant Society. Sacramento, CA. Available at <http://www.cnps.org/inventory>.
- Conrad, C. E. 1987. Common Shrubs of Chaparral and Associated Ecosystems of Southern California. General technical report PSW-99. Berkeley, California: U.S. Department of Agriculture, Pacific Southwest Forest and Range Experiment Station.
- Conard, S. G., and D. R. Weise. 1998. Management of Fire Regime, Fuels, and Fire Effects in Southern California Chaparral: Lessons from the Past and Thoughts for the Future. In *Fire in Ecosystem Management: Shifting the Paradigm from Suppression to Prescription*, edited by Teresa L. Pruden and Leonard A. Brennan, pp. 342–350. Proceedings of the 20th Tall Timbers Fire Ecology Conference.
- County of San Diego. 2009. Vegetation Management Report: A Report on Vegetation Management in the Unincorporated Area of San Diego County. Department of Planning and Land Use. 97 pages (48 pages plus appendices)
- County of San Diego. 2010. County Of San Diego Report Format and Content Requirements Wildland Fire and Fire Protection. Land Use Environment Group, Department of Planning and Land Use, Department of Public Works. 18pp.

- 
- DiTomaso, J. M., and D. W. Johnson (eds.). 2006. The Use of Fire as a Tool for Controlling Invasive Plants. Cal-IPC Publication 2006-01. California Invasive Plant Council: Berkley, CA. 56 pp.
- Dudek. 2011a. Escondido Creek Preserve Vegetation Management Plan. San Diego County. County of San Diego Department of Parks and Recreation.
- Dudek. 2011b. Baseline Biodiversity Survey for the Escondido Creek Preserve. County of San Diego Department of Parks and Recreation. May.
- Escondido Creek Conservancy. 2014. About the Watershed. Available at <http://escondidocreek.org/the-watershed/> Accessed September 22, 2014
- Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Unpublished report. California Department of Fish and Game, Natural Heritage Division, Sacramento, California.
- Keeley, J.E. 2005. Fire history of the San Francisco East Bay region and implications for landscape patterns. *International Journal of Wildland Fire* 14:285–296. [http://www.werc.usgs.gov/seki/pdfs/K2005\\_East%20Bay%20Fire%20History\\_IJWF.pdf](http://www.werc.usgs.gov/seki/pdfs/K2005_East%20Bay%20Fire%20History_IJWF.pdf)
- Keeley, J. E. 1987. Role of Fire in Seed Germination of Woody Taxa in California Chaparral. *Ecology* 68(2):434–443.
- Keeley, J.E. and S.C. Keeley 1984. Postfire recovery of California Coastal Sage Scrub. *The American Midland Naturalist*. 111(1): 105–117.
- League, Kevin R. 2005. *Ceanothus cuneatus*. In Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at <http://www.fs.fed.us/database/feis/>. Accessed September 24, 2014.
- McGlashan, H. D., and F. C. Ebert. 1918. Southern California Floods of January, 1916. United States Geological Survey Water-Supply Paper 426:1–80.
- Minnich, R. A. 1983. Fire Mosaics in Southern California and Northern Baja California. *Science*. New Series 219(4590):1287–1294.

- 
- Minnich, R. A. 2006. California Climate and Fire Weather. Fire in California's Ecosystems, edited by N. G. Sugihara, J. W. VanWagtendonk, K. E. Shaffer, Joann Fites-Kaufman, and A. E. Thode. University of California Press.
- Minnich R. A., and Y. H. Chou. 1997. Wildland Fire Patch Dynamics in the Chaparral of Southern California and Northern Baja California. *International Journal of Wildland Fire* 7:221–48.
- Moritz, M.A. 2003. Spatiotemporal Analysis of Controls on Shrubland Fire Regimes: Age Dependency and Fire Hazard. *Ecology*. 84(2), Pp 351–361.
- Murphy, S. 2014. San Diego's Rain Year Ends as One of the Driest on Record. KPBS available at <http://www.kpbs.org/news/2014/jun/30/san-diegos-rain-year-ends-drought-continues/>. Accessed September 17, 2014.
- National Fuel Moisture Database. 2017. 4S ranch Station. [http://www.wfas.net/nfmd/public/site.php?site\\_fuel=4S%20Ranch&gacc=SOCC&state=CA&grup=Rancho%20Santa%20Fe%20Fire%20Protection&sitefuel=site&display\\_type=Graph With Tables](http://www.wfas.net/nfmd/public/site.php?site_fuel=4S%20Ranch&gacc=SOCC&state=CA&grup=Rancho%20Santa%20Fe%20Fire%20Protection&sitefuel=site&display_type=Graph%20With%20Tables) Accessed February 1, 2017.
- National Weather Service. 2012. San Diego National Weather Service Office: Watch, Warning, and Advisory Criteria Quick Reference.
- Oberbauer, T., J. Buegge, and M. Kelly. 2008. Draft Vegetation Communities of San Diego County Based on “Preliminary Descriptions of the Terrestrial Natural Communities of California” prepared by Robert F. Holland, Ph.D. for State of California, The Resources Agency, Department of Fish and Game (October 1986).
- Office of Emergency Services. 2014. May 2014 San Diego County Wildfires after Action Report. County of San Diego. 76 pages plus appendices.
- Oneto, S., J. M. DiTomaso, G. B. Kyser, S. Garcia, and S. Hale. 2005. Control of Tree Tobacco (*Nicotiana glauca*). University of California Davis, University of California Cooperative Extension. Available at <http://www.cal-ipc.org/symposia/archive/pdf/17788.pdf>. Accessed August 4, 2014.
- Plant Health & Pest Prevention Services (PHPPS). 2017. Capweed. California Department of Food and Agriculture. Available at <https://www.cdfa.ca.gov/plant/ipc/encycloweedia/weedinfo/arctotheca.htm>. Accessed January 3, 2017.

- 
- Plumb, Tim R. 1980. Response of Oaks to Fire. In Proceedings of the Symposium on the Ecology, Management, and Utilization of California Oaks. Timothy R. Plumb, technical coordinator; 1979 June 26–28; Claremont, CA. Gen. Tech. Rep. PSW-44. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station: 202-215.
- Reiser, C. H. 1994. Rare Plants of San Diego County. May 1994. Available at <http://sandiego.sierraclub.org/rareplants/008.html>.
- San Diego County Fire Authority. 2017. Fire Authority and Partner Agency Volunteer Fire Stations. Available at <http://www.sandiegocounty.gov/content/sdc/sdcfa/faq.html>. Accessed February 2, 2017.
- San Diego Foundation. 2008. *The San Diego Foundation Regional Focus 2050 Study: Climate Change Related Impacts in the San Diego Region by 2050*. San Diego Foundation. 24 pp.
- SanGIS. 2014. Regional Data Warehouse. Available at <http://www.sangis.org/download/index.html>.
- Scott, J. H., and R. E. Burgan. 2005. *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*. U.S. Department of Agriculture, Rocky Mountain Research Station. General Technical Report RMRS-GTR-153.
- Sproul, F., J. Dunn, P. Gordon-Reedy, K. Harper, T. Keeler-Wolf, and A. Klein. 2011. Vegetation Classification Manual for Western San Diego County. San Diego Association of Governments
- Steinberg, Peter D. 2002. *Quercus agrifolia*. In Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at <http://www.fs.fed.us/database/feis/>. Accessed September 24, 2014.
- Suddjian, D. L. 2004. "Birds and Eucalyptus on the Central California Coast: A Love-Hate Relationship." Ecology and Impacts of Blue Gum Eucalyptus in Coastal California. Conference notes from Elkhorn Slough Coastal Training Program, June 3, 2004. Available at <http://www.elkhornsloughctp.org/uploads/files/1108147180Suddjianunpublished%20conference%20notes.pdf>.

- 
- Sylvan Kaufman, Denton. 2014. *Melinis repens*. Invasive species compendium. CABI. Available at <http://www.cabi.org/isc/datasheet/116730>. Accessed August 4, 2014.
- Technology Associates International Corporation (TAIC). 2008. Biological Diversity Baseline Report for the Del Dios Highlands Preserve County of San Diego. Prepared for Department Parks and Recreation, County of San Diego. San Diego, California: TAIC. November 2008.
- U.S. Department of Agriculture Natural Resources Conservation Service. 2014. California State-listed noxious weeds. Available at <https://plants.usda.gov/java/noxious?rptType=State&statefips=06>.
- Washington State Noxious Weed Control Board. 2014. Italian thistle *Carduus pycnocephalus*. Available at <http://www.nwcb.wa.gov/detail.asp?weed=22>. Accessed July 30, 2014.
- Weather Warehouse. 2014. Past Monthly Weather Data for Escondido, CA. Available at [http://weatherwarehouse.com/WeatherHistory/PastWeatherData\\_EscondidoNo2\\_Escondido\\_CANovember.html](http://weatherwarehouse.com/WeatherHistory/PastWeatherData_EscondidoNo2_Escondido_CANovember.html). Accessed September 17, 2014.
- Weise, D. R., and J. Regelbrugge. 1997. Recent Chaparral Fuel Modeling Efforts. Prescribed fire and Fire Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station.
- Western Regional Climate Center. 2016. National Climatic Data Center Weather Station Escondido 2. Latitude 33.07; Longitude -117.05. Available at <http://www.wrcc.dri.edu/>. Accessed August 21, 2016.
- Weather Collector. 2017. Escondido, California. The Weather Collector. <http://www.theweathercollector.com/?gclid=CJiUqJbxkNUCFU6Jsgodt6cGyA> Accessed July 17, 2017.
- Wills, R. 2000. Effective fire planning for California native grasslands. Sacramento, CA: U.S. Geological Survey. Open-File Report 00-62.
- Zedler, P. H. 1995. Fire Frequency in Southern California Shrublands: Biological Effects and Management Options. In *Brushfires in California Wildlands: Ecology and Resources Management*. J. E. Keeley and T. A. Scott, eds. International Association of Wildland Fire, Fairfield, WA. Pp 101–112.

**APPENDIX A**

**PLANT SPECIES DETECTED WITHIN THE  
ESCONDIDO CREEK PRESERVE**



## **Appendix A-1**

### **Plant Species Detected on the Existing Property**

**(Appendix A from Baseline Biodiversity Survey for the  
Escondido Creek Preserve  
Prepared by Dudek [2011b])**



**APPENDIX A**  
**Escondido Creek Preserve Plant Species List**

---

**VASCULAR PLANT SPECIES**

**LYCOPODS**

***SELAGINELLACEAE* – SPIKE–MOSS FAMILY**

*Selaginella bigelovii* – Bigelow's spike-moss

*Selaginella cinerascens* – ashy spike-moss

**FERNS**

***POLYPODIACEAE* – POLYPODY FERN FAMILY**

*Polypodium californicum* – California polypody

***PTERIDACEAE* – BRAKE FAMILY**

*Pentagramma triangularis* – goldenback or silverback fern

**CONIFERS**

***PINACEAE* – PINE FAMILY**

*Pinus* sp. – pine

**ANGIOSPERMS (DICOTS)**

***ANACARDIACEAE* – SUMAC FAMILY**

*Malosma laurina* – laurel sumac

*Rhus integrifolia* – lemonadeberry

\* *Schinus molle* – Peruvian peppertree

*Toxicodendron diversilobum* – western poison oak

***APIACEAE* – CARROT FAMILY**

\* *Conium maculatum* – poison-hemlock

\* *Foeniculum vulgare* – fennel

\* *Pastinaca sativa* – common parsnip

*Sanicula arguta* – sharp-toothed sanicle

***ASTERACEAE* – SUNFLOWER FAMILY**

*Ambrosia acanthicarpa* – annual bur-sage

*Artemisia californica* – California sagebrush

*Artemisia palmeri* – San Diego sagewort

*Baccharis pilularis* – chaparral broom, coyote brush

*Baccharis salicifolia* – mulefat, seep-willow, water-wally

## APPENDIX A (Continued)

---

- Brickellia californica* – California brickellbush
- \* *Carduus pycnocephalus* – Italian thistle
- \* *Centaurea melitensis* – tocalote
- Chaenactis glabriuscula* var. *glabriuscula* – yellow pincushion
- \* *Chamomilla suaveolens* – pineapple weed, rayless chamomile
- Cirsium scariosum* – meadow thistle
- Conyza canadensis* – horseweed
- Corethrogyne filaginifolia* – sand aster
- \* *Dimorphotheca sinuate* – African daisy
- Encelia californica* – California encelia
- Eriophyllum confertiflorum* var. *confertiflorum* – long-stem golden yarrow
- \* *Glebionis coronarium* – crown daisy
- Gnaphalium bicolor* – bicolor cudweed
- Gnaphalium californicum* – California everlasting
- Gnaphalium canescens* – white everlasting
- Gnaphalium stramineum* – cotton-batting plant
- Hazardia squarrosa* – saw-toothed goldenbush
- \* *Hedypnois cretica* – Crete hedypnois
- Helianthus annuus* – common sunflower
- Helianthus gracilentus* – slender sunflower
- Heterotheca grandiflora* – telegraph weed
- \* *Hypochaeris glabra* – smooth cat's ear
- Isocoma menziesii* –spreading goldenbush
- Iva hayesiana* – San Diego marsh-elder
- Lasthenia gracilis* – common goldfields
- Layia platyglossa* – common tidy tips
- Pentachaeta aurea* – golden-ray pentachaeta
- \* *Picris echioides* – bristly oxtongue
- Rafinesquia californica* – California chicory
- \* *Silybum marianum* – blessed milkthistle
- \* *Sonchus asper* –spiny sowthistle

### **BORAGINACEAE – BORAGE FAMILY**

- Amsinckia menziesii* –rancher's fireweed
- Cryptantha micrantha* – redroot cryptantha

### **BRASSICACEAE – MUSTARD FAMILY**

- \* *Brassica nigra* – black mustard
- Cardamine californica* – milkmaids, toothwort

## APPENDIX A (Continued)

---

- \* *Hirschfeldia incana* – shortpod mustard
- Lepidium nitidum* – shining pepper-grass
- \* *Raphanus sativus* – radish

### **CACTACEAE – CACTUS FAMILY**

- \* *Opuntia ficus-indica* – Indian-fig
- Opuntia littoralis* – coastal prickly-pear
- Opuntia oricola* – oracle cactus

### **CAPRIFOLIACEAE – HONEYSUCKLE FAMILY**

*Sambucus nigra* – blue elderberry

### **CARYOPHYLLACEAE – PINK FAMILY**

- \* *Silene gallica* – common catchfly
- \* *Stellaria media* – common chickweed

### **CHENOPODIACEAE – GOOSEFOOT FAMILY**

- \* *Salsola tragus* – Russian thistle

### **CISTACEAE – ROCK-ROSE FAMILY**

*Helianthemum scoparium* – peak rush-rose

### **CONVOLVULACEAE – MORNING-GLORY FAMILY**

*Calystegia macrostegia* – morning-glory

### **CRASSULACEAE – STONECROP FAMILY**

*Crassula connata* – pygmy-weed  
*Dudleya edulis* – ladies' fingers  
*Dudleya pulverulenta* – chalky live-forever

### **CUCURBITACEAE – GOURD FAMILY**

*Marah macrocarpus* – manroot, wild-cucumber

### **CUSCUTACEAE – DODDER FAMILY**

*Cuscuta* sp. – dodder

### **ERICACEAE – HEATH FAMILY**

*Xylococcus bicolor* – mission manzanita

### **EUPHORBIACEAE – SPURGE FAMILY**

*Chamaesyce albomarginata* – rattlesnake weed  
*Ricinus communis* – castor bean

## APPENDIX A (Continued)

---

### **FABACEAE – LEGUME FAMILY**

- Lathyrus vestitus* – wild pea
- \* *Lathyrus odoratus* – sweet pea
- Lotus scoparius* – deerweed
- Lotus strigosus* – strigose deerweed
- Lupinus bicolor* – miniature lupine
- Lupinus hirsutissimus* – stinging lupine
- Lupinus truncatus* – collar lupine
- \* *Melilotus indica* – sourclover
- \* *Parkinsonia aculeata* – Mexican palo verde
- Trifolium* sp. – clover

### **FAGACEAE – OAK FAMILY**

*Quercus agrifolia* – coast live oak

### **GERANIACEAE – GERANIUM FAMILY**

- \* *Erodium botrys* – broadleaf filaree
- \* *Erodium cicutarium* – redstem filaree
- \* *Geranium dissectum* – cut-leaf geranium

### **GROSSULARIACEAE – CURRANT FAMILY**

*Ribes indecorum* – white flowering currant  
*Ribes speciosum* – fuschia-flowered gooseberry

### **HYDROPHYLLACEAE – WATERLEAF FAMILY**

*Emmenanthe penduliflora* – whispering bells  
*Eucrypta chrysanthemifolia* – common eucrypta  
*Phacelia cicutaria* – caterpillar phacelia  
*Pholistoma auritum* – fiesta flower

### **LAMIACEAE – MINT FAMILY**

- \* *Marrubium vulgare* – white horehound
- Salvia apiana* – white sage
- Salvia mellifera* – black sage
- Stachys ajugoides* var. *rigida* – hillside hedge-nettle

### **LINACEAE – FLAX FAMILY**

*Linum lewisii* – Lewis flax

### **MALVACEAE – MALLOW FAMILY**

*Malacothamnus fasciculatus* – chaparral bushmallow

## APPENDIX A (Continued)

---

- \* *Malva parviflora* – cheeseweed, little mallow  
*Sidalcea malviflora* ssp. *sparsifolia* – checker-bloom

### **MYRTACEAE – MYRTLE FAMILY**

- \* *Eucalyptus* sp. – eucalyptus

### **NYCTAGINACEAE – FOUR O'CLOCK FAMILY**

*Mirabilis laevis* var. *crassifolia* – wishbone bush

### **OLEACEAE – OLIVE FAMILY**

- \* *Olea europaea* – olive

### **ONAGRACEAE – EVENING-PRIMROSE FAMILY**

*Camissonia* sp. – sun cup

### **OROBANCHACEAE – BROOM-RAPE FAMILY**

*Castilleja affinis* ssp. *affinis* – coast paintbrush

*Castilleja exserta* ssp. *exserta* – common owl's-clover

*Cordylanthus* sp. – bird's beak

### **OXALIDACEAE – WOOD-SORREL FAMILY**

*Oxalis albicans* – California wood-sorrel

- \* *Oxalis pes-caprae* – Bermuda buttercup

### **PAEONIACEAE – PEONY FAMILY**

*Paeonia californica* – California peony

### **PAPAVERACEAE – POPPY FAMILY**

*Eschscholzia californica* – California poppy

*Romneya* sp. – matilija poppy

### **PHRYMACEAE – HOPSEED FAMILY**

*Mimulus aurantiacus* – coast monkey flower, bush monkey flower

### **PLANTAGINACEAE – PLANTAIN FAMILY**

*Keckiella cordifolia* – climbing bush penstemon

*Keckiella ternata* – scarlet keckiella

*Plantago erecta* – dot-seed plantain

- \* *Plantago lanceolata* – English plantain

### **PLATANACEAE – SYCAMORE FAMILY**

*Platanus racemosa* – California sycamore

## APPENDIX A (Continued)

---

### **POLEMONIACEAE – PHLOX FAMILY**

- Gilia* sp. – gilia
- Linanthus dianthiflorus* – farinose ground pink
- Navarretia atractyloides* – holly-leaf skunkweed

### **POLYGONACEAE – BUCKWHEAT FAMILY**

- Eriogonum fasciculatum* – California buckwheat
- Pterostegia drymarioides* – granny’s hairnet
- \* *Rumex crispus* – curly dock
- Rumex salicifolius* – willow dock

### **PORTULACACEAE – PURSLANE FAMILY**

- Claytonia perfoliata* var. *perfoliata* – miner's-lettuce

### **PRIMULACEAE – PRIMROSE FAMILY**

- \* *Anagallis arvensis* – poor man’s weatherglass, scarlet pimpernel
- Dodecatheon clevelandii* ssp. *clevelandii* – Padre’s shooting star

### **RANUNCULACEAE – CROWFOOT FAMILY**

- Aquilegia formosa* – western columbine

### **RHAMNACEAE – BUCKTHORN FAMILY**

- Ceanothus leucodermis* – chaparral whitethorn
- Ceanothus tomentosus* – Ramona-lilac
- Ceanothus verrucosus* – wart-stemmed ceanothus
- Rhamnus ilicifolia* – holly-leaf redberry

### **ROSACEAE – ROSE FAMILY**

- Adenostoma fasciculatum* – chamise
- Cercocarpus betuloides* var. *betuloides* – birch-leaf mountain-mahogany
- Heteromeles arbutifolia* – toyon
- Rubus ursinus* – California blackberry

### **RUBIACEAE – MADDER FAMILY**

- Galium angustifolium* – narrow-leaved bedstraw
- \* *Galium aparine* – goose grass
- Galium nuttallii* ssp. *nuttallii* – San Diego bedstraw

### **RUTACEAE – RUE FAMILY**

- Cneoridium dumosum* – bushrue

## APPENDIX A (Continued)

---

### **SALICACEAE – WILLOW FAMILY**

*Salix lasiolepis* – arroyo willow

### **SCROPHULARIACEAE – FIGWORT FAMILY**

*Scrophularia californica* var. *floribunda* – California figwort

### **SOLANACEAE – NIGHTSHADE FAMILY**

*Datura wrightii* – jimson weed

- \* *Nicotiana glauca* – tree tobacco
- Solanum douglasii* – Douglas' nightshade
- Solanum parishii* – Parish's nightshade

### **TAMARICACEAE – TAMARISK FAMILY**

- \* *Tamarix ramosissima* – salt-cedar, Mediterranean tamarisk

### **VIOLACEAE – VIOLET FAMILY**

*Viola pedunculata* – Johnny-jump-up

## ANGIOSPERMS (MONOCOTS)

### **ARECACEAE – PALM FAMILY**

- \* *Phoenix canariensis* – Canary Island date palm

### **CYPERACEAE – SEDGE FAMILY**

*Carex triquetra* – triangular-fruit sedge

### **IRIDACEAE – IRIS FAMILY**

*Sisyrinchium bellum* – blue-eyed-grass

### **JUNCACEAE – RUSH FAMILY**

*Juncus acutus* ssp. *leopoldi* – southwestern spiny rush  
*Juncus balticus* – wire rush

### **LEMNACEAE – DUCKWEED FAMILY**

*Lemna miniscula* – least duckweed

### **LILIACEAE – LILY FAMILY**

*Calochortus* sp. – mariposa lily  
*Chlorogalum parviflorum* – small-flowered soap plant  
*Dichelostemma capitatum* – blue dicks  
*Muilla clevelandii* – San Diego goldenstar

## APPENDIX A (Continued)

---

*Muilla maritima* – common muilla

*Yucca whipplei* – our lord's candle

*Zigadenus fremontii* – Fremont's camas

### **POACEAE – GRASS FAMILY**

*Achnatherum coronatum* – giant stipa

\* *Arundo donax* – giant reed

\* *Avena barbata* – slender wild oat

\* *Avena fatua* – wild oat

\* *Bromus diandrus* – ripgut brome

\* *Bromus hordeaceus* – soft brome

\* *Bromus madritensis* ssp. *rubens* – foxtail chess

\* *Bromus tectorum* – downy brome

\* *Cortaderia selloana* – pampas grass

*Distichlis spicata* – saltgrass

\* *Gastridium ventricosum* – nit grass

\* *Hordeum marinum* – Mediterranean barley

\* *Lamarckia aurea* – golden-top

*Leymus condensatus* – giant wild rye

*Nassella pulchra* – purple needlegrass

\* *Pennisetum setaceum* – crimson fountaingrass

\* *Rhynchelytrum repens* – Natal grass

\* *Vulpia myuros* – rattail fescue

### **TYPHACEAE – CATTAIL FAMILY**

*Typha domingensis* – slender cattail

*Typha latifolia* – broad-leaved cattail

\* signifies introduced (non-native) species

## **Appendix A-2**

### **Plant Species Detected on the New Property**



**Appendix A - 2**  
**Plant Species Detected on the New Property**

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
<b>Vascular Species – Dicots</b>		
<b>ADOXACEAE - Muskroot Family</b>		
<i>Sambucus nigra</i> subsp. <i>caerulea</i>	Blue elderberry	None/None/None
<b>AIZOACEAE –Iceplant Family</b>		
* <i>Aptenia cordifolia</i>	Heartleaf iceplant	None/None/None
* <i>Carpobrotus edulis</i>	Hottentot fig	None/None/None
<b>AMARANTHACEAE-Amaranth Family</b>		
* <i>Amaranthus albus</i>	White tumbleweed	None/None/None
<b>ANACARDIACEAE - Sumac or Cashew Family</b>		
<i>Malosma laurina</i>	Laurel sumac	None/None/None
<i>Rhus integrifolia</i>	Lemonadeberry	None/None/None
* <i>Schinus molle</i>	Sugar bush	None/None/None
<i>Toxicodendron diversilobum</i>	Western poison oak	None/None/None
<b>APIACEAE - Carrot Family</b>		
<i>Apiastrum angustifolium</i>	Mock-parsley	None/None/None
* <i>Apium graveolens</i>	Common celery	None/None/None
<i>Foeniculum vulgare</i>	Sweet fennel	None/None/None
<i>Sanicula tuberosa</i>	Turkey pea sanicle	None/None/None
<b>APOCYNACEAE - Dogbane Family</b>		
<i>Asclepias fascicularis</i>	Narrow-leaf milkweed	None/None/None
<b>ASTERACEAE - Sunflower Family</b>		
<i>Acourtia microcephala</i>	Sacapellote	None/None/None
<i>Ambrosia psilostachya</i>	Western ragweed	None/None/None
<i>Artemisia californica</i>	California sagebrush	None/None/None
<i>Artemisia dracunculus</i>	Tarragon, Dragon sagewort	None/None/None
<i>Baccharis pilularis</i> subsp. <i>consanguinea</i>	Chaparral broom	None/None/None
<i>Brickellia californica</i>	California brickellbush	None/None/None
* <i>Carduus pycnocephalus</i>	Italian thistle	None/None/None
* <i>Centaurea melitensis</i>	Tocalote	None/None/None
<i>Chaenactis artemisiifolia</i>	White pincushion	None/None/None
<i>Cirsium occidentale</i> var. <i>californicum</i>	California thistle	None/None/None
<i>Cotula coronopifolia</i>	African brass buttons	None/None/None
<i>Deinandra fasciculata</i>	Fascicled tarweed	None/None/None
* <i>Dimorphotheca sinuata</i>	Blue-eye cape-marigold	None/None/None
* <i>Erigeron bonariensis</i>	Flax-leaf fleabane	None/None/None
<i>Erigeron canadensis</i>	Horseweed	None/None/None
<i>Erigeron foliosus</i> var. <i>foliosus</i>	Leafy daisy	None/None/None
<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	Golden yarrow	None/None/None
* <i>Gazania linearis</i>	Treasure flower	None/None/None
<i>Gutierrezia californica</i>	California matchweed	None/None/None
<i>Hazardia squarrosa</i> var. <i>grindelioides</i>	Saw toothed goldenbush	None/None/None

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
<i>*Hedypnois cretica</i>	Crete weed	None/None/None
<i>Helianthus gracilentus</i>	Slender sunflower	None/None/None
<i>*Helminthotheca echioides</i>	Bristly ox-tongue	None/None/None
<i>Heterotheca grandiflora</i>	Telegraph weed	None/None/None
<i>*Hypochaeris glabra</i>	Smooth cat's ear	None/None/None
<i>Isocoma menziesii</i> var. <i>menziesii</i>	Spreading goldenbush	None/None/None
<i>*Lactuca serriola</i>	Prickly lettuce	None/None/None
<i>*Logfia gallica</i>	Narrow-leaf cottonrose	None/None/None
<i>Pseudognaphalium beneolens</i>	Fragrant everlasting	None/None/None
<i>Pseudognaphalium biolettii</i>	Bicolor cudweed	None/None/None
<i>Pseudognaphalium californicum</i>	California everlasting	None/None/None
<i>Pseudognaphalium microcephalum</i>	White everlasting	None/None/None
<i>*Pseudognaphalium luteoalbum</i>	Fragrant everlasting cudweed	None/None/None
<i>*Senecio vulgaris</i>	Common groundsel	None/None/None
<i>*Silybum marianum</i>	Milk thistle	None/None/None
<i>*Sonchus asper</i> subsp. <i>asper</i>	Prickly sow thistle	None/None/None
<i>Stephanomeria exigua</i> subsp. <i>exigua</i>	Small wreath-plant	None/None/None
<i>Stephanomeria diegensis</i>	San Diego wreath-plant	None/None/None
<i>Stephanomeria virgata</i> subsp. <i>virgata</i>	Virgate wreath-plant	None/None/None
<i>Stylocline gnaphaloides</i>	Everlasting nest-straw	None/None/None
<i>Uropappus lindleyi</i>	Silver puffs	None/None/None
<i>Venegasia carpesioides</i>	Jesuit flower	None/None/None
<b>BORAGINACEAE - Borage Family</b>		
<i>Cryptantha intermedia</i> var. <i>intermedia</i>	Nievas cryptantha	None/None/None
<i>Cryptantha muricata</i> var. <i>jonesii</i>	Jones's prickly cryptantha	None/None/None
<i>Emmenanthe penduliflora</i> var. <i>penduliflora</i>	Whispering bells	None/None/None
<i>Eucrypta chrysanthemifolia</i> var. <i>chrysanthemifolia</i>	Common eucrypta	None/None/None
<i>Phacelia cicutaria</i> var. <i>hispida</i>	Caterpillar phacelia	None/None/None
<i>Phacelia grandiflora</i>	Giant-flower phacelia	None/None/None
<i>Phacelia parryi</i>	Parry's phacelia	None/None/None
<b>BRASSICACEAE - Mustard Family</b>		
<i>*Hirschfeldia incana</i>	Short-pod mustard	None/None/None
<i>Lepidium nitidum</i>	Shining peppergrass	None/None/None
<i>*Sisymbrium irio</i>	London rocket	None/None/None
<b>CACTACEAE – Cactus family</b>		
<i>*Lophocereus schottii</i>	Old man cactus	None/None/None
<i>*Opuntia ficus-indica</i>	Mission cactus	None/None/None
<i>*Stenocereus thurberi</i>	Organ pipe cactus	None/None/None
<b>CAPRIFOLIACEAE - Honeysuckle Family</b>		
<i>Lonicera subspicata</i> var. <i>denudata</i>	Johnston's honeysuckle	None/None/None
<b>CARYOPHYLLACEAE - Pink Family</b>		
<i>*Cerastium glomeratum</i>	Mouse-ear chickweed	None/None/None
<i>Silene antirrhina</i>	Snapdragon catchfly	None/None/None

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
* <i>Silene gallica</i>	Common catchfly	None/None/None
<i>Silene laciniata</i> subsp. <i>laciniata</i>	Southern pink	None/None/None
* <i>Stellaria media</i>	Common chickweed	None/None/None
<b>CHENOPODIACEAE - Goosefoot Family</b>		
* <i>Atriplex semibaccata</i>	Australian saltbush	None/None/None
<i>Chenopodium californicum</i>	California goosefoot	None/None/None
* <i>Chenopodium murale</i>	Nettle-leaf goosefoot	None/None/None
* <i>Salsola tragus</i>	Prickly Russian-thistle, Tumbleweed	None/None/None
<b>CISTACEAE - Rock-rose Family</b>		
<i>Crocanthemum scoparium</i> var. <i>scoparium</i>	Peak rush-rose	None/None/None
<b>CONVOLVULACEAE - Morning Glory Family</b>		
<i>Calystegia macrostegia</i> subsp. <i>arida</i>	San Diego morning-glory	None/None/None
<b>CRASSULACEAE - Stonecrop Family</b>		
* <i>Aeonium arborium</i>	Tree house leek	None/None/None
<b>CUCURBITACEAE - Gourd Family</b>		
<i>Marah macrocarpa</i>	Wild-cucumber	None/None/None
<b>ERICACEAE - Heath Family</b>		
<i>Arctostaphylos glandulosa</i> subsp. <i>glandulosa</i>	Eastwood's manzanita	None/None/None
<i>Xylococcus bicolor</i>	Mission manzanita	None/None/None
<b>EUPHORBIACEAE - Spurge Family</b>		
<i>Croton setiger</i>	Doveweed	None/None/None
* <i>Ricinus communis</i>	Castor bean	None/None/None
<b>FABACEAE - Legume Family</b>		
* <i>Acacia dealbata</i>	Silver wattle	None/None/None
* <i>Acacia longifolia</i>	Sydney golden wattle	None/None/None
<i>Acmispon americanus</i> var. <i>americanus</i>	Spanish-clover	None/None/None
<i>Acmispon glaber</i> var. <i>glaber</i>	Coastal deerweed	None/None/None
<i>Acmispon maritimus</i> var. <i>maritimus</i>	Alkali lotus	None/None/None
<i>Acmispon strigosus</i>	Strigose lotus	None/None/None
<i>Lupinus truncatus</i>	Collar lupine	None/None/None
<i>Vicia ludoviciana</i> subsp. <i>ludoviciana</i>	Deer Pea vetch	None/None/None
<b>FAGACEAE - Oak Family</b>		
<i>Quercus ×acutidens</i>	Torrey's scrub oak	None/None/None
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	Coast live oak	None/None/None
<b>GERANIACEAE - Cranesbill Family</b>		
* <i>Erodium botrys</i>	Long-beak filaree	None/None/None
* <i>Erodium cicutarium</i>	Red-stem filaree	None/None/None
* <i>Geranium rotundifolium</i>	Round-leaf geranium	None/None/None
* <i>Pelargonium hortorum</i>	Geranium	None/None/None
<b>GROSSULARIACEAE - Gooseberry Family</b>		
<i>Ribes speciosum</i>	Fuschia-flower gooseberry	None/None/None

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
<b>LAMIACEAE - Mint Family</b>		
<i>Marrubium vulgare</i>	Horehound	None/None/None
<i>Salvia mellifera</i>	Black sage	None/None/None
<i>Stachys stebbinsii</i>	Stebbins's hedge-nettle	None/None/None
<b>MALVACEAE - Mallow Family</b>		
* <i>Brachychiton rupestris</i>	Australian bottle tree	None/None/None
<i>Malacothamnus fasciculatus</i> var. <i>fasciculatus</i>	Chaparral bush mallow	None/None/None
<i>Sidalcea sparsifolia</i>	Checker-bloom	None/None/None
<b>MONTIACEAE – Miner’s Lettuce Family</b>		
<i>Calandrinia menziesii</i>	Red maids	None/None/None
<i>Claytonia perfoliata</i> subsp. <i>mexicana</i>	Mexican miner's-lettuce	None/None/None
<b>MYRSINACEAE - Myrsine Family</b>		
* <i>Anagallis arvensis</i>	Scarlet pimpernel	None/None/None
<b>MYRTACEAE- Myrtle Family</b>		
* <i>Eucalyptus camaldulensis</i>	Red gum	None/None/None
<b>OLEACEAE –Olive Family</b>		
* <i>Olea europaea</i>	Olive tree	None/None/None
<b>ONAGRACEAE - Willowherb Family</b>		
<i>Camossoniopsis micrantha</i>	Miniature sun cup	None/None/None
<i>Clarkia epilobioides</i>	White clarkia	None/None/None
<b>OROBANCHACEAE - Broom-rape Family</b>		
<i>Cordylanthus rigidus</i> subsp. <i>brevibracteatus</i>	Stiff-branch bird's beak	None/None/None
<b>PAPAVERACEAE – Poppy Family</b>		
<i>Ehrendorferia chrysantha</i>	Golden ear-drops	None/None/None
<i>Papaver californicum</i>	Fire poppy	None/None/None
<b>PHRYMACEAE - Lopseed Family</b>		
<i>Mimulus aurantiacus</i> var. <i>aurantiacus</i>	Bush monkey flower	None/None/None
<b>PLATANACEAE – Sycamore Family</b>		
* <i>Platanus racemosa</i>	California sycamore	None/None/None
<b>PLANTAGINACEAE - Plantain Family</b>		
<i>Antirrhinum nuttallianum</i> subsp. <i>nuttallianum</i>	Nuttall's snapdragon	None/None/None
<i>Keckiella cordifolia</i>	Climbing bush penstemon	None/None/None
<i>Nuttallanthus texanus</i>	Large blue toadflax	None/None/None
* <i>Plantago lanceolata</i>	English plantain	None/None/None
<b>PLUMBAGINACEAE – Leadwort Family</b>		
<i>Limonium sinuatum</i>	Notch-leaf marsh-rosemary	None/None/None
<b>POLEMONIACEAE - Phlox Family</b>		
<i>Navarretia hamata</i> subsp. <i>hamata</i>	Hooked skunkweed	None/None/None
<b>POLYGONACEAE - Buckwheat Family</b>		
<i>Eriogonum fasciculatum</i> var. <i>fasciculatum</i>	Coast California buckwheat	None/None/None
<i>Pterostegia drymarioides</i>	Granny’s hairnet	None/None/None
* <i>Rumex crispus</i>	Curly dock	None/None/None

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
<b>PORTULACACEAE – Purslane Family</b>		
<i>*Portulaca afra</i>	Miniature jade plant	None/None/None
<b>RHAMNACEAE - Buckthorn Family</b>		
<i>Ceanothus tomentosus</i>	Ramona-lilac; woolly-leaved ceanothus	None/None/None
<i>Ceanothus verrucosus</i>	Wart-stem ceanothus	None/None/None
<i>Rhamnus ilicifolia</i>	Holly-leaf redberry	None/None/None
<b>ROSACEAE - Rose Family</b>		
<i>Adenostoma fasciculatum</i> var. <i>fasciculatum</i>	Chamise	None/None/None
<i>Heteromeles arbutifolia</i>	Toyon	None/None/None
<i>*Lyonothamnus floribundus</i> ssp. <i>asplenifolius</i>	Island ironwood	None/None/None
<i>Prunus ilicifolia</i>	Islay, Holly-leaf cherry	None/None/None
<b>RUBIACEAE - Madder Family</b>		
<i>Galium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf bedstraw	None/None/None
<i>Galium nuttallii</i> subsp. <i>nuttallii</i>	San Diego bedstraw	None/None/None
<i>Galium porrigens</i> var. <i>porrigens</i>	Climbing/Oval-leaf bedstraw	None/None/None
<b>RUTACEAE- Rue Family</b>		
<i>Cneoridium dumosum</i>	Coast spice bush	None/None/None
<b>SCROPHULARIACEAE – Figwort Family</b>		
<i>Scrophularia californica</i>	California figwort	None/None/None
<b>SOLANACEAE - Nightshade Family</b>		
<i>*Nicotiana glauca</i>	Tree tobacco	None/None/None
<i>Solanum americanum</i>	White nightshade	None/None/None
<i>Solanum parishii</i>	Parish's nightshade	None/None/None
<b>CUPRESSACEAE – Cypress Family</b>		
<i>Hesperocyparis arizonica</i>	Arizona cypress	None/None/None
<b>DRYOPTERIDACEAE - Wood Fern Family</b>		
<i>Dryopteris arguta</i>	California wood fern	None/None/None
<b>PINACEAE – Pine Family</b>		
<i>*Pinus halepensis</i>	Aleppo pine	None/None/None
<b>PTERIDACEAE - Maidenhair Fern Family</b>		
<i>Pellaea mucronata</i> var. <i>mucronata</i>	Bird's foot fern	None/None/None
<i>Pentagramma triangularis</i> subsp. <i>triangularis</i>	California goldback fern	None/None/None
<b>Vascular Species - Monocots</b>		
<b>AGAVACEAE - Agave Family</b>		
<i>*Agave americana</i>	Century plant	None/None/None
<i>Chlorogalum parviflorum</i>	Small-flower soap-plant	None/None/None
<i>Hesperoyucca whipplei</i>	Chaparral candle	None/None/None
<i>*Yucca elephantipes</i>	Giant yucca	None/None/None
<i>Yucca schidigera</i>	Mohave yucca	None/None/None
<b>LILIACEAE – Lily Family</b>		
<i>Calochortus weedii</i>	Weed's mariposa lily	None/None/None

Scientific name	Common name	Status (Federal/State/County, Draft North County Plan)
<b>MELANTHIACEAE - Bunch Flower or Camas Family</b>		
<i>Toxicoscordion fremontii</i>	Fremont's camas	None/None/None
<b>POACEAE - Grass Family</b>		
* <i>Avena fatua</i>	Wild oat	None/None/None
* <i>Brachypodium distachyon</i>	Purple false brome	None/None/None
* <i>Bromus diandrus</i>	Ripgut grass	None/None/None
* <i>Bromus hordeaceus</i>	Soft chess	None/None/None
* <i>Bromus madritensis</i> var. <i>rubens</i>	Red brome	None/None/None
* <i>Cenchrus setaceus</i>	African fountain grass	None/None/None
* <i>Cortaderia jubata</i>	Purple pampas grass	None/None/None
* <i>Festuca myuros</i>	Rat-tail fescue	None/None/None
<i>Festuca octoflora</i>	Tufted fescue	None/None/None
* <i>Hordeum murinum</i> var. <i>leporinum</i>	Hare barley	None/None/None
* <i>Lamarckia aurea</i>	Golden-top	None/None/None
<i>Melica frutescens</i>	Tall melic	None/None/None
<i>Melica imperfecta</i>	Coast range melic	None/None/None
* <i>Melinis repens</i> subsp. <i>repens</i>	Natal grass	None/None/None
<i>Muhlenbergia microsperma</i>	Little-seed muhly	None/None/None
* <i>Phleum pratense</i>	Cultivated Timothy	None/None/None
* <i>Polypogon monspeliensis</i>	Annual beard grass	None/None/None
* <i>Schismus barbatus</i>	Mediterranean schismus	None/None/None
<i>Stipa coronata</i>	Giant stipa	None/None/None
<i>Stipa lepida</i>	Foothill needle-grass	None/None/None
<i>Stipa pulchra</i>	Purple needle-grass	None/None/None
* <i>Zea mays</i>	Corn	None/None/None
<b>THEMIDACEAE - Brodiaea Family</b>		
<i>Bloomeria crocea</i>	Common goldenstar	None/None/None
<i>Dichelostemma capitatum</i> subsp. <i>capitatum</i>	Blue dicks, School bells	None/None/None

\*Signifies species nonnative for the Property.

## **APPENDIX B**

### **SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR WITHIN THE ESCONDIDO CREEK PRESERVE**



## **Appendix B-1**

### **Special-Status Plant Species with Potential to Occur on the Existing Property**

**(Appendix D from Baseline Biodiversity Survey for the  
Escondido Creek Preserve  
Prepared by Dudek [2011b])**



**APPENDIX B-1**  
**Sensitive Plant Species Detected or Potentially Occurring at Escondido Creek Preserve**  
**Site Elevation 400–1,040 Feet**

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Acanthomintha ilicifolia</i>	San Diego thornmint	FT/SE/1B.1/List A, NCMSCP	Chaparral, coastal scrub, valley and foothill grassland, vernal pools; annual herb/ April–June/ 30–3,150 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable chaparral, coastal scrub, and grassland habitat with clay soils occur on site, but nearest CNDDDB record is approximately two miles southwest of the Preserve. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Adolphia californica</i>	Spineshrub	None/None/1B.1/ List B, NCMSCP	Chaparral, coastal scrub, valley and foothill grassland; clay/ perennial deciduous shrub/ December–May/ 145–2,430 feet.	Within 1 mile.	Present	<b>Low potential to occur.</b> Limited clay soils on site.
<i>Agave shawii</i>	Shaw's agave	None/ None/ 2.1/ List B	Coastal bluff scrub, coastal scrub/ leaf succulent/ September–May/ 30–250 ft.	Within surrounding quads.	Not present.	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Ambrosia pumila</i>	San Diego ambrosia	FE/None/1B.1/List A, NCMSCP	Chaparral, coastal scrub, valley and foothill grassland, vernal pools/ perennial rhizomatus herb/ April–October/ 60–1,360 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat is present but is limited to areas of heavy soils. Also, the nearest CNDDDB record is located approximately 2.5 miles south of the Preserve.
<i>Aphanisma blitoides</i>	Aphanisma	None/ None/ 1B.2/ List A	Coastal bluff scrub, coastal dunes, coastal scrub; sandy/ annual herb/ March–June/ <1,000 ft.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 7 miles southwest of the Preserve.
<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>	Del Mar Manzanita	FE/None/1B.1/List A, NCMSCP	Chaparral (maritime, sandy)/perennial evergreen shrub/ December–June/ 0–1,200 feet.	Within 1 mile.	Present	<b>Low potential to occur.</b> Chaparral on site is not maritime chaparral, which occurs within the coastal fog belt.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Arctostaphylos rainbowensis</i>	Rainbow Manzanita	None/None/1B.1/List A, NCMSCP	Chaparral/ perennial evergreen shrub/ December–March/ 700–2,200 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 5 miles north of the Preserve.
<i>Artemisia palmeri</i>	San Diego sagewort	None/None/4.2/List D	Chaparral, coastal scrub, riparian forest, scrub, and woodland; sandy, mesic/ deciduous shrub/ May–September/ 50–3,000 ft.	Within 1 mile.	Present	<b>Present.</b> This species was observed along Escondido Creek and its tributaries north and south of Harmony Grove Road as well as south of Canyon De Oro Road.
<i>Astragalus deanei</i>	Dean's milk-vetch	None/None/1B.1/ List A	Chaparral, coastal scrub, riparian forest/ perennial herb/ February–May/ 250–2,200 feet.	None in the area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.
<i>Astragalus insularis</i> var. <i>harwoodii</i>	Harwood's milk-vetch	None/None/ 2.2/List B	Desert dunes, Mojavean desert scrub/ annual herb/ January–May/ <2,200 feet.	None in the area.	Not present	<b>Not likely to occur.</b> No suitable habitat on site and no known occurrences in the area.
<i>Astragalus oocarpus</i>	Descanso milk-vetch	None/None/ 2.2/List A	Chaparral, cismontane woodland/ perennial herb/ May–August/ 1,000–5,000 feet.	None in the area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.
<i>Astragalus tener</i> var. <i>titi</i>	Coastal dunes milk-vetch	FE/ SE/ 1B.1/ List A	Coastal bluff scrub, coastal dunes, coastal prairie; mesic, often vernal mesic/ annual herb/ March–May/ < 170 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Atriplex coulteri</i>	Coulter's saltbush	None/None/1B.2/List A, NCMSCP	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland/ perennial herb/ March–October/ <1,300 feet	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB record is approximately 4 miles south of the Preserve.
<i>Atriplex pacifica</i>	South Coast saltscale	None/ None/ 1B.2/ List A	Coastal bluff scrub, coastal dunes, coastal scrub, playas/ annual herb/ March–October/ < 500 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable habitat present, but the majority of the Preserve is above the species' elevation range. In addition, this species would likely have been observed during focused surveys.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Atriplex parishii</i>	Parish brittle-scale	None/None/1B.1/List A, NCMSCP	Chenopod scrub, playas, vernal pools/ annual herb/ June–October/ 75–6,000 feet.	None in the area.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Atriplex serenana</i> var. <i>davidsonii</i>	Davidson's salt-scale	None/ None/ 1B.2/ List A	Coastal bluff scrub, coastal scrub; alkaline/ annual herb/ April–October/ 30–650 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable alkaline soils in coastal scrub on site.
<i>Baccharis vanessae</i>	Encinitas baccharis	FT/SE/1B.1/List A, NCMSCP	Chaparral, cismontane woodland/ perennial deciduous shrub/ August–November/ 180–2,500 feet.	Within 1 mile.	Present	<b>High potential to occur.</b> Species is recorded on adjacent Del Dios Highlands Preserve and suitable habitat is present on site.
<i>Berberis nevinii</i>	Nevin's barberry	FE/SE/1B.1/List A, NCMSCP	Chaparral, cismontane woodland, coastal scrub/perennial evergreen shrub/March–June/900–2,700 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Only a small portion in the northeastern parcels of the site are within the species' elevation range.
<i>Bergerocactus emoryi</i>	Golden-spined cereus	None/ None/ 2.2/ List B	Closed-cone conifer forest, chaparral, coastal scrub; sandy/ shrub/ May–June/ 10–1,300 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 10 miles south of the Preserve.
<i>Brodiaea filifolia</i>	Thread-leaf brodiaea	FT/SE/1B.1/List A, NCMSCP	Chaparral, cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools/perennial bulbiferous herb/ March–June/ 80–4,000 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present; nearest CNDDDB record is approximately 1.5 miles west of the Preserve. Species' typical blooming period may allow detection during focused surveys conducted in February/March 2011, but presence/absence cannot be determined.
<i>Brodiaea orcutti</i>	Orcutt's brodiaea	None/None/1B.1/List A, NCMSCP	Closed-cone coniferous forest, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ perennial bulbiferous herb/ May–July/ 90–5,600 feet.	Within 1 mile.	Present	<b>High potential to occur.</b> Species is recorded within one mile of the Preserve and suitable habitat is present on site.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Calandrinia breweri</i>	Brewer's calandrinia	None/None/4.2/List D	Chaparral, coastal scrub/ annual herb/ March–June/ 33–4,003 feet	None within area.	Present	<b>High potential to occur.</b> Suitable habitat present and previously observed on the adjacent Del Dios Highlands Preserve (TAIC 2008).
<i>Calochortus dunnii</i>	Dunn's mariposa lily	None/SR/1B.2/List A	Closed-cone coniferous forest, chaparral, valley and foothill grassland/ Perennial bulbiferous herb/ April–June/ 1,200–6,000 feet.	None within area.	Not present	<b>Not likely to occur.</b> No known occurrences in the area; site is below elevation range of species.
<i>Camissonia lewisii</i>	Lewis's evening primrose	None/None/3/List C	Coastal bluff scrub, cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland/ annual herb/ March–May/ <700 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable habitat present; although there are CNPS records, there are no CNDDDB occurrences within the surrounding quads.
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	None/None/1B.2/List A	Closed-cone coniferous forest, chaparral/ Perennial evergreen shrub/ March–May/ 750–2,500 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable habitat present, but nearest CNDDDB record is over 10 miles south of the Preserve.
<i>Ceanothus verrucosus</i>	Wart-stemmed ceanothus	None/None/2.2/List B, NCMSCP	Chaparral/ perennial evergreen shrub/ December–May/ <1,250 feet.	Within 1 mile.	Present	<b>Present.</b> This species is a common component of the southern mixed chaparral on site.
<i>Centromadia (=Hemizonia) parryi</i> spp. <i>australis</i>	Southern tarplant	None/None/1B.1/List A, NCMSCP	Marshes and swamps (margins), valley and foothill grassland (vernally mesic), vernal pools/ annual herb/ May–November/ 0–1,400 feet	Within 5 miles.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Centromadia (=Hemizonia) pungens</i> ssp. <i>laevis</i>	Smooth tarplant	None/ None/ 1B.1/ List A	Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland; alkaline/ annual herb/ April–September/ <1580 ft.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable alkaline soils on site.
<i>Chaenactis glabriuscula</i> var. <i>orcuttiana</i>	Orcutt's pincushion	None/ None/ 1B.1/ List A	Coastal bluff scrub, coastal dunes/ annual herb/ January–August/ 10-330 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable habitat on site; site is above elevation range of species.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Chorizanthe orcuttiana</i>	Orcutt's spineflower	FE/ SE/1B.1/List A, NCMSCP	Closed-cone coniferous forest, chaparral, coastal scrub/annual herb/ March–May/ 0–410 feet.	Within 5 miles.	Present	<b>Low potential to occur.</b> Only a small portion of the southern Preserve parcels is within the species' elevation range.
<i>Chorizanthe polygonoides</i> var. <i>longispina</i>	Long-spined spineflower	None/ None/ 1B.2/ List A	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland; often clay/ annual herb/ April-July/ 100-5,000 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Limited suitable clay soils. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Clarkia delicata</i>	Delicate clarkia	None/None/1B.2/List A	Chaparral, cismontane woodland/ annual herb/ April–June/ 750–3,500 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 8 miles southeast of the Preserve. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	Summer-holly	None/None/1B.2/List A, NCMSCP	Chaparral, cismontane woodland/ perennial evergreen shrub/ April–June/ 90–1,800 feet.	Within 1 mile.	Present	<b>High potential to occur.</b> Suitable chaparral and cismontane woodland present on site and species was observed within 1 mile.
<i>Corethrogyne filaginifolia</i> var. <i>incana</i>	San Diego sand aster	None/ None/ 1B.1/ List A	Chaparral, coastal bluff scrub, coastal scrub/ perennial herb/ June-September/ 10-380 feet.	Within surrounding quads.	Marginal	<b>Low potential to occur.</b> Although this species was observed on the adjacent Del Dios Highland Preserve (TAIC 2008), the site elevation is slightly above elevation range of the species.
<i>Corethrogyne filaginifolia</i> var. <i>linifolia</i>	Del Mar Mesa sand aster	None/ None/ 1B.1/ List A	Coastal bluff scrub, maritime chaparral (openings), coastal scrub; sandy/ perennial herb/ May-September/ 10-380 feet.	Within 5 miles.	Marginal	<b>Low potential to occur.</b> Site elevation is slightly above elevation range of the species.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Dudleya blochmaniae</i> spp. <i>blochmaniae</i>	Blochman's dudleya	None/ None/ 1B.1/ List A	Chaparral, coastal bluff scrub, coastal scrub, valley and foothill grassland, rocky; often clay or serpentinite/ perennial herb/ April-June/ 15-1,500 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Limited clay soils on site. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Dudleya brevifolia</i>	Short-leaf dudleya	None/SE/1B.1/List A, NCMSCP	Chaparral, coastal scrub/perennial herb/ April/ 90–850 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB record is over 8 miles south of the Preserve. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Dudleya variegata</i>	Variegated dudleya	None/None/1B.2/List A	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools; clay/ perennial herb/ April–June/ <1,900 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 3 miles southeast of the Preserve. Timing of surveys in February/March not optimal for the detection of this species; therefore, presence/absence cannot be determined.
<i>Dudleya viscida</i>	Sticky dudleya	None/None/1B.2/List A, NCMSCP	Coastal bluff scrub, chaparral, cismontane woodland, coastal scrub; rocky/ perennial herb/May–June/ 30–1,800 feet.	Within 1 mile.	Present	<b>High potential to occur.</b> Species recorded within 1 mile. Timing of surveys in February/March not optimal for detection of this species; therefore, presence/absence cannot be determined.
<i>Ericameria palmeri</i> var. <i>palmeri</i>	Palmer's ericameria	None/None/2.2/List B	Chaparral, coastal scrub/ perennial evergreen shrub/ September–November/ 90–1,300 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 7 miles southeast of the Preserve.
<i>Eryngium aristulatum</i> var. <i>hooveri</i>	Hoover's button-celery	None/ None/ 1B.1/ None	Vernal pools/ annual-perennial herb/ July/ 10-150 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species; no vernal pools on site.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery	FE/SE/1B.1/List A, NCMSCP	Coastal scrub, valley and foothill grassland, vernal pools/annual/perennial herb/ April–June/ 60–2,000 feet.	Within 5 miles.	Present	<b>Low potential to occur.</b> Suitable habitat present, but no vernal pools on site and nearest CNDDDB record is over 3 miles north of the Preserve.
<i>Erysimum ammophilum</i>	Sand-loving wallflower	None/ None/ 1B.2/ None	Maritime chaparral, coastal dunes, coastal scrub; sandy, openings/ perennial herb/ February-June/ <200 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Euphorbia misera</i>	Cliff spurge	None/ None/ 2.2/ List B	Coastal bluff scrub, coastal scrub, Mojavean desert scrub; rocky/ shrub/ December-August/ 30-1,650 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable coastal scrub on site, but nearest CNDDDB record is over 5 miles south of the Preserve.
<i>Ferocactus viridescens</i>	San Diego barrel cactus	None/None/2.1/List B, NCMSCP	Chaparral, coastal scrub, valley and foothill grassland, vernal pools/ perennial stem succulent/ May–June/ <1,500 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but site appears to be north of the species' range based on CNDDDB occurrences.
<i>Geothaollus tuberosa</i>	Campbell's liverwort	None/ None/ 1B.1/ None	Coastal scrub (mesic), vernal pools; soil/ ephemeral liverwort/ NA/ 30-2,000 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable mesic habitat or vernal pools on site.
<i>Githopsis diffusa</i> ssp. <i>filicaulis</i>	Mission Canyon bluecup	None/None/3.1/List C	Chaparral/ annual herb/ April–June/ 1,400–2,300 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Grindelia hirsutula</i> var. <i>hallii</i>	San Diego gumplant	None/None/1B.2/List A	Chaparral, lower montane conifer forest, meadows and seeps, valley and foothill grassland/ perennial herb/ July–October/ 600–5,700 feet	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 20 miles east of the Preserve.
<i>Harpagonella palmeri</i>	Palmer's grapplinghook	None/ None/ 4.2/ List D	Chaparral, coastal scrub, valley and foothill grassland; clay/ annual herb/ March-May/ 60-3,100 ft.	Within 5 miles.	Present	<b>Low potential to occur.</b> Limited suitable clay soils on site.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Hazardia orcuttii</i>	Orcutt's hazardia	FC/ ST/ 1B.1/ List A	Maritime chaparral, coastal scrub; often clay/ evergreen shrub/ August-October/ 250-280 ft.	Within 5 miles.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Hesperocyparis stephensonii</i>	Cuyamaca cypress	None/None/1B.1/ List A	Closed-cone coniferous forest, chaparral, cismontane woodland, riparian forest/ perennial evergreen tree/ 3,000–6,000 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Heterotheca sessiliflora</i> ssp. <i>sessiliflora</i>	False goldenaster	None/None/1B.1/None	Chaparral, coastal dunes, coastal scrub/ perennial herb/ March–December/ <4,000 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present on site, but nearest CNDDDB record is approximately 5 miles southwest of the Preserve
<i>Horkelia truncata</i>	Ramona horkelia	None/None/1B.3/List A	Chaparral, cismontane woodland/ perennial herb/ May–June/ 1,200–4,000 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Isocoma menziesii</i> var. <i>decumbens</i>	Decumbent goldenbush	None/None/1B.2/List A	Chaparral, coastal scrub/ perennial shrub/ April–November/ <450 feet.	Within 5 miles.	Marginal	<b>Low potential to occur.</b> The majority of the study area is above the elevation range of species..
<i>Iva hayesiana</i>	San Diego marsh-elder	None/ None/ 2.2/ List B	Marshes and swamps, playas/ perennial herb/ April-November/ 30-1,650 feet.	Within 1 mile.	Present	<b>Present.</b> Located along Escondido Creek.
<i>Juncus acutus</i> ssp. <i>leopoldii</i>	Southwestern spiny rush	None/ None/ 4.2/List D	Coastal dunes(mesic), meadows and alkaline seeps, coastal saltwater marshes and swamps/ rhizomatous herb/ May-June/ <3000 ft.	Within surrounding quads.	Present	<b>Present.</b> This species occurs along Escondido Creek and its tributaries north and south of Harmony Grove Road on the Preserve.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	Coulter's goldfields	None/ None/ 1B.1/ List A	Saltwater marsh and swamps, playas, vernal pools/ annual herb/ February-June/ <4000 feet.	Within 5 miles.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Lepechinia cardiophylla</i>	Heart-leaved pitchersage	None/None/1B.2/List A	Chaparral, coastal scrub/ perennial shrub/ April–July/ 1,700–4,500 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Lepidium virginicum</i> var. <i>robinsonii</i>	Robinson's pepper-grass	None/None/1B.2/List A	Chaparral, coastal scrub/ annual herb/ January–July/ <2,700 feet.	Within 5 miles.	Present	<b>High potential to occur.</b> Recorded on the adjacent Del Dios Highlands Preserve (TAIC 2008).
<i>Leptosyne</i> (=Coreopsis) <i>maritima</i>	Sea dahlia	None/ None/ 2.2/ List B	Coastal bluff scrub, coastal scrub/ perennial herb/ March–May/ 15-500 feet.	Within 1 mile.	Present	<b>Low potential to occur.</b> Although there is suitable coastal scrub habitat present on site, this species prefers sandstone cliffs near the ocean (Reiser 1994).
<i>Lessingia glandulifera</i> var. <i>tomentosa</i>	Warner Springs lessingia	None/None/1B.3/List A	Chaparral/ annual herb/ August–October/ 2,800–6,500 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Limnanthes gracilis</i> ssp. <i>parishii</i>	Parish's slender meadowfoam	None/SE/1B.2/List A	Lower montane coniferous forest, meadows and seeps, vernal pools/ annual herb/ April–June/ 1,900–6,500 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Linanthus orcutti</i>	Orcutt's linanthus	None/None/1B.3/List A	Chaparral, lower montane coniferous forest, pinyon and juniper woodland/ annual herb/ May–June/ 3,000–7,000 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Lotus nuttallianus</i>	Nuttall's lotus	None/ None/ 1B.1/ List A	Coastal dunes, coastal scrub; sandy/ annual herb/ March–June/ <35 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved rock-mint	None/None/1B.2/List A, NCMSCP	Chaparral, cismontane woodland/ perennial rhizomatous herb/ June–August/ 900–5,200 feet.	Within 1 mile.	Present	<b>High potential to occur.</b> Suitable chaparral habitat present and species recorded within 1 mile of the site.
<i>Monardella viminea</i>	Willowy monardella	FE/SE/1B.1 /List A	Chaparral, coastal scrub, riparian forest, woodland, and scrub; alluvial ephemeral washes/ perennial herb/ June–August/ 160–750 feet	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable habitat present but nearest CNDDDB occurrence is over 9 miles south of the Preserve.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Muilla clevelandii</i>	San Diego goldenstar	None/None/1B.1/ List A NCMSCP	Chaparral, coastal scrub, valley and foothill grasslands, vernal pools; clay/ perennial bulbiferous herb/ April–May/ 150–1,550 feet.	Within 1 mile.	Present	<b>Present.</b> This species was observed north of Canyon Del Oro Road on the Preserve.
<i>Myosurus minimus</i> ssp. <i>apus</i>	Little mousetail	None/None/3.1/List C, NCMSCP	Valley and foothill grassland, vernal pools/ annual herb/ March–June/ 60–2,100 feet.	Within surrounding quads.	Marginal	<b>Low potential to occur.</b> Minimal suitable grassland habitat on site.
<i>Nama stenocarpum</i>	Mud nama	None/ None/ 2.2/ List B	Marshes and swamps, lake margins, riverbanks/ annual-perennial herb/ January-July/ 15-1,650 feet.	Within surrounding quads.	Marginal	<b>Low potential to occur.</b> Minimal suitable riverbank habitat on site.
<i>Navarretia fossalis</i>	Spreading navarretia	FT/None/1B.1/List A, NCMSCP	Chenopod scrub, shallow freshwater marshes and swamps, playas, vernal pools/ annual herb/ April–June/ 100–4,300 feet	Within 5 miles.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Nemacaulis denudata</i> var. <i>denudata</i>	Coast woolly-heads	None/ None/ 1B.2/ List A	Coastal dunes/ annual herb/ April-September/ < 330 feet.	Within 5 miles.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species; no suitable habitat on site.
<i>Nemacaulis denudata</i> var. <i>gracilis</i>	Slender woolly-heads	None/ None/ 2.2/ List B	Coastal dunes, desert dunes, Sonoran desert scrub/ annual herb/ (March)April-May/ 160-1,300 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Nolina cismontana</i>	Chaparral beargrass	None/None/1B.2/List A, NCMSCP	Chaparral, coastal scrub/perennial evergreen shrub/May–July/ 450–4,200 feet.	None within area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.
<i>Opuntia californica</i> var. <i>californica</i>	Snake cholla	None/ None/ 1B.1/ List A	Chaparral, coastal scrub/ stem succulent/ April-May/ 100-500 feet.	Within surrounding quads.	Present	<b>Not likely to occur.</b> Suitable habitat present, but most of the Preserve is above the species' range and the nearest CNDDDB occurrence is over 11 miles south of the Preserve.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Orcuttia californica</i>	California Orcutt grass	FE/ SE/ 1B.1/ List A	Vernal pools/ annual herb/ April-August/ 50-2,200 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No vernal pools on site.
<i>Orobanche parishii</i> ssp. <i>brachyloba</i>	Short-lobed broom-rape	None/ None/ 4.2/ List D	Coastal bluff scrub, coastal dunes, coastal scrub; sandy/ perennial herb parasitic/ April - October/ <1,000 feet.	Within 5 miles.	Present	<b>Low potential to occur.</b> Limited sandy soils below 1,000 feet on the Preserve.
<i>Packera ganderi</i>	Gander's ragwort	None/SR/B.2/List A, NCMSCP	Chaparral (burns)/ perennial herb/ April-June/ 1,200-4,000 feet.	None within area.	Present	<b>Not likely to occur.</b> Site is below elevation range of species.
<i>Pinus torreyana</i> spp. <i>torreyana</i>	Torrey pine	None/ None/ 1B.2/ List A	Closed-cone conifer forest, chaparral; sandstone/ evergreen tree/ NA/ 250-550 feet.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No suitable sandstone soils on site.
<i>Pogogyne abramsii</i>	San Diego mesa mint	FE/ SE/ 1B.1/ List A	Vernal pools/ annual herb/ May-July/ 300-650 ft.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No vernal pools on site.
<i>Pogogyne nudiuscula</i>	Otay Mesa mint	FE/ SE/ 1B.1/ List A	Vernal pools/ annual herb/ May-July/ 300-620 ft.	Within surrounding quads.	Not present	<b>Not likely to occur.</b> No vernal pools on site.
<i>Quercus dumosa</i>	Nuttall's scrub oak	None/None/1B.1/List A, NCMSCP	Closed-cone coniferous forest, chaparral, coastal scrub/ perennial evergreen shrub/ February-April/ <1,300 feet.	Within 5 miles.	Present	<b>Low potential to occur.</b> Suitable habitat present, but nearest CNDDDB occurrence is over 4 miles southwest of the Preserve.
<i>Quercus engelmannii</i>	Engelmann oak	None/None/4.2/List D, NCMSCP	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland/ perennial deciduous tree/ March-June/ 150-4,300 feet.	Within one mile	Present	<b>Moderate potential to occur.</b> Previously documented on the adjacent Del Dios Highlands Preserve (TAIC 2008), but this perennial deciduous tree would have been observed during focused surveys.
<i>Ribes canthariforme</i>	Moreno currant	None/None/1B.3/List A	Chaparral, riparian scrub/ perennial deciduous shrub/ February-May/ 1,100-4,000 feet.	None within area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Satureja chandleri</i>	San Miguel savory	None/None/1B.2/List A, NCMSCP	Chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland; rocky, gabbroic or metavolcanic/ shrub/ March–July/ 400–3,550 feet	None within area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.
<i>Scutellaria bolanderi</i> ssp. <i>austromontana</i>	Southern mountains skullcap	None/None/1B.2/List A	Chaparral, cismontane woodland, lower montane coniferous forest/ perennial rhizomatous herb/ June–August/ 1,300–6,600 feet.	None within area.	Present	<b>Not likely to occur.</b> No known occurrences in the area.
<i>Selaginella cinerascens</i>	Ashy spike-moss	None/ None/ 4.1/ List D	Chaparral, coastal scrub/ perennial rhizomatous herb/ 66–2,100 feet	None within area.	Present	<b>Present.</b> Ashy spike-moss occurs in several locations across the Preserver, often in open or rocky areas.
<i>Senecio aphanactis</i>	Chaparral ragwort	None/ None/ 2.2/List B	Chaparral, cismontane woodland, coastal scrub; sometimes alkaline/ annual herb/ January-April/ 50-2,630 feet.	Within surrounding quads.	Present	<b>Low potential to occur.</b> Suitable vegetation present, but no alkaline soils recorded on the site.
<i>Sphaerocarpus drewei</i>	Bottle liverwort	None/ None/ 1B.1/ None	Chaparral, coastal scrub; openings, soil/ ephemeral liverwort/ NA/ 300-1,970 feet.	Within surrounding quads.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but no CNDDDB records in the vicinity.
<i>Stemodia durantifolia</i>	Purple stemodia	None/None/2.1/List B	Sonoran desert scrub/ perennial herb/ January–December/ 550–1,000 feet.	Within 5 miles.	Not present	<b>Not likely to occur.</b> No suitable habitat on site.
<i>Suaeda esteroa</i>	Estuary seablite	None/ None/ 1B.2/ List A	Coastal salt marshes and swamps/ perennial herb/ May–October (Jan)/ < 20 feet.	Within 5 miles.	Not present	<b>Not likely to occur.</b> Site is above elevation range of species.
<i>Tetracoccus dioicus</i>	Parry's tetracoccus	None/None/1B.2/List A, NCMSCP	Chaparral, coastal scrub/ perennial deciduous shrub/ April–May/ 500–3,500 feet.	Within 5 miles.	Present	<b>Moderate potential to occur.</b> Suitable habitat present, but nearest CNDDDB record is over 3 miles north of the Preserve.

## APPENDIX B-1 (Continued)

Scientific Name	Common Name	Status <sup>1</sup> Federal/ State/ CNPS / County List	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDDB/CNPS)	Suitable Habitat/ Elevation	Status On Site or Potential to Occur
<i>Thermopsis californica</i> var. <i>semota</i>	Velvety false lupine	None/None/1B.2/List A	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland/ perennial rhizomatous herb/ March–June/ 3,200–6,200 feet.	None within area.	Not present	<b>Not likely to occur.</b> Site is below elevation range of species.

<sup>1</sup> Status

FE: Federally listed as endangered

FT: Federally listed as threatened

SE: State-listed as endangered

SR: State-listed as rare

CNPS List 1B, County List A: Considered rare, threatened, or endangered in California and elsewhere.

CNPS List 2, County List B: Considered rare, threatened, or endangered in CA, but more common elsewhere.

CNPS List 3, County List C: Plants which need more information

CNPS List 4, County List D: Limited distribution – a watch list

NCMSCP: Proposed for coverage under the Draft North County MSCP (February 2008)



## **Appendix B-2**

### **Special-Status Plant Species with Potential to on the New Property**



**Appendix B-2**  
**Special-Status Plant Species Evaluated for Potential to Occur on the New Property**

Common Name	Scientific Name	Status <sup>1</sup>	General Habitat Description	Microhabitat Description	Habitat Present/ Absent	Potential for Occurrence
San Diego sagewort	<i>Artemisia palmeri</i>	CRPR: List 4.2 County List : D	Sandy, mesic soils, chaparral, coastal scrub, riparian forest, riparian scrub, riparian woodland. Elevation 15–915 meters. Perennial deciduous shrub.  Blooms February–September.	Found along creeks and drainages near the coast. Found in rocky, sandy loams. Grows commonly in shaded understory beneath willow, sycamore, and cottonwood.	Low areas within the new property may support habitat for the species.	<b>Low potential to occur.</b> The species occurs in similar habitats to the southwest of the new property.
Encinitas baccharis	<i>Baccharis vanessae</i>	USFWS: Threatened CDFW: Endangered CRPR: List 1B.1 County List: A North County Plan: Proposed covered	Sandstone, metavolcanic rock, maritime chaparral, and cismontane woodland. Elevation 60–720 meters. Perennial deciduous shrub.  Blooms August–November.	Found in low-growing chaparral, Corralitos loamy sand, and Cienega rocky coarse sandy loam.	Habitat for the species exists on the site in rocky peak areas.	<b>High potential to occur.</b> The species has been found on rocky peak areas in central San Diego County 3.5 miles to the south of the new property (Calflora 2016).
San Diego goldenstar	<i>Bloomeria clevelandii</i>	CRPR: List 1B.1 County List: A	Clay, chaparral, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 50–465 meters. Perennial bulbiferous herb.  Blooms April–May.	Clay soil and loamy soil patches in openings of chaparral and sage scrub habitats.	Loamy conditions occur within the new property and a few clay patches may occur.	<b>Moderate potential to occur.</b> Known locations are 2.5 miles to the southwest of the new property (County of San Diego 2011).
Orcutt's brodiaea	<i>Brodiaea orcuttii</i>	CRPR: 1B.1 County List: A	Mesic, clay, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation 30–1,692 meters. Perennial bulbiferous herb.  Blooms April–May.	Mima mound topography, vernal moist grasslands, periphery of vernal pools and ephemeral streams. Soils consist of stockpen gravelly loam and Redding gravelly loam.	Could occur in vernal moist drainages.	<b>Moderate potential to occur.</b> Known from a nearby collection.
round-leaved filaree	<i>California macrophylla</i>	CRPR: List 1B.1 County List: B	Clay soils.  Blooms March–July.	Clay lenses with grassy cover.	Unmapped clay lenses may occur on the new property.	<b>Low potential to occur.</b> new property lacks suitable clay soils.
wart-stem ceanothus	<i>Ceanothus verrucosus</i>	CRPR: List 2.2 County List: B	Chaparral. Elevation 1–380 meters. Perennial evergreen shrub.	Coastal chaparral intermixed with chamise. Soils consist of	Suitable habitat is abundant throughout the new property.	<b>Present.</b> A major population of the species occurs on the new property. It is a dominant species in the heart of its distribution.

Common Name	Scientific Name	Status <sup>1</sup>	General Habitat Description	Microhabitat Description	Habitat Present/Absent	Potential for Occurrence
			Blooms December–May.	Exchequer rocky silt loams and San Miguel-Exchequer rocky silt loams.		
summer holly	<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	CRPR: List 1B.2 County List: A	Chaparral and cismontane woodland. Elevation 30–790 meters. Perennial evergreen shrub.  Blooms April–June.	Southern mixed chaparral, usually in mesic areas, north-facing slopes.	Suitable habitat exists on the lower slopes of the new property east of Mount Whitney.	<b>Moderate potential to occur.</b> Suitable habitat is present within the new property and the species occurs at similar inland locations. Within the new property, plants were found that were recovering from the 2014 Cocos Fire that may be this species, but diagnostic characters were not fully developed.
sticky dudleya	<i>Dudleya viscida</i>	CRPR: List 1B.2 County List: A	Coastal bluff scrub, chaparral, cismontane woodland, coastal scrub. Elevation 10–550 meters. Perennial herb.  Blooms May–June.	Steep slopes or cliff edges.	Habitat on the new property is somewhat similar to habitat in the Del Dios area, where the species occurs.	<b>Moderate potential to occur.</b> Habitat within the new property is similar to Del Dios, where the species is present, but lacks large rocky cliff areas.
San Diego barrel cactus	<i>Ferocactus viridescens</i>	CRPR: List 2.1 County List: B	Chaparral, coastal scrub, valley and foothill grassland, and vernal pools. Elevation 3–450 meters. Perennial stem succulent.  Blooms May–June.	Diegan sage scrub hillsides, often at the crest of slopes and growing in cobbles, occasionally found on the periphery of vernal pools and mima mounds. Soil types include San Miguel-Exchequer rocky silt loams and Redding gravelly loams.	Low elevation coastal scrub does not occur on the new property.	<b>Not expected to occur.</b> The new property lacks suitable habitat for this species.
Palmer's grapplinghook	<i>Harpagonella palmeri</i>	CRPR: List 4.2 County List: D	Clay habitat, chaparral, coastal scrub, and valley and foothill grassland. Elevation 20–955 meters. Annual herb.  Blooms March–May.	Clay vertisols with open grassy slopes and open Diegan sage scrub. Diablo clays are favored on the coast.	Occurs on clay soils that have not been observed on the new property.	<b>Not expected to occur.</b> The new property lacks suitable habitat for this species.

Common Name	Scientific Name	Status <sup>1</sup>	General Habitat Description	Microhabitat Description	Habitat Present/Absent	Potential for Occurrence
decumbent goldenbush	<i>Isocoma menziesii</i> var. <i>decumbens</i>	CRPR: List 1B.2 County List: A	Chaparral and coastal scrub (sandy, often open in disturbed areas). Elevation 10–135 meters. Perennial shrub.  Blooms April–November.	Coastal sage scrub and is found in clay soils in coastal regions	The new property lacks the necessary coastal clay soils.	<b>Not expected to occur.</b> The new property lacks suitable habitat for this species.
San Diego marsh-elder	<i>Iva hayesiana</i>	CRPR: List 2.2 County List: B	Marshes, swamps, and playas. Elevation 10–500 meters. Perennial herb.  Blooms April–October.	Creeks and intermittent streambeds, open riparian canopy allowing substantial sunlight.	Low drainages on the new property are potentially suitable habitat.	<b>Moderate potential to occur.</b> Habitat is present within the new property, but it lays further inland than known locations in this part of San Diego County.
southwestern spiny rush	<i>Juncus acutus</i> ssp. <i>leopoldii</i>	CRPR: List 4.2 County List: D	Marshes and seeps in drainage lowlands.	Stream and creek edges.	Low drainages on the new property are potentially suitable habitat but are probably too dry.	<b>Moderate potential to occur.</b> Drainage habitat is present within the new property, but it may be too dry for the species.
Robinson's pepper-grass	<i>Lepidium virginicum</i> var. <i>robinsonii</i>	CRPR: List 1B.2 County List: A	Chaparral and coastal scrub. Elevation 1–885 meters. Annual herb.  Blooms February–July.	Openings in chaparral and sage scrub, usually found in foothill elevations. Sites are dry, exposed locales.	The new property contains suitable habitat.	<b>Moderate potential to occur.</b> The new property contains potentially suitable habitat.
felt-leaved monardella	<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	CRPR: List 1B.2 County List: A	Chaparral and cismontane woodland. Elevation 300–1,575 meters. Perennial rhizomatous herb.  Blooms June–August.	Chaparral understory usually below stands of chamise in xeric situations. Soils include San Miguel-Exchequer rocky silt loams often near Otay Mountain.	Habitat exists on the new property where the species may occur.	<b>High potential to occur.</b> There is potentially suitable ridge top and understory habitat present on the new property.
Nuttall's scrub oak	<i>Quercus dumosa</i>	CRPR: List 1B.1 County List: A	Sandy and clay loam habitat. Elevation 15–400 meters. Perennial evergreen shrub.  Blooms February–August.	Coastal chaparral with a relatively open canopy cover and relatively flat terrain.	No suitable habitat exists on the new property due to distance from the coast.	<b>Not expected to occur.</b> The new property lacks suitable habitat for this species.

Common Name	Scientific Name	Status <sup>1</sup>	General Habitat Description	Microhabitat Description	Habitat Present/Absent	Potential for Occurrence
Engelmann oak	<i>Quercus engelmannii</i>	CRPR: List 4.2 County: List D North County Plan: Proposed Covered	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Elevation 50–1,300 meters. Perennial deciduous tree.  Blooms March–June.	Oak woodland, southern mixed chaparral, and grasslands.	No suitable habitat is present on the new property.	<b>Low potential to occur.</b> The new property lacks suitable woodland habitat and the species generally occurs further inland.
ashy spike-moss	<i>Selaginella cinerascens</i>	CRPR: List 4.1 County List D	Flat soils and areas around rock slabs, also mesas around vernal pools.	Undisturbed soils with cryptogamic crusts on flat mesas and adjacent to rock slabs.	Suitable habitat was not observed within the new property.	<b>Low potential to occur.</b> The new property lacks suitable habitat for this species.

<sup>1</sup>  
Federal  
State  
Other

U.S. Fish and Wildlife Service (USFWS)  
California Department of Fish and Wildlife (CDFW)  
California Rare Plant Rank (CRPR):

1B: Plants rare, threatened, or endangered in California and elsewhere  
2: Plants rare, threatened, or endangered in California, but more common elsewhere  
3: Plants more information is needed – a review list  
4: Plants of limited distribution – a watch list  
CRPR R-E-D Code -

R (Rarity): 1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time; 2 = Occurrence confined to several populations or to one extended population;  
3 = Occurrence limited to one or a few highly restricted populations, or present in such numbers that it is seldom reported  
E (Endangerment): 1 = Not endangered; 2 = Endangered in a portion of its range; 3 = Endangered throughout its range  
D (Distribution): 1 = More or less widespread outside California; 2 = Rare outside California; 3 = Endemic to California

County Designations-

County List A Plants rare, threatened, or endangered in California and elsewhere  
County List B Plants rare, threatened, or endangered in California but common elsewhere  
County List C Plants which may be rare, but need more information to determine their true rarity status  
County List D Plants of limited distribution and are uncommon, but not presently rare or endangered

North County Plan: Included on the draft North County Multiple Species Conservation Program (North County Plan) covered plant species list (2009)

## Literature Cited

- Calflora. 2016. Information on California plants for education, research and conservation. Berkeley, California: The Calflora Database [a non-profit organization]. Available at <http://www.calflora.org/> (Accessed: Oct 6, 2016).
- County of San Diego. 2009. *North County Plan*. Public review draft of the North County Multiple Species Conservation Program Plan. Department of Planning and Land Use 148 p.
- County of San Diego. 2011. Department of Parks and Recreation. *Resource Management Plan for Escondido Creek Preserve, San Diego County*. June.

**APPENDIX C**

**WILDLIFE SPECIES DETECTED WITHIN THE  
ESCONDIDO CREEK PRESERVE**



## **Appendix C-1**

### **Wildlife Species Detected on the Existing Property**

**(Appendix B from Baseline Biodiversity Survey for the  
Escondido Creek Preserve  
Prepared by Dudek [2011b])**



**APPENDIX C-1**  
**Escondido Creek Preserve Wildlife Species List**

---

**WILDLIFE SPECIES – VERTEBRATES**

**AMPHIBIANS**

**PLETHODONTIDAE – LUNGLESS SALAMANDERS**

*Batrachoseps major* – garden slender salamander

**PELOBATIDAE – SPADEFOOT TOADS**

*Spea hammondi* – western spadefoot

**BUFONIDAE – TRUE TOADS**

*Anaxyrus boreas* – western toad

**HYLIDAE – TREEFROGS**

*Hyla regilla* – Pacific treefrog

**REPTILES**

**IGUANIDAE – IGUANID LIZARDS**

*Phrynosoma blainvillii* – Blainville's horned lizard

*Sceloporus occidentalis* – western fence lizard

*Sceloporus orcutti* – granite spiny lizard

*Uta stansburiana* – common side-blotched lizard

**SCINCIDAE – SKINKS**

*Plestiodon skiltonianus interparietalis* – Coronado skink

**TEIIDAE – WHIPTAIL LIZARDS**

*Aspidoscelis tigris stejnegeri* – coastal western whiptail

**ANGUIDAE – ALLIGATOR LIZARDS**

*Elgaria multicarinata* – southern alligator lizard

**BOIDAE – BOAS**

*Diadophis punctatus similis* – San Diego ringneck snake

*Lampropeltis getula* – common kingsnake

*Pituophis cantifer* – gophersnake

*Thamnophis hammondi* – two-striped gartersnake

**VIPERIDAE – VIPERS**

*Crotalus oreganus* – western rattlesnake

## APPENDIX C-1 (Continued)

---

### BIRDS

#### **ARDEIDAE – HERONS, BITTERNS, AND ALLIES**

*Ardea herodias* – great blue heron

*Ardea alba* – great egret

*Egretta thula* – snowy egret

#### **THRESKIORNITHIDAE – IBISES AND SPOONBILLS**

*Plegadis chihi* – white-faced ibis

#### **ANATIDAE – DUCKS, GEESE, AND SWANS**

*Anas acuta* – northern pintail

*Anas platyrhynchos* – mallard

*Anas strepera* – gadwall

*Aythya affinis* – lesser scaup

*Branta canadensis* – Canada goose

#### **CATHARTIDAE – NEW WORLD VULTURES**

*Cathartes aura* – turkey vulture

#### **ACCIPITRIDAE – HAWKS, KITES, EAGLES, AND ALLIES**

*Accipiter cooperii* – Cooper's hawk

*Buteo jamaicensis* – red-tailed hawk

*Buteo lineatus* – red-shouldered hawk

*Circus cyaneus* – northern harrier

*Elanus leucurus* – white-tailed kite

#### **FALCONIDAE – CARACARAS AND FALCONS**

*Falco sparverius* – American kestrel

#### **ODONTOPHORIDAE – NEW WORLD QUAIL**

*Callipepla californica* – California quail

#### **RALLIDAE – RAILS, GALLINULES, AND COOTS**

*Fulica americana* – American coot

#### **CHARADRIIDAE – LAPWINGS AND PLOVERS**

*Charadrius vociferus* – killdeer

#### **LARIDAE – GULLS, TERNS, AND SKIMMERS**

*Larus californicus* – California gull

## APPENDIX C-1 (Continued)

---

### **COLUMBIDAE – PIGEONS AND DOVES**

- \* *Columba livia* – rock pigeon
- Zenaida macroura* – mourning dove

### **CUCULIDAE – CUCKOOS, ROADRUNNERS, AND ANIS**

- Geococcyx californianus* – greater roadrunner

### **TYTONIDAE – BARN OWLS**

- Tyto alba* – barn owl

### **STRIGIDAE – TYPICAL OWLS**

- Bubo virginianus* – great horned owl

### **CAPRIMULGIDAE – GOATSUCKERS**

- Phalaenoptilus nuttallii* – common poorwill

### **APODIDAE – SWIFTS**

- Aeronautes saxatalis* – white-throated swift

### **TROCHILIDAE – HUMMINGBIRDS**

- Calypte anna* – Anna's hummingbird
- Calypte costae* – Costa's hummingbird
- Selasphorus sasin* – Allen's hummingbird

### **ALCEDINIDAE – KINGFISHERS**

- Ceryle alcyon* – belted kingfisher

### **PICIDAE – WOODPECKERS AND ALLIES**

- Colaptes auratus* – northern flicker
- Melanerpes formicivorus* – acorn woodpecker
- Picoides nuttallii* – Nuttall's woodpecker
- Sphyrapicus ruber* – red-breasted sapsucker

### **TYRANNIDAE – TYRANT FLYCATCHERS**

- Sayornis nigricans* – black phoebe
- Sayornis saya* – Say's phoebe
- Tyrannus vociferans* – Cassin's kingbird
- Tyrannus verticalis* – western kingbird

## APPENDIX C-1 (Continued)

---

### **HIRUNDINIDAE – SWALLOWS**

- Petrochelidon pyrrhonota* – cliff swallow
- Stelgidopteryx serripennis* – northern rough-winged swallow
- Tachycineta thalassina* – violet-green swallow

### **CORVIDAE – CROWS AND JAYS**

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

### **PARIDAE – CHICKADEES AND TITMICE**

- Baeolophus inornatus* – oak titmouse

### **AEGITHALIDAE – LONG-TAILED TITS AND BUSHTITS**

- Psaltriparus minimus* – bushtit

### **TROGLODYTIDAE – WRENS**

- Catherpes mexicanus* – canyon wren
- Salpinctes obsoletus* – rock wren
- Thryomanes bewickii* – Bewick's wren
- Troglodytes aedon* – house wren

### **POLIOPTILIDAE – GNATCATCHERS AND GNATWRENS**

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

### **TURDIDAE – THRUSHES**

- Sialia mexicana* – western bluebird
- Turdus migratorius* – American robin

### **SYLVIIDAE – SYLVIID WARBLERS**

- Chamaea fasciata* – wrentit

### **MIMIDAE – MOCKINGBIRDS AND THRASHERS**

- Mimus polyglottos* – northern mockingbird
- Toxostoma redivivum* – California thrasher

### **BOMBYCILLIDAE – WAXWINGS**

- Bombycilla cedrorum* – cedar waxwing

## APPENDIX C-1 (Continued)

---

### ***PTILOGONATIDAE* – SILKY-FLYCATCHERS**

*Phainopepla nitens* – phainopepla

### ***STURNIDAE* – STARLINGS**

\* *Sturnus vulgaris* – European starling

### ***PARULIDAE* – WOOD-WARBLERS**

*Dendroica coronata* – yellow-rumped warbler

*Dendroica petechia* – yellow warbler

*Geothlypis trichas* – common yellowthroat

*Oreothlypis celata* – orange-crowned warbler

*Wilsonia pusilla* – Wilson's warbler

### ***EMBERIZIDAE* – EMBERIZIDS**

*Aimophila ruficeps canescens* – Southern California Rufous-crowned Sparrow

*Amphispiza belli* – sage sparrow

*Chondestes grammacus* – lark sparrow

*Melospiza melodia* – song sparrow

*Melospiza crissalis* – California towhee

*Pipilo maculatus* – spotted towhee

*Spizella atrogularis* – black-chinned sparrow

*Zonotrichia leucophrys* – white-crowned sparrow

### ***ICTERIDAE* – BLACKBIRDS**

*Agelaius phoeniceus* – red-winged blackbird

*Euphagus cyanocephalus* – Brewer's blackbird

*Icterus bullockii* – Bullock's oriole

*Molothrus ater* – brown-headed cowbird

*Quiscalus mexicanus* – great-tailed grackle

*Sturnella neglecta* – western meadowlark

### ***FRINGILLIDAE* – FRINGILLINE AND CARDUELINE FINCHES AND ALLIES**

*Carpodacus mexicanus* – house finch

*Spinus psaltria* – lesser goldfinch

## MAMMALS

### ***DIDELPHIDAE* – NEW WORLD OPOSSUMS**

\* *Didelphis virginiana* – Virginia opossum

## APPENDIX C-1 (Continued)

---

### **SORICIDAE – SHREWS**

*Sorex ornatus* – ornate shrew

### **VESPERTILIONIDAE – EVENING BATS**

*Eptesicus fuscus* – big brown bat

*Lasiurus blossevillei* – western red bat

*Lasiurus cinereus* – hoary bat

*Myotis yumanensis* – Yuma myotis

*Parastrellus hesperus* – canyon bat

### **MOLOSSIDAE – FREE-TAILED BATS**

*Nyctinomops femorosaccus* – pocketed free-tailed bat

*Tadarida brasiliensis* – Brazilian free-tailed bat

### **LEPORIDAE – HARES & RABBITS**

*Sylvilagus bachmani* – brush rabbit

### **SCIURIDAE – SQUIRRELS**

*Spermophilus beecheyi* – California ground squirrel

### **GEOMYIDAE – POCKET GOPHERS**

*Thomomys bottae* – Botta's pocket gopher

### **HETEROMYIDAE – POCKET MICE AND KANGAROO RATS**

*Chaetodipus fallax fallax* – Northwestern San Diego pocket mouse

*Dipodomys simulans* – Dulzura kangaroo rat

### **MURIDAE – RATS AND MICE**

*Microtus californicus* – California vole

*Neotoma lepida intermedia* – San Diego desert woodrat

*Neotoma fuscipes* – dusky-footed woodrat

*Peromyscus* sp. – deermouse

*Peromyscus californicus* – California deermouse

*Peromyscus eremicus* – cactus deermouse

*Peromyscus maniculatus* – North American deermouse

\* *Rattus norvegicus* – brown rat

*Reithrodontomys megalotis* – western harvest mouse

### **CANIDAE – WOLVES AND FOXES**

\* *Canis lupus familiaris* – domestic dog

*Canis latrans* – coyote

## APPENDIX C-1 (Continued)

---

### **PROCYONIDAE – RACCOONS AND RELATIVES**

*Procyon lotor* – common raccoon

### **MUSTELIDAE – WEASELS, SKUNKS, AND OTTERS**

*Mephitis mephitis* – striped skunk

*Mustela frenata* – long-tailed weasel

### **FELIDAE – CATS**

*Felis catus* – domestic cat

*Lynx rufus* – bobcat

### **CERVIDAE – DEERS**

*Odocoileus hemionus* – mule deer

## **WILDLIFE SPECIES – INVERTEBRATES**

### **BUTTERFLIES AND MOTHS**

#### **HESPERIIDAE – SKIPPERS**

*Erynnis funeralis* – funereal duskywing

#### **PAPILIONIDAE – SWALLOWTAILS**

*Papilio eurymedon* – pale swallowtail

*Papilio rutulus* – western tiger swallowtail

#### **PIERIDAE – WHITES AND SULFURS**

*Anthocharis sara sara* – Pacific sara orangetip

*Phoebis sennae* – cloudless sulfur

*Pontia protodice* – checkered white

*Pontia sisymbrii beringiensis* – California white

#### **RIODINIDAE – METALMARKS**

*Apodemia mormo virgulti* – Behr's metalmark

#### **LYCAENIDAE – BLUES, HAIRSTREAKS, AND COPPERS**

*Hemiargus ceraunus gyas* – Edward's blue

*Plebejus acmon* – acmon blue

*Zizina oxleyi* – southern blue

#### **NYMPHALIDAE – BRUSH-FOOTED BUTTERFLIES**

*Coenonympha californica californica* – California ringlet

*Danaus plexippus* – monarch

## APPENDIX C-1 (Continued)

---

*Junonia coenia* – common buckeye

*Vanessa cardui* – painted lady

\* signifies introduced (non-native) species

## **Appendix C-2**

### **Wildlife Species Detected on the New Property**



**Appendix C-2  
Wildlife Species Detected on the New Property**

Common Name	Scientific Name	Status (Federal/State/ County, Draft North County Plan <sup>1</sup> )
<b>Invertebrates</b>		
<b>Family Hesperiiidae</b>		
funereal duskywing	<i>Erynnis funerealis</i>	None/None/None
white checkered skipper	<i>Pyrgus albescens</i>	None/None/None
<b>Family Lycaenidae</b>		
brown elfin	<i>Callophrys augustinus</i>	None/None/None
acmon blue	<i>Icaricia acmon acmon</i>	None/None/None
marine blue	<i>Leptotes marina</i>	None/None/None
hedgerow hairstreak	<i>Satyrrium saepium</i>	None/None/None
gray hairstreak	<i>Strymon melinus</i>	None/None/None
<b>Family Nymphalidae</b>		
common buckeye	<i>Junonia coenia</i>	None/None/None
red admiral	<i>Vanessa atalanta</i>	None/None/None
painted lady	<i>Vanessa cardui</i>	None/None/None
American lady	<i>Vanessa virginiensis</i>	None/None/None
<b>Family Papilionidae</b>		
pale swallowtail	<i>Papilio eurymedon</i>	None/None/None
anise swallowtail	<i>Papilio zelicaon</i>	None/None/None
<b>Family Pieridae</b>		
Sara orangetip	<i>Anthocharis sara sara</i>	None/None/None
orange sulphur	<i>Colias eurytheme</i>	None/None/None
Harford's sulphur	<i>Colias harfordii</i>	None/None/None
dainty sulphur	<i>Nathalis iole</i>	None/None/None
checkered white	<i>Pontia protodice</i>	None/None/None
<b>Family Riodinidae</b>		
Behr's metalmark	<i>Apodemia mormo virgulti</i>	None/None/None
<b>Family Sphingidae</b>		
sphingid moth	<i>Sphingid sp.</i>	None/None/None
<b>Family Aeshnidae</b>		
common green darner	<i>Anax junius</i>	None/None/None

Common Name	Scientific Name	Status (Federal/State/County, Draft North County Plan <sup>1</sup> )
<b>Reptiles &amp; Amphibians</b>		
<b>Family Bufonidae</b>		
western toad	<i>Anaxyrus boreas</i>	None/None/None
<b>Family Scaphiopodidae</b>		
western spadefoot	<i>Spea hammondi</i>	None/SSC/County Group 2, Covered
<b>Family Phrynosomatidae</b>		
Blainville's horned lizard	<i>Phrynosoma blainvillii</i>	None/SSC/County Group 2, Covered
<b>Family Scincidae</b>		
western red-tailed skink	<i>Plestiodon gilberti rubricaudatus</i>	None/None/None
<b>Family Teiidae</b>		
San Diegan tiger whiptail	<i>Aspidoscelis tigris stejnegeri</i>	None/SSC/County Group 2
<b>Family Anguidae</b>		
southern alligator lizard	<i>Elgaria multicarinata</i>	None/None/None
<b>Family Phrynosomatidae</b>		
western fence lizard	<i>Sceloporus occidentalis</i>	None/None/None
<b>Family Colubridae</b>		
California striped racer	<i>Coluber lateralis lateralis</i>	None/None/None
gopher snake	<i>Pituophis catenifer</i>	None/None/None
<b>Family Viperidae</b>		
red diamond rattlesnake	<i>Crotalus ruber</i>	None/SSC/County Group 2, Watch List
southern Pacific rattlesnake	<i>Crotalus oreganus helleri</i>	None/None/None
<b>Avian</b>		
<b>Family Falconidae</b>		
American kestrel	<i>Falco sparverius</i>	None/None/None
<b>Family Accipitridae</b>		
red-tailed hawk	<i>Buteo jamaicensis</i>	None/None/None
red-shouldered hawk	<i>Buteo lineatus</i>	None/None/County Group 1
Swainson's hawk	<i>Buteo swainsoni</i>	None/Threatened/County Group 1
sharp-shinned hawk	<i>Accipiter striatus</i>	None/WL/ County Group 1
Cooper's hawk	<i>Accipiter cooperii</i>	None/WL/ County Group 1

Common Name	Scientific Name	Status (Federal/State/County, Draft North County Plan <sup>1</sup> )
<b>Family Cathartidae</b>		
turkey vulture	<i>Cathartes aura</i>	None/None/County Group 1
<b>Family Apodidae</b>		
white-throated swift	<i>Aeronautes saxatalis</i>	None/None/None
Vaux's swift	<i>Chaetura vauxi</i>	None/None/None
<b>Family Trochilidae</b>		
Anna's hummingbird	<i>Calypte anna</i>	None/None/None
Costa's hummingbird	<i>Calypte costae</i>	None/None/None
rufous hummingbird	<i>Selasphorus rufus</i>	None/None/None
rufous/Allen's hummingbird	<i>Selasphorus rufus/sasin</i>	None/None/None
<b>Family Caprimulgidae</b>		
common poorwill	<i>Phalaenoptilus nuttallii</i>	None/None/None
<b>Family Columbidae</b>		
mourning dove	<i>Zenaida macroura</i>	None/None/None
<b>Family Odontophoridae</b>		
California quail	<i>Callipepla californica</i>	None/None/None
<b>Family Cuculidae</b>		
greater roadrunner	<i>Geococcyx californianus</i>	None/None/None
<b>Family Aegithalidae</b>		
bushtit	<i>Psaltriparus minimus</i>	None/None/None
<b>Family Cardinalidae</b>		
lazuli bunting	<i>Passerina amoena</i>	None/None/None
blue grosbeak	<i>Passerina caerulea</i>	None/None/None
black-headed grosbeak	<i>Pheucticus melanocephalus</i>	None/None/None
western tanager	<i>Piranga ludoviciana</i>	None/None/None
<b>Family Corvidae</b>		
western scrub-jay	<i>Aphelocoma californica</i>	None/None/None
American crow	<i>Corvus brachyrhynchos</i>	None/None/None
common raven	<i>Corvus corax</i>	None/None/None
<b>Family Emberizidae</b>		
southern California rufous-crowned sparrow	<i>Aimophila ruficeps canescens</i>	None/ WL/County Group 1, Watch List

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status (Federal/State/County, Draft North County Plan<sup>1</sup>)</b>
Bell's sparrow	<i>Artemisiospiza belli</i>	None/ WL/County Group 1, Watch List
Lincoln's sparrow	<i>Melospiza lincolni</i>	None/None/None
song sparrow	<i>Melospiza melodia</i>	None/None/None
California towhee	<i>Melozona crissalis</i>	None/None/None
savannah sparrow	<i>Passerculus sandwichensis</i>	None/None/None
fox sparrow	<i>Passerella iliaca</i>	None/None/None
spotted towhee	<i>Pipilo maculatus</i>	None/None/None
black-chinned sparrow	<i>Spizella atrogularis</i>	None/None/None
golden-crowned sparrow	<i>Zonotrichia atricapilla</i>	None/None/None
white-crowned sparrow	<i>Zonotrichia leucophrys</i>	None/None/None
<b>Family Fringillidae</b>		
house finch	<i>Haemorhous mexicanus</i>	None/None/None
Lawrence's goldfinch	<i>Spinus lawrencei</i>	None/None/None
lesser goldfinch	<i>Spinus psaltria</i>	None/None/None
<b>Family Hirundinidae</b>		
cliff swallow	<i>Petrochelidon pyrrhonota</i>	None/None/None
<b>Family Icteridae</b>		
hooded oriole	<i>Icterus cucullatus</i>	None/None/None
<b>Family Mimidae</b>		
northern mockingbird	<i>Mimus polyglottos</i>	None/None/None
California thrasher	<i>Toxostoma redivivum</i>	None/None/None
<b>Family Parulidae</b>		
Wilson's warbler	<i>Cardellina pusilla</i>	None/None/None
common yellowthroat	<i>Geothlypis trichas</i>	
orange-crowned warbler	<i>Oreothlypis celata</i>	None/None/None
Nashville warbler	<i>Oreothlypis ruficapilla</i>	None/None/None
yellow-rumped warbler	<i>Setophaga coronata</i>	None/None/None
black-throated gray warbler	<i>Setophaga nigrescens</i>	None/None/None
<b>Family Polioptilidae</b>		
blue-gray gnatcatcher	<i>Polioptila caerulea</i>	None/None/None

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status (Federal/State/County, Draft North County Plan<sup>1</sup>)</b>
coastal California gnatcatcher	<i>Polioptila californica californica</i>	Threatened/SSC/County Group 1, Covered
<b>Family Ptilonotidae</b>		
phainopepla	<i>Phainopepla nitens</i>	None/None/None
<b>Family Sylviidae</b>		
wren	<i>Chamaea fasciata</i>	None/None/None
<b>Family Regulidae</b>		
ruby-crowned kinglet	<i>Regulus calendula</i>	None/None/None
<b>Family Troglodytidae</b>		
rock wren	<i>Satyrium auretteum</i>	None/None/None
Bewick's wren	<i>Thryomanes bewickii</i>	None/None/None
house wren	<i>Troglodytes aedon</i>	None/None/None
<b>Family Turdidae</b>		
hermit thrush	<i>Catharus guttatus</i>	None/None/None
American robin	<i>Turdus migratorius</i>	None/None/None
<b>Family Tyrannidae</b>		
western wood-pewee	<i>Contopus sordidulus</i>	None/None/None
Pacific-slope flycatcher	<i>Empidonax difficilis</i>	None/None/None
ash-throated flycatcher	<i>Myiarchus cinerascens</i>	None/None/None
Cassin's kingbird	<i>Tyrannus vociferans</i>	None/None/None
black phoebe	<i>Sayornis nigricans</i>	None/None/None
Say's phoebe	<i>Sayornis saya</i>	None/None/None
<b>Family Picidae</b>		
northern flicker	<i>Colaptes auratus</i>	None/None/None
Nuttall's woodpecker	<i>Picoides nuttallii</i>	None/None/None
<b>Family</b>		
great horned owl	<i>Bubo virginianus</i>	None/None/None
<b>Mammals</b>		
<b>Family Cervidae</b>		
mule deer	<i>Odocoileus hemionus</i>	None/None/County Group 2
<b>Family Canidae</b>		
coyote	<i>Canis latrans</i>	None/None/None
gray fox	<i>Urocyon cinereoargenteus</i>	None/None/None

Common Name	Scientific Name	Status (Federal/State/County, Draft North County Plan <sup>1</sup> )
<b>Family Felidae</b>		
bobcat	<i>Lynx rufus</i>	None/None/None
<b>Family Procyonidae</b>		
raccoon	<i>Procyon lotor</i>	None/None/None
<b>Family Molossidae</b>		
Mexican free-tailed bat	<i>Tadarida brasiliensis</i>	None/None/None
pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	None/SSC/County Group 2
western mastiff bat	<i>Eumops perotis californicus</i>	None/SSC/County Group 2
<b>Family Vespertilionidae</b>		
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	None/CT, SSC/County Group 2, Covered
big brown bat	<i>Eptesicus fuscus</i>	None/None/None
hoary bat	<i>Lasiurus cinereus</i>	None/None/None
western yellow bat	<i>Lasiurus xanthinus</i>	None/SSC/None
western red bat	<i>Lasiurus blossevillii</i>	None/SSC/County Group 2
California/Yuma myotis <sup>2</sup>	<i>Myotis californicus/yumanensis</i>	None/None/County Group 2
Yuma myotis	<i>Myotis yumanensis</i>	None/None/County Group 2
canyon bat (also known as western pipistrelle)	<i>Pipistrellus hesperus</i>	None/None/None
<b>Family Leporidae</b>		
desert cottontail	<i>Sylvilagus audubonii</i>	None/None/None
<b>Family Heteromyidae</b>		
Dulzura pocket mouse	<i>Chaetodipus californicus femoralis</i>	None/SSC/County Group 2
Dulzura kangaroo rat	<i>Dipodomys simulans</i>	None/None/None
northwestern San Diego pocket mouse	<i>Chaetodipus fallax fallax</i>	None/SSC/County Group 2
<b>Family Muridae</b>		
San Diego desert woodrat	<i>Neotoma bryanti intermedia</i>	None/SSC/County Group 2
large-eared woodrat	<i>Neotoma macrotis</i>	None/None/None
California mouse	<i>Peromyscus californicus</i>	None/None/None
cactus mouse	<i>Peromyscus eremicus</i>	None/None/None
deer mouse	<i>Peromyscus maniculatus</i>	None/None/None
western harvest mouse	<i>Reithrodontomys megalotis</i>	None/None/None

Common Name	Scientific Name	Status (Federal/State/ County, Draft North County Plan <sup>1</sup> )
<b>Family Soricidae</b>		
ornate shrew	<i>Sorex ornatus</i>	None/None/None
<b>Family Geomyidae</b>		
Botta's pocket gopher	<i>Thomomys bottae</i>	None/None/None

<sup>1</sup> State Status Abbreviations: CT: Candidate Threatened; FP: Fully Protected; SSC: Species of Special Concern; WL: Watch List (CDFW 2016); Draft MSCP North County Plan List of Covered and Watch List Species from most recent 2016 list.

<sup>2</sup> Could not accurately differentiate the call between California and Yuma myotis.

### Literature Cited

California Department of Fish and Wildlife (CDFW). 2016. Special Animals List. Natural Diversity Database. October, Periodic Publication. 51 pp.



## **APPENDIX D**

### **SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR WITHIN THE ESCONDIDO CREEK PRESERVE**



## **Appendix D-1**

### **Special-Status Wildlife Species with Potential to Occur on the Existing Property**

**(Appendix E from Baseline Biodiversity Survey for the  
Escondido Creek Preserve  
Prepared by Dudek [2011b])**



## APPENDIX D-1

### Sensitive Wildlife Species Detected or Potentially Occurring at Escondido Creek Preserve

Scientific Name / Common Name	Status (Federal/ State/ County)1	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Amphibians</i>			
<i>Anaxyrus</i> (= <i>Bufo</i> <i>microscaphus</i> ) <i>californicus</i> Arroyo toad	FE/CSC/Group 1, NCMSCP	Stream channels for breeding (typically 3rd order); adjacent stream terraces and uplands for foraging and wintering	<b>Not expected to occur.</b> No suitable habitat present.
<i>Ensatina eschscholtzii</i> <i>klauberi</i> Large-blotched salamander	None/CSC/Group 1	Oak woodland, chaparral, coastal sage scrub, coastal dunes, conifer forest	<b>Low potential to occur.</b> Minimal moist sites available on the Preserve.
<i>Rana aurora draytoni</i> California red-legged frog	FT/CSC/Group 1	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands	<b>Not expected to occur.</b> No suitable habitat present.
<i>Rana muscosa</i> Mountain yellow-legged frog	FE/CSC/Group 1	Meadow streams, isolated pools, lake borders, rocky stream courses within ponderosa pine, montane hardwood-conifer and montane riparian habitat types	<b>Not expected to occur.</b> No suitable habitat present. Preserve is outside of the species' range.
<i>Spea</i> [= <i>Scaphiopus</i> ] <i>hammondi</i> Western spadefoot	None/CSC/Group 2, NCMSCP	Most common in grasslands, coastal sage scrub near rain pools or vernal pools; riparian habitat	<b>Present.</b> Detected on site during 2010-11 amphibian surveys conducted along Escondido Creek.
<i>Taricha torosa torosa</i> Coast Range newt (Monterey Co. south only)	None/CSC/Group 2, NCMSCP	Coastal drainages from Mendocino Co. to San Diego Co. Lives in terrestrial habitats and will migrate over 1 km to breed in ponds, reservoirs and slow moving streams.	<b>Not expected to occur.</b> No suitable habitat present.
<i>Fish</i>			
<i>Eucyclogobius newberryi</i> Tidewater goby	FE/ CSC/Group 1	Low-salinity waters in coastal wetlands	<b>Not expected to occur.</b> No suitable habitat present.
<i>Reptiles</i>			
<i>Anniella pulchra pulchra</i> Silvery legless lizard	None/CSC/Group 2	Loose soils (sand, loam, humus) in coastal dune, coastal sage scrub, woodlands, and riparian habitats	<b>Moderate potential to occur.</b> Suitable habitat and soils (i.e., sandy drainages) on site; however, the closest recorded location is over 10 miles from the site.
<i>Aspidoscelis hyperythra</i> <i>beldingi</i> Orange-throated whiptail	None/CSC/Group 2, NCMSCP	Coastal sage scrub, chaparral, grassland, juniper and oak woodland; sandy soils, washes	<b>High potential to occur.</b> Previously detected on the adjacent existing Del Dios Highlands Preserve (TAIC 2008).
<i>Aspidoscelis tigris stejnegeri</i> Coastal western whiptail	None/None/Group 2	Coastal sage scrub, chaparral; sandy areas, gravelly arroyos, or washes	<b>Present.</b> Observed during 2010-11 surveys.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Charina trivirgata roseofusca</i> Rosy boa	None/None/Group 2	Rocky chaparral, coastal sage scrub, oak woodlands, desert and semi-desert scrub	<b>High potential to occur.</b> Observed on the adjacent Del Dios Highlands Preserve parcel additions (Dudek 2011a).
<i>Coleonyx switaki</i> Barefoot gecko	None/ST/Group 2	Rocky areas at the heads of canyons	<b>Low potential to occur.</b> Not expected to occur within the region. The distribution includes the east face of the Peninsular Range.
<i>Coleonyx variegatus abbotti</i> San Diego banded gecko	None/None/Group 1	Cismontane chaparral, coastal sage scrub, desert scrub; granite outcrops	<b>Moderate potential to occur.</b> Suitable habitat and rocky areas are present on site; however, the site does not contain the required massive boulders that this species prefers.
<i>Crotalus ruber ruber</i> Northern red-diamond rattlesnake	None/CSC/Group 2, NCMSCP	Variety of shrub habitats where there is heavy brush, large rocks, or boulders	<b>High potential to occur.</b> Observed on the adjacent Del Dios Highlands Preserve parcel additions (Dudek 2011a).
<i>Diadophis punctatus similis</i> San Diego ringneck snake	None/None/Group 2	Open, rocky areas in moist habitats near intermittent streams: marsh, riparian woodland, sage scrub	<b>Present.</b> Observed during aquatic surveys conducted in 2010-11 along Escondido Creek.
<i>Actinemys marmorata pallida</i> Western pond turtle	None/CSC/Group 1, NCMSCP	Slow-moving permanent or intermittent streams, ponds, small lakes, reservoirs with emergent basking sites; adjacent uplands used during winter	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Eumeces skiltonianus interparietalis</i> Coronado skink	None/CSC/Group 2	Grassland, riparian and oak woodland; found in litter, rotting logs, under flat stones	<b>Present.</b> Observed in western parcels during 2010-11 pitfall trap surveys.
<i>Lampropeltis zonata</i> (San Diego population) San Diego mountain kingsnake	None/CSC/Group 2	Valley-foothill hardwood, hardwood-conifer, chaparral, coniferous forest, wet meadow	<b>Low potential to occur.</b> It is known to occur only in the San Diego county peninsular ranges.
<i>Phrynosoma coronatum</i> (blainvillei population) Coast (San Diego) horned lizard	None/CSC/ Group 2, NCMSCP	Coastal sage scrub, annual grassland, chaparral, oak and riparian woodland, coniferous forest, sandy areas, washes, flood plains	<b>Present.</b> Observed during 2010-11 surveys.
<i>Salvadora hexalepis virgultea</i> Coast patch-nosed snake	None/CSC/Group 2	Chaparral, washes, sandy flats, rocky areas	<b>High potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008).

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Sceloporus graciosus vanderburgianus</i> Southern sagebrush lizard	None/None/Group 2	Montane chaparral, hardwood and conifer forest, juniper, coastal sage scrub	<b>Low potential to occur.</b> It is known to occur only in the San Diego county peninsular and transverse ranges.
<i>Thamnophis hammondi</i> Two-striped garter snake	None/CSC/Group 1, NCMSCP	Marshes, meadows, sloughs, ponds, slow-moving water courses	<b>Present.</b> Observed during aquatic surveys conducted in 2010-11 along Escondido Creek.
<i>Thamnophis sirtalis</i> ssp. South Coast garter snake	None/CSC/Group 2	Streams, creeks, pools, streams with rocky beds, ponds, lakes, vernal pools	<b>Low potential to occur.</b> Limited suitable habitat on site.
<i>Birds</i>			
<i>Accipiter cooperii</i> Cooper's hawk (nesting)	None/WL/Group 1	Riparian and oak woodlands, montane canyons	<b>Present.</b> Observed on site during 2010-11 surveys at the bird point count locations adjacent to Canyon de Oro, both north and south of Harmony Grove Road, and along Wild Willow Hollow Road. No nests were observed.
<i>Accipiter striatus</i> (nesting) Sharp-shinned hawk	None/WL/Group 1	Nests in coniferous forests, ponderosa pine, black oak, riparian deciduous, mixed conifer, Jeffrey pine; winters in lowland woodlands and other habitats	<b>Moderate potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008); however, this species does not nest along the coastal slope of southern California and would only be expected as a winter migrant.
<i>Agelaius tricolor</i> Tricolored blackbird	BCC/CSC/ Group 1, NCMSCP	Nests near fresh water, emergent wetland with cattails or tules; forages in grasslands, woodland, agriculture	<b>Low potential to occur.</b> Suitable foraging habitat on site, but no suitable nesting habitat.
<i>Aimophila ruficeps canescens</i> Southern California rufous-crowned sparrow	None/WL/Group 1, NCMSCP	Grass-covered hillsides, coastal sage scrub, chaparral with boulders and outcrops	<b>Present.</b> Previously recorded south of Canyon de Oro during studies conducted in 2001 (RECON 2001). Observed in this area in 2011.
<i>Anser caerulescens</i> Snow goose	None/None/Group 2	Fresh emergent wetlands, adjacent lacustrine waters, and nearby wet croplands, pastures, meadows, and grasslands. Occasionally found in saline (brackish) emergent wetlands and adjacent estuarine waters.	<b>Not expected to occur.</b> No suitable habitat.
<i>Anas strepera</i> Gadwall	None/None/Group 2	Interior valleys, wetlands, ponds, and streams. Feeds and rests in freshwater lacustrine and emergent habitats, and to a lesser extent, estuarine and saline emergent habitats, and nests in nearby herbaceous and cropland habitats.	<b>Present.</b> Observed during 2010-11 aquatic surveys.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Amphispiza belli belli</i> Bell's sage sparrow	BCC/WL/Group 1, NCMSCP	Coastal sage scrub and dry chaparral along coastal lowlands and inland valleys	<b>Present.</b> Observed during 2010-11 surveys.
<i>Ammodramus savannarum</i> Grasshopper sparrow	None/CSC/Group 1, NCMSCP	Restricted to native grassland.	<b>Low potential to occur.</b> Poor suitable habitat on site.
<i>Aquila chrysaetos</i> Golden eagle (nesting and wintering)	BCC/WL, FP/Group 1, NCMSCP	Open country, especially hilly and mountainous regions; grassland, coastal sage scrub, chaparral, oak savannas, open coniferous forest	<b>Moderate potential to occur.</b> Suitable foraging habitat present on site, but this species has not been recorded as using the area by Unitt (2004)
<i>Ardea herodias</i> Great blue heron	None/None/Group 2	Variety of habitats, but primarily wetlands; lakes, rivers, marshes, mudflats, estuaries, saltmarsh, riparian habitats	<b>Present.</b> Observed adjacent to Escondido Creek during 2010-11 surveys.
<i>Asio flammeus</i> Short-eared owl	None/CSC/Group 2	Grassland, prairies, dunes, meadows, irrigated lands, saline and freshwater emergent wetlands	<b>Moderate potential to occur</b> as a wintering species. Suitable habitat on site; however, the species has not been recorded within the vicinity.
<i>Asio otus</i> Long-eared owl	None/CSC/Group 1	Riparian, live oak thickets, other dense stands of trees, edges of coniferous forest	<b>Low potential to occur.</b> Limited suitable habitat on site.
<i>Athene cucularia</i> Burrowing owl	BCC/CSC/Group 1, NCMSCP	Grassland, lowland scrub, agriculture, coastal dunes and other artificial open areas	<b>Moderate potential to occur.</b> Suitable habitat on site; however, species has not been recorded as using the area by Unitt (2004)
<i>Aythya americana</i> Redhead	None/None/Group 2	Lacustrine waters, foothills and coastal lowlands, and along the coast and Colorado river. Nests in fresh emergent wetland bordering open water.	<b>Not expected to occur.</b> No suitable nesting habitat on site.
<i>Branta canadensis</i> Canada goose	None/None/Group 2	Lakes, fresh emergent wetlands, moist grasslands, croplands, pastures, and meadows.	<b>Present.</b> Observed flying overhead during 2010-11 surveys.
<i>Buteo lineatus</i> Red-shouldered hawk	None/None/Group 1	Riparian and woodland habitats, eucalyptus	<b>Present.</b> Observed during 2010-11 surveys on central parcel of the Preserve north of Elfin Forest Rd, adjacent to Canyon de Oro and along Escondido Creek.
<i>Buteo regalis</i> Ferruginous hawk	BCC/WL/Group 1	Open, dry country, grasslands, open fields, agriculture	<b>Low potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008); however, this would have been a migratory animal and its potential to occur on site is low as the site only provides for marginal foraging habitat.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Buteo swainsoni</i> Swainson's hawk	BCC/ST/ Group 1	Open grassland, shrublands, croplands	<b>Low potential to occur</b> during migration only. Suitable foraging habitat on site is marginal.
<i>Butorides virescens</i> Green heron	None/None/Group 2	Lakes, marshes, streams	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Campylorhynchus brunneicapillus sandiegensis</i> Coastal (San Diego) cactus wren	BCC/CSC/Group 1, NCMSCP	Southern cactus scrub, maritime succulent scrub, cactus thickets in coastal sage scrub	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Cathartes aura</i> Turkey vulture	None/None/Group 1	Rangeland, agriculture, grassland; uses cliffs and large trees for roosting, nesting and resting	<b>Present.</b> Observed foraging on site during 2010-11 surveys. Suitable nesting habitat on site is limited.
<i>Chaetura vauxi</i> Vaux's swift	None/CSC/None	Prefers redwood and Douglas-fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs.	<b>Low potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008); however, there is low potential for this species to occur as a winter migrant only as it is known to migrate through San Diego in very low numbers. The site possesses mostly poor foraging opportunities and does not support any suitable winter roost areas.
<i>Charadrius alexandrinus nivosus</i> Western snowy plover	FT, BCC/CSC/Group 1	Nests primarily on coastal beaches, in flat open areas, with sandy or saline substrates; less commonly in salt pans, dredged spoil disposal sites, dry salt ponds and levees.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Charadrius montanus</i> Mountain plover	PT, BCC/CSC/ Group 2	Nests in open, shortgrass prairies or grasslands; winters in shortgrass plains, plowed fields, open sagebrush, and sandy deserts	<b>Low potential to occur.</b> Marginal habitat present on site.
<i>Circus cyaneus</i> Northern harrier	None/CSC/Group 1, NCMSCP	Open wetlands (nesting), pasture, old fields, dry uplands, grasslands, rangelands, coastal sage scrub	<b>Present.</b> Observed during 2010-11 surveys. No nesting habitat is present so will only use the site for foraging purposes.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FC, BCC/SE/Group 1	Dense, wide riparian woodlands and forest with well-developed understories	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Contopus cooperi [borealis]</i> Olive-sided flycatcher	BCC/CSC/ Group 2	Summer resident in a wide variety of forest and woodland habitats. Preferred nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Cypseloides niger</i> Black swift	BCC/CSC/Group 2	Nests in moist crevices or caves on sea cliffs or near waterfalls in deep canyons; forages over many habitats	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Dendrocygne bicolor</i> Fulvous whistling-duck	None/CSC/Group 2	Fresh emergent wetlands, shallow lacustrine and quiet riverine waters; feeds in wet croplands and pastures. Nests in dense wetlands of cattails.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Dendroica petechia brewsteri</i> Yellow warbler	BCC/CSC/Group 2	Nests in lowland and foothill riparian woodlands dominated by cottonwoods, alders and willows; winters in a variety of habitats	<b>Present.</b> Observed on site during 2010-11 surveys. A single male yellow warbler was detected along Escondido Creek in late March.
<i>Elanus leucurus (caeruleus)</i> White-tailed kite	None/FP/Group 1	Open grasslands, savanna-like habitats, agriculture, wetlands, oak woodlands, riparian	<b>Present.</b> Observed during 2010-11 surveys on the central parcel of the Preserve north of Elfin Forest Road. No nests were observed.
<i>Empidonax traillii extimus</i> Southwestern willow flycatcher	FE/SE/ Group 1, NCMSCP	Riparian woodlands along streams and rivers with mature, dense stands of willows or alders; may nest in thickets dominated by tamarisk	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Eremophila alpestris actia</i> California horned lark	None/WL/Group 2	Open habitats, grassland, rangeland, shortgrass prairie, montane meadows, coastal plains, fallow grain fields	<b>Low potential to occur.</b> Site does not support the open habitat that they require.
<i>Falco columbarius</i> Merlin	None/WL/Group 2	Nests in open country, open coniferous forest, prairie; winters in open woodlands, grasslands, cultivated fields, marshes, estuaries and sea coasts	<b>Moderate potential to occur</b> for wintering. Suitable habitat present on site.
<i>Falco mexicanus</i> Prairie falcon	BCC/WL/Group 1	Grassland, savannas, rangeland, agriculture, desert scrub, alpine meadows; nest on cliffs or bluffs	<b>Moderate potential to occur</b> for wintering. Suitable habitat present on site.
<i>Falco peregrinus anatum</i> American peregrine falcon	FD, BCC/SD,FP/ Group 1	Nests on cliffs, buildings, bridges; forages in wetlands, riparian, meadows, croplands, especially where waterfowl are present	<b>Moderate potential to occur</b> as a migrant. Detected on the adjacent Del Dios Highlands Preserve (TAIC 2008). No suitable nesting habitat on site.
<i>Grus canadensis canadensis</i> Lesser sandhill crane	ST, P/Group 2	Wet meadow, shallow lacustrine, and fresh emergent wetland habitats (summer); annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains (winter).	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Grus canadensis tabida</i> Greater sandhill crane	CSC, FP/Group 2	Wet meadow, shallow lacustrine, and fresh emergent wetland habitats (summer); annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains (winter).	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Haliaeetus leucocephalus</i> Bald eagle	FD/SE, FP/Group 1	Seacoasts, rivers, swamps, large lakes; winters at large bodies of water in lowlands and mountains	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Icteria virens</i> Yellow-breasted chat	None/CSC/Group 1, NCMSCP	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles and dense brush.	<b>Moderate potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008); however, only marginal habitat present onsite.
<i>Ixobrychius exilis</i> Least bittern	BCC/CSC/Group 2	Dense emergent wetland vegetation, sometimes interspersed with woody vegetation and open water	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Laterallus jamaicensis coturniculus</i> California black rail	BCC/ST, FP/Group 2	Saline, brackish, and fresh emergent wetlands	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Lanius ludovicianus</i> Loggerhead shrike	BCC/CSC/ Group 1	Open ground including grassland, coastal sage scrub, broken chaparral, agriculture, riparian, open woodland	<b>Moderate potential to occur.</b> Only marginal habitat present. This species requires a matrix of open habitat and shrub/trees. Habitat on site is generally too closed.
<i>Larus californicus</i> California gull	WL/ Group 2	Along the coast: sandy beaches, mudflats, rocky intertidal, and pelagic areas of marine and estuarine habitats, fresh and saline emergent wetlands. Inland: lacustrine, riverine, and cropland habitats, landfill dumps, and open lawns in cities. Nests in alkali and freshwater lacustrine habitats; adults roost along shorelines, landfills, pastures, and on islands.	<b>Present.</b> Was observed flying overhead during February surveys. Would not be expected to use the site.
<i>Melanerpes lewis</i> Lewis' woodpecker	BCC/None/Group 1	Open oak savannahs, broken deciduous and coniferous habitats.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Mycteria americana</i> Wood stork (Non-breeding, very rare)	None/CSC/Group 2	Shallow, relatively warm waters with fish for prey. Nests colonially.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Numenius americanus</i> Long-billed curlew	BCC/WL/ Group 2	Nests in upland shortgrass prairies and wet meadows in northeast California; winters in coastal estuaries, open grasslands and croplands	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Oreortyx pictus eremophila</i> Mountain quail	None/None/Group 2	Dense montane chaparral and brushy areas within coniferous forest, pinyon-juniper-yucca associations; uses shrubs, brush stands and trees on steep slopes for cover	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Pandion haliaetus</i> Osprey	None/WL/Group 1, NCMSCP	Large waters (lakes, reservoirs, rivers) supporting fish; usually near forest habitats, but widely observed along the coast	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Passerculus sandwichensis beldingi</i> Belding's savannah sparrow	None/ SE/Group 1	Saltmarsh, pickleweed	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Phalacrocorax auritus</i> (rookery site) Double-crested cormorant	None/ WL/None	Lakes, rivers, reservoirs, estuaries, ocean; nests in tall trees, rock ledges on cliffs, rugged slopes	<b>Low potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008); however, this species was likely observed flying to or from one of the adjacent lakes. There is no suitable nesting, loafing, foraging, or roosting habitat on site.
<i>Piranga rubra</i> (nesting) Summer tanager	None/ CSC/Group 2	Nests in riparian woodland; winter habitats include parks and residential areas	<b>Low potential to occur.</b> Limited suitable habitat on site.
<i>Plegadis chihi</i> White-faced ibis (rookery site)	None/WL/Group 1, NCMSCP	Nests in marsh; winter foraging in shallow lacustrine waters, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields and estuaries	<b>Present.</b> Observed flying overhead during 2010-11 surveys; however, suitable nesting, foraging, or roosting habitat not present.
<i>Polioptila californica californica</i> Coastal California gnatcatcher	FT/CSC/ Group 1, NCMSCP	Coastal sage scrub, coastal sage scrub-chaparral mix, coastal sage scrub-grassland ecotone, riparian in late summer	<b>Present.</b> Observed during 2010-11 surveys on the central parcel of the Preserve north of Elfin Forest Road and in the far western portions of the Preserve.
<i>Progne subis</i> (nesting) Purple martin	None/CSC/Group 1	Nests in tall sycamores, pines, oak woodlands, coniferous forest; forages over riparian, forest and woodland	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Pyrocephalus rubinus</i> Vermilion flycatcher	None/CSC/Group 1	Nesters inhabit cottonwood, willow, mesquite, and other vegetation in desert riparian habitat adjacent to irrigated fields, irrigation ditches, pastures and other open, mesic areas in isolated patches.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Rallus longirostris levipes</i> Light-footed clapper rail	FE/ SE, FP/Group 1, NCMSCP	Coastal saltmarsh	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Riparia riparia</i> Bank swallow	None/ST/Group 1	Nests in lowland country with soft banks or bluffs; open country and water during migration	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Siala mexicana</i> Western bluebird	None/None/Group 2	Open forests of deciduous, coniferous or mixed trees, savanna, edges of riparian woodland	<b>Present.</b> Western bluebirds were observed along Escondido Creek during the 2010-11 surveys. Western bluebirds have not been recorded as breeding regularly in San Diego County until recently. Although this species could breed on site, based on the late winter/early spring season observation, it may be wintering on site and may not breed.
<i>Sternula antillarum browni</i> California least tern	FE/ SE, FP/Group 1	Coastal waters, estuaries, large bays and harbors, mudflats; nests on sandy beaches	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Strix occidentalis occidentalis</i> California spotted owl	BCC/CSC/ Group 1	Forests and woodlands dominated by hardwoods, oak and oak-conifer woodlands, and conifers at high elevations	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Tyto alba</i> Barn owl	None/None/Group 2	Open habitats including grassland, chaparral, riparian, and other wetlands.	<b>Present.</b> Observed during 2010-11 surveys adjacent to Canyon de Oro, north of Harmony Grove Road, and along Wild Willow Hollow Road.
<i>Vireo bellii pusillus</i> Least Bell's vireo (nesting)	FE/ SE/Group 1, NCMSCP	Nests in southern willow scrub with dense cover within 1-2 meters of the ground; habitat includes willows, cottonwoods, baccharis, wild blackberry or mesquite on desert areas	<b>Low potential to occur.</b> Marginal habitat on site.
<i>Vireo vicinior</i> Gray vireo	BCC/CSC/Group 1	Summer resident in arid pinyon-juniper, juniper, and chamise-redshank chaparral habitats	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Mammals</i>			
<i>Antrozous pallidus</i> Pallid bat	None/CSC/Group 2, NCMSCP	Rocky outcrops, cliffs, and crevices with access to open habitats for foraging	<b>Moderate potential to occur.</b> Suitable habitat on site but there are limited cliff and crevice opportunities for roost. Could forage over the site.
<i>Bassariscus astulus</i> Ringtail	None/None/Group 2	Mixed forests and shrublands near rocky areas or riparian habitats.	<b>Low potential to occur</b> due to poor riparian habitat.
<i>Chaetodipus californicus femoralis</i> Dulzura (California) pocket mouse	None/CSC/Group 2	Coastal sage scrub, chaparral, riparian-scrub ecotone; more mesic areas	<b>High potential to occur.</b> Detected on the adjacent Del Dios Highlands Preserve (TAIC 2008). Suitable habitat on site.
<i>Chaetodipus fallax fallax</i> Northwestern San Diego pocket mouse	None/CSC/Group 2	Coastal sage scrub, grassland, sage scrub-grassland ecotones, sparse chaparral; rocky substrates, loams and sandy loams	<b>Present.</b> Observed during the 2010-11 surveys near Canyon De Oro

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Chaetodipus fallax pallidus</i> Pallid San Diego pocket mouse	None/CSC/Group 2	Coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland.	<b>Low potential to occur.</b> It is known to occur only in the San Diego county peninsular and transverse ranges.
<i>Choeronycteris mexicana</i> Mexican long-tongued bat	None/CSC/Group 2	Desert and montane riparian, desert succulent scrub, desert scrub, and pinyon-juniper woodland. Roosts in caves, mines, and buildings.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Coryorhinus townsendii</i> Townsend's big-eared bat	None/CSC/Group 2, NCMSCP	Mesic habitats, gleans from brush or trees or feeds along habitat edges	<b>High potential to occur.</b> Detected during the 2010-11 surveys on the adjacent Del Dios Highlands Preserve (Dudek 2011a).
<i>Dipodomys stephensi</i> Stephens' kangaroo rat	FE/ST/Group 1, NCMSCP	Open habitat, grassland, sparse coastal sage scrub, sandy loam and loamy soils with low clay content; gentle slopes (<30%)	<b>Not expected to occur.</b> Outside of range and poor habitat suitability.
<i>Euderma maculatum</i> Spotted bat	None/CSC/Group 2	Rock crevices, riparian forest, woodland, and scrub, ponds, lakes, grasslands	<b>Moderate potential to occur.</b> Suitable habitat on site but there are limited cliff and crevice opportunities for roost. Could forage over the site however it prefers foraging over water. Not detected during surveys.
<i>Eumops perotis californicus</i> Greater western mastiff bat	None/CSC/Group 2	Roosts in small colonies in cracks and small holes, seeming to prefer man-made structures	<b>High potential to occur.</b> Previously detected on the adjacent Del Dios Highlands Preserve (TAIC 2008).
<i>Lasiurus blossevillii</i> Western red bat	None/CSC/Group 2	Prefers edges with trees for roosting and open areas for foraging. Roosts in woodlands and forests. Forages over grasslands, shrublands, woodlands, forests, and croplands.	<b>Present.</b> Detected during the 2010-11 surveys at Escondido Creek, along Canyon de Oro, and Wild Willow Hollow.
<i>Lasiurus xanthinus</i> Western yellow bat	None/CSC/None	Desert and montane riparian, desert succulent scrub, desert scrub, and pinyon-juniper woodland.	<b>High potential to occur.</b> Detected during the 2010-11 surveys on the adjacent Del Dios Highlands Preserve (Dudek 2011a).
<i>Lepus californicus bennettii</i> San Diego black-tailed jackrabbit	None/CSC/Group 2, NCMSCP	Arid habitats with open ground; grasslands, coastal sage scrub, agriculture, disturbed areas, rangelands	<b>Present.</b> Observed during the 2010-11 surveys at the Cielo Azul parcel of the adjacent Del Dios Highland Preserve.
<i>Macrotus californicus</i> California leaf-nosed bat	None/CSC/Group 2	Desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis.	<b>Moderate potential to occur.</b> Habitat is only moderately suitable.
<i>Myotis ciliolabrum</i> Small-footed myotis	None/None/Group 2	Caves, old mines, abandoned buildings	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Myotis evotis</i> Long-eared myotis	None/None/Group 2	Roosts in buildings, crevices, under bark, and snags. Caves used as night roosts. Feeds along habitat edges, in open habitats, and over water.	<b>Low potential to occur.</b> Suitable habitat for foraging occurs on site; however, this species prefers to occur in coniferous forests and woodlands.
<i>Myotis thysanodes</i> Fringed myotis	None/None/Group 2	Maternity colonies in caves, mines, buildings, or crevices. Forages over open habitats, early successional stages, streams, lakes, and ponds.	<b>Moderate potential to occur.</b> Suitable foraging habitat occurs on site; however, its preferred habitat, pinyon-juniper, valley foothill hardwood and hardwood-conifer is not present.
<i>Myotis volans</i> Long-legged myotis	None/None/Group 2	Feeds over open water and over open habitats, using denser woodlands and forests for cover and reproduction	<b>Low potential to occur.</b> Limited suitable habitat on site.
<i>Myotis yumanensis</i> Yuma myotis	None/None/Group 2	Closely tied to open water which is used for foraging; open forests and woodlands are optimal habitat	<b>Present.</b> Observed during 2010-11 surveys conducted on site and at every station.
<i>Neotoma lepida intermedia</i> San Diego desert woodrat	None/CSC/Group 2	Coastal sage scrub, chaparral, pinyon-juniper woodland with rock outcrops, cactus thickets, dense undergrowth	<b>Present.</b> Observed during both sessions of the small mammal trapping on site near Canyon De Oro Road.
<i>Nyctinomops femorosaccus</i> Pocketed free-tailed bat	None/CSC/Group 2	Rocky desert areas with high cliffs or rock outcrops	<b>Present.</b> Detected during 2010-11 surveys conducted on site and at each station.
<i>Nyctinomops macrotis</i> Big free-tailed bat	None/CSC/Group 2	Rugged, rocky canyons	<b>High potential to occur.</b> Observed during the 2010-11 surveys on the adjacent Del Dios Highlands Preserve (Dudek 2011a).
<i>Odocoileus hemionus</i> Mule deer	None/None/Group 2	Coastal sage scrub, chaparral, riparian, woodlands, forest; often browses in open areas adjacent to cover	<b>Present.</b> Wildlife cameras detected two individual mule deer in 2010-11. However, it is likely several individuals commonly traverse the Preserve as pellets were routinely discovered on most sites.
<i>Onychomys torridus ramona</i> Southern grasshopper mouse	None/CSC/Group 2	Grassland, sparse coastal sage scrub	<b>Moderate potential to occur.</b> Suitable habitat on site. Not detected during either the small mammal trapping or the herpetological pit trap surveys, however the location of the trapping was directed towards areas that appear suitable for the species.
<i>Ovis canadensis nelsoni</i> Peninsular bighorn sheep	FE/ ST, FP/Group 1	Alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian.	<b>Not expected to occur.</b> Habitat is unsuitable and site is outside of species range.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Perognathus longimenbris pacificus</i> Pacific pocket mouse	FE/CSC/Group 1	Grassland, coastal sage scrub with sandy soils; along immediate coast	<b>Not expected to occur.</b> Habitat is unsuitable and site is outside of species range.
<i>Puma [=Felis] concolor</i> Mountain lion	None/None/Group 2, NCMSCP	Coastal sage scrub, chaparral, riparian, woodlands, forest; rests in rocky areas, and on cliffs and ledges that provide cover	<b>High potential to occur.</b> Track and scat observed in 2010-11 on the adjacent Del Dios Highland Preserve (Dudek 2011a).
<i>Taxidea taxus</i> American badger	None/CSC/Group 2, NCMSCP	Dry, open treeless areas, grasslands, coastal sage scrub	<b>Low potential to occur.</b> Habitat quality is marginal due to proximity to urban development and lack of openness.
<i>Invertebrates</i>			
<i>Branchinecta sandiagonensis</i> San Diego fairy shrimp	FE/None/Group 1, NCMSCP	Small, shallow vernal pools, occasionally ditches and road ruts	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Callophrys (=Mitoura) thornei</i> Thorne's hairstreak butterfly	None/None/Group 1	Tecate cypress	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Cicindela hirticollis grvida</i> Sandy beach tiger beetle	None/None/Group 2	Sandy areas adjacent to non-brackish water along California coast; found in dry sand in upper zone.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Cicindela senilis frosti</i> Senile tiger beetle	None/None/Group 2	Salt marshes.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Coelus globosus</i> Globose dune beetle	None/None/Group 1	Coastal dunes.	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Danaus plexippus</i> Monarch butterfly (wintering sites)	None/None/Group 2	Overwinters in eucalyptus groves	<b>Moderate potential to occur</b> during migrations. No suitable roost habitat present.
<i>Euphydryas editha quino</i> Quino checkerspot butterfly	FE/None/Group 1, NCMSCP	Sparsely vegetated hilltops, ridgelines, occasionally rocky outcrops; host plant <i>Plantago erecta</i> and nectar plants must be present	<b>Low potential to occur.</b> Site is outside of survey area for species and few host plants were detected. Habitat is generally too closed.
<i>Euphyes vestris harbisoni</i> Harbison's dun skipper	None/None/Group 1, NCMSCP	Restricted to wetland, riparian, oak woodlands, and chaparral habitats supporting host plant <i>Carex spissa</i>	<b>Not expected to occur.</b> Host plant not observed on site.
<i>Linderiella occidentalis</i> California linderiella	None/None/Group 1	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity and TDS.	<b>Not expected to occur.</b> No suitable habitat on site.

## APPENDIX D-1 (Continued)

Scientific Name / Common Name	Status (Federal/ State/ County) <sup>1</sup>	Habitat Preferences / Requirements	Status On site or Potential to Occur
<i>Lycaena hermes</i> Hermes copper butterfly	None/None/Group 1, NCMSCP	Coastal sage scrub, southern mixed chaparral supporting at least 5% cover of host plant <i>Rhamnus crocea</i>	<b>Not expected to occur.</b> Host plant not observed on site.
<i>Papilio multicaudata</i> Two-tailed swallowtail	None/None/Group 1	Foothill slopes and canyons, moist valleys, streamsides, woodlands, parks, roadsides, suburbs, and cities	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Streptocephalus woottonii</i> Riverside fairy shrimp	FE/None/Group 1, NCMSCP	Deep, long-lived vernal pools, vernal pool-like seasonal ponds, stock ponds; warm water pools that have low to moderate dissolved solids	<b>Not expected to occur.</b> No suitable habitat on site.
<i>Tryonia imitator</i> Mimic tryonia (California brackishwater snail)	None/None/Group 2	Coastal lagoons, estuaries and salt marshes	<b>Not expected to occur.</b> No suitable habitat on site.

<sup>1</sup> Status

Federal Designations (USFWS):

- BCC Fish and Wildlife Service: Birds of Conservation Concern
- FC Candidate for federal listing as threatened or endangered
- FD Federally-delisted
- FE Federally-listed Endangered
- FT Federally-listed as Threatened
- PT Proposed Threatened

State Designations (CDFG):

- CSC California Species of Special Concern
- FP Fully Protected Species
- SD State-delisted
- SE State-listed as Endangered
- ST State-listed as Threatened
- WL Watch List

County Designations:

- Group 1 Animals of high sensitivity (listed or specific natural history requirements)
- Group 2 Animals declining, but not in immediate threat of extinction or extirpation
- NCMSCP Proposed for coverage under the Draft North County MSCP (February 2008)



## **Appendix D-2**

### **Special-Status Wildlife Species with Potential to Occur on the New Property**



**Appendix D-2**  
**Special-Status Wildlife Species Evaluated for Potential to Occur on the New Property**

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<b>INVERTEBRATES</b>				
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp	Federal: Endangered County: Group 1 Draft MSCP North County Plan: Covered	Vernal pools and seasonal depressions, restricted to mesas and other areas with suitable soils.	<b>Not expected to occur.</b> The new property contains no suitable habitat (vernal pools) for this species.
<i>Lycaena hermes</i>	Hermes copper butterfly	Federal: Candidate County: Group 1 Draft MSCP North County Plan: Covered	Hermes copper butterfly larvae utilize spiny redberry ( <i>Rhamnus crocea</i> ) as a foodplant and the distribution of the Hermes copper is closely tied to the distribution of redberry, typically occurring in chaparral or coastal sage scrub. Adults visit flowers, especially those of flat-top buckwheat ( <i>Eriogonum fasciculatum</i> ).	<b>Low potential to occur.</b> There are historical records of this species from the Harmony Grove and Del Dios areas. The new property lacks the potential host plant spiny redberry.
<i>Pyrgus ruralis lagunae</i>	Laguna Mountains skipper	Federal: Endangered County: Group 1	Inhabits wet montane meadows, reaching altitudes of approximately 4,000 to 6,000 feet (1,800 meters) in yellow pine forests of the Laguna and Palomar Mountains. The larval host plant is Cleveland's Horkelia ( <i>Horkelia clevelandii</i> ).	<b>Not expected to occur.</b> The new property is located outside of the known range of this species.
<b>AMPHIBIANS</b>				
<i>Anaxyrus californicus</i>	arroyo toad	Federal: Endangered State: SSC County: Group 1 Draft MSCP North County Plan: Covered	Gravelly or sandy washes, stream and river banks, and arroyos. Also upland habitat near washes and streams such as sage scrub, mixed chaparral, Joshua tree woodland, and sagebrush habitats.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species and the species does not occur nearby.
<i>Spea hammondi</i>	western spadefoot	State: SSC County: Group 2 Draft MSCP North County Plan: Covered	Sandy or gravelly soil in grasslands, open chaparral and pine-oak woodlands, coastal sage scrub; vernal pools or freshwater marshes are essential for breeding.	<b>Detected.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Rana muscosa</i>	Sierra Madre yellow-legged frog	Federal: Endangered County: Group 1	Inhabits rocky streams in narrow canyons and in the chaparral belt.	<b>Not expected to occur.</b> This species is extirpated from San Diego County.
<b>REPTILES</b>				
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail	County: Group 2	Low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food-termites.	<b>Moderate potential to occur.</b> The species is known to occur in the general area around Lake Hodges based on CNDDDB (CDFW 2016b).

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Aspidoscelis tigris stejnegeri</i>	San Diegan tiger whiptail	State: SSC County: Group 2	Open areas in grasslands, scrublands, and woodlands.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Lichanura orcutti</i>	northern three-lined boa (former subspecies of coastal rosy boa)	County: Group 2	Scrub habitats with rock outcrops. Once common on the coast, now typically found in inland locations.	<b>High potential to occur.</b> The new property contains suitable habitat for this species. The species was found off-site crossing a dirt access road (Way Up Trail Road) while driving to the new property.
<i>Coleonyx variegatus abbottii</i>	San Diego banded gecko	County: Group 2	Occurs in arid areas including creosote flats, sagebrush desert, pinion-juniper woods, and chaparral. Prefers rocky areas but may occur in rock-free areas such as sand dunes.	<b>Low potential to occur.</b> The new property contains limited suitable habitat for this species.
<i>Crotalus ruber</i>	red diamond rattlesnake	State: SSC County: Group 2 Draft MSCP North County Plan: Watch List	Coastal sage scrub and grasslands. Occurs in rocky areas and dense vegetation with rodent burrows, cracks in rocks, or surface cover objects.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Diadophis punctatus similis</i>	San Diego ringed-neck snake	County: Group 2	Prefers moist habitats, including wet meadows, rocky hillsides, gardens, grassland, chaparral, mixed coniferous woods, and woodlands.	<b>High potential to occur.</b> The new property contains suitable habitat for this species, and the species is known to occur nearby along Escondido Creek (County of San Diego 2011).
<i>Anniella stebbinsi</i>	southern California legless lizard (formerly silvery legless lizard)	State: SSC County: Group 2	Occurs in moist warm loose soil with plant cover. Moisture is essential. Found in beach dunes, pine-oak woodlands, chaparral, desert scrub, washes, and stream terraces.	<b>Moderate potential to occur.</b> The new property contains marginally suitable habitat patches for this species.
<i>Clemmys marmorata pallida</i>	southwestern pond turtle	State: SSC County: Group 1 Draft MSCP North County Plan: Covered	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. May enter brackish water and even seawater.	<b>Not expected to occur.</b> The new property lacks suitable wetland habitat for this species.
<i>Ensatina klauberi</i>	large-blotched salamander	State: SSC County: Group 1	Inhabits moist shaded evergreen and deciduous forests and oak woodlands on Palomar Mountain and in the Peninsular Ranges.	<b>Not expected to occur.</b> The new property lies outside the known range of this species.
<i>Phrynosoma blainvillei</i>	Blainville's horned lizard	State: SSC County: Group 2 Draft MSCP North County Plan: Covered	Coastal sage scrub and chaparral in arid and semi-arid climate conditions. Prefers friable, rocky, or shallow sandy soils.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Eumeces skiltonianus interparietalis</i>	Coronado Island skink	County: Group 2	Scrub habitats with leaf litter and sandy substrates.	<b>Low potential to occur.</b> The new property generally lacks suitable habitat for this species.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Salvadora hexalepis virgulata</i>	coast patch-nosed snake	State: SSC County: Group 2	Grasslands, scrublands, and woodlands with sandy soils and leaf litter.	<b>High potential to occur.</b> Suitable habitat present within the new property and, based on CNDDDB, the species is known to occur in the nearby Elfin Forest Preserve (CDFW 2016b).
<i>Thamnophis hammondi</i>	two-striped garter snake	State: SSC County: Group 2	Aquatic habitats, preferably rocky streams with protected pools, cattle ponds, marshes, vernal pools, and other shallow bodies of water lacking large aquatic predators.	<b>Low potential to occur.</b> The new property is primarily upland chaparral and does not contain riparian habitat. However, the species is known to occur in the Escondido Creek Preserve.
<b>BIRDS</b>				
<i>Accipiter cooperii</i>	Cooper's hawk	State: WL (Nesting) County: Group 1	Usually found nesting in oak woodlands, but occasionally in willow or eucalyptus woodlands.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Accipiter striatus</i>	sharp-shinned hawk	State: WL (Nesting) County: Group 1	A winter visitor, distributed over the coastal slope of San Diego County. The habitat of this species encompasses a variety of vegetation communities and land covers. It requires a certain amount of dense cover, but this can be localized and scattered through relatively open country.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Agelaius tricolor</i>	tricolored blackbird	State: WL County: Group 1 Draft MSCP North County Plan: Covered	Freshwater marshes with cattails and other emergent vegetation.	<b>Low potential to occur.</b> There is no suitable breeding habitat within the new property or nearby.
<i>Aimophila ruficeps canescens</i>	southern California rufous-crowned sparrow	State: WL County: Group 1 Draft MSCP North County Plan: Watch List	Coastal sage scrub and sparse mixed chaparral, often in steep or rocky terrain.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Artemisiospiza belli</i>	Bell's sparrow	State: WL County: Group 1 Draft MSCP North County Plan: Watch List	Coastal sage scrub and sparse chaparral, typically in large unfragmented blocks in inland locales.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Aquila chrysaetos</i>	golden eagle	State: FP, WL (Nesting and Wintering) County: Group 1 Draft MSCP North County Plan: Covered	Nests on cliff ledges and trees on steep slopes. Hunts for prey in nearby grasslands, sage scrub, or broken chaparral. Requires very large territories.	<b>Low potential to occur.</b> The new property contains limited suitable foraging habitat for this species. There are no known nearby nesting locations.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Athene cunicularia hypugaea</i>	western burrowing owl	State: SSC County: Group 1 Draft MSCP North County Plan: Covered	Grasslands, open scrublands, and margins of agriculture fields with burrows. Subterranean nester, dependent upon burrowing mammals, especially California ground squirrel.	<b>Low potential to occur.</b> The new property lacks the characteristic habitat for this species.
<i>Buteo lineatus</i>	red-shouldered hawk	County: Group 1	Occurs mainly in swamp and forest habitats. They use the same nesting site from year to year.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Buteo swainsoni</i>	Swainson's hawk	State: Threatened County: Group 1	Prefers open plains, grasslands, prairies, deserts, dry scrublands, and low-growing agricultural areas.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Campylorhynchus brunneicapillus sandiegensis</i>	coastal (San Diego) cactus wren	State: SSC County: Group 1 Draft MSCP North County Plan: Covered	Coastal sage scrub usually with abundant cactus patches.	<b>Not expected to occur.</b> The new property lacks large patches of cactus that this species requires for nesting.
<i>Cathartes aura</i>	turkey vulture	County: Group 1	Forages aerially above virtually any vegetation type or terrain, except dense human development. Secluded cliff ledge or rock fissure in remote, rugged terrain required for nesting. Native or nonnative tree groves in lowlands often used as winter roosts.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Charadrius nivosus nivosus</i>	western snowy plover	Federal: Threatened State: SSC County: Group 1	Coastal sandy beaches, dunes, and estuary habitats.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Circus cyaneus</i>	northern harrier	State: SSC (Nesting) County: Group 1 Draft MSCP North County Plan: Watch List	Generally inhabits flat, open, areas with grassland, marsh, agriculture, or desert. Prefers areas with very low growing vegetation with occasional scattered shrubs. Nests in dense sage scrub or dense shrubs. Often found near ponded water.	<b>Low potential to occur.</b> The new property contains limited suitable foraging habitat for this species. There are no known nearby nesting locations.
<i>Contopus cooperi</i>	olive-sided flycatcher	State: SSC County: Group 2	Inhabits openings in and edges to dense coniferous forests	<b>Moderate potential to occur.</b> The new property does not contain suitable breeding habitat for this species, as it is out of its known breeding range; however, the species may migrate through the new property.
<i>Setophaga petechia brewsteri</i>	yellow warbler	State: SSC County: Group 2	Mature riparian woodlands consisting of cottonwood, willow, alder, and ash trees. Restricted to this increasingly patchy habitat.	<b>Low potential to occur.</b> No suitable riparian habitat exists on the new property; however, the species occurs in the Escondido Creek Preserve and therefore may occur as a migrant.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Elanus leucurus</i>	white-tailed kite	State: FP, SSC (Nesting) County: Group 1	Widespread over the coastal slope of San Diego County preferring riparian woodlands, oak groves, or sycamore groves adjacent to grasslands.	<b>High potential to occur.</b> The new property contains limited patches of suitable foraging habitat for this species and the species is known to occur in nearby Escondido Creek (County of San Diego 2011).
<i>Empidonax traillii extimus</i>	southwestern willow flycatcher	Federal: Endangered State: Endangered County: Group 1 Draft MSCP North County Plan: Covered	Restricted to a few colonies in riparian woodlands scattered throughout Southern California. Riparian forests are integral to this species' persistence.	<b>Low potential to occur.</b> No suitable riparian habitat exists on the new property; however, the species may occur as a migrant.
<i>Icteria virens</i>	yellow-breasted chat	State: SSC County: Group 1	Riparian woodland, with dense undergrowth.	<b>Low potential to occur.</b> No suitable riparian habitat exists on the new property; however, the species may occur as a migrant.
<i>Ixobrychus exilis</i>	least bittern	State: SSC County: Group 2	Marsh habitats or large emergent wetlands with cattails ( <i>Typha</i> sp.) and tules.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Laterallus jamaicensis coturniculus</i>	California black rail	State: FP, SSC County: Group 2	Freshwater and saltwater marshes with bulrush or pickleweed.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Passerculus sandwichensis beldingi</i>	Belding's savannah sparrow	State: Endangered County: Group 1	Salt marsh and mudflats with pickleweed.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Phalacrocorax auritus</i>	double-crested cormorant	State: WL County: Group 2	Marine, freshwater and estuary environments. Needs water for foraging and perching areas to dry out.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Plegadis chihi</i>	white-faced ibis	State: WL County: Group 1	Freshwater marsh, shallow lacustrine waters, muddy ground of wet meadows, and irrigated or flooded pastures and croplands. Nests in dense freshwater marsh.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Polioptila californica californica</i>	coastal California gnatcatcher	Federal: Threatened State: SSC County: Group 1 Draft MSCP North County Plan: Covered	Coastal sage scrub below 2,500 feet in elevation. Low, coastal sage scrub, in arid washes, and on mesas and slopes.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Rallus obsoletus</i>	Ridgway's rail	Federal: Endangered State: Endangered, FP County: Group 1	Coastal salt marshes and freshwater marshes with connection to estuarine habitats.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Sialia mexicana</i>	western bluebird	County: Group 2	Frequents open woodlands for foraging, but requires suitable roosting and nesting cavities usually in snags. Availability of suitable nesting cavities in large trees may limit population density.	<b>High potential to occur.</b> The new property contains limited patches of suitable foraging habitat for this species and the species is known to occur in nearby Escondido Creek (County of San Diego 2011).
<i>Sterna antillarum browni</i>	California least tern	Federal: Endangered State: Endangered, FP County: Group 1	Coastal beaches and saltflats.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Tyto alba</i>	barn owl	County: Group 2	Inhabits grasslands, deserts, marshes, agricultural fields, narrow forest strips, brushy fields, and suburbs and cities. They nest in tree cavities, caves, and in buildings.	<b>High potential to occur.</b> The new property contains limited patches of suitable foraging habitat for this species and the species is known to occur in nearby Escondido Creek (County of San Diego 2011).
<i>Vireo bellii pusillus</i>	least Bell's vireo	Federal: Endangered State: Endangered County: Group 1 Draft MSCP North County Plan: Covered	Willow and mulefat-dominated riparian forests and woodlands.	<b>Low potential to occur.</b> No suitable riparian habitat exists on the new property; however, the species may occur as a migrant.
<b>MAMMALS</b>				
<i>Antrozous pallidus</i>	pallid bat	State: SSC County: Group 2 Draft MSCP North County Plan: Covered	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect species from high temperatures.	<b>Moderate potential to occur:</b> The new property contains suitable foraging habitat.
<i>Chaetodipus californicus femoralis</i>	Dulzura pocket mouse	State: SSC County: Group 2	Slopes covered with chaparral and live oaks.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Chaetodipus fallax fallax</i>	northwestern San Diego pocket mouse	State: SSC County: Group 2	Sagebrush scrub, annual grassland, chaparral, and desert scrubs. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	State: CT, SSC County: Group 2 Draft MSCP North County Plan: Covered	Coniferous forests, deserts, prairies, riparian communities, active agricultural areas, and coastal habitats with caves and cave-like roosting habitat, mines, and abandoned buildings.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	Federal: Endangered State: Threatened County: Group 1 Draft MSCP North County Plan: Covered	Inhabits annual and perennial grassland habitats, but may occur in coastal scrub or sagebrush with sparse canopy cover, or in disturbed areas.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species and there are no known nearby populations.
<i>Eumops perotis californicus</i>	western mastiff bat	State: SSC County: Group 2	Chaparral; live oaks; and arid, rocky regions. Requires downward-opening crevices.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Lasiurus blossevillii</i>	western red bat	State: SSC County: Group 2	Feeds over grasslands, shrublands, open woodlands, forests, and croplands. Roosts primarily in trees and at times, shrubs, often in edge habitats along streams, fields, or urban areas.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Lasiurus xanthinus</i>	western yellow bat	State: SSC	Associated with thorny vegetation on the Mexican Plateau and found in desert regions of the southwestern United States, particularly in association with palms.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit	State: SSC County: Group 2 Draft MSCP North County Plan: Watch List	Grasslands, open scrub habitats, disturbed areas, and agricultural fields.	<b>High potential to occur.</b> The new property contains suitable habitat for this species and the species is known to occur along nearby Escondido Creek (County of San Diego 2011).
<i>Macrotus californicus</i>	California leaf-nosed bat	State: SSC County: Group 2	Preferred habitats are caves, mines, and rock shelters, mostly in Sonoran desert scrub.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species.
<i>Myotis evotis</i>	long-eared myotis	County: Group 2	Uses mostly forested areas, especially with broken rock outcrops, also shrubland, meadows near tall timber, wooded streams, and reservoirs. Often roosts in buildings, hollow trees, mines, caves, fissures, etc.	<b>Low potential to occur.</b> The new property contains limited suitable habitat for this species.
<i>Myotis thysanodes</i>	fringed myotis	State: SSC County: Group 2	Occurs in a variety of habitats from desert scrub to fir-pine associations. Oak and pinyon woodlands most commonly used. Roosts within caves, mines, and buildings	<b>Low potential to occur.</b> The new property contains limited suitable habitat for this species.
<i>Myotis yumanensis</i>	Yuma myotis	County: Group 2	Primarily an inhabitant of desert regions where it is most commonly encountered in lowland habitats near open water, where it prefers to forage.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	State: SSC County: Group 2	Sagebrush scrub, annual grassland, chaparral, and desert scrubs, often with cactus patches, rock outcrops, or rock piles.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Nyctinomops femorosaccus</i>	pocketed free-tailed bat	State: SSC County: Group 2	Rugged cliffs, rocky outcrops, and slopes in desert shrub and pine oak forests.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.

Scientific Name	Common Name	Status <sup>1</sup>	General Habitat	Potential for Occurrence <sup>2</sup>
<i>Nyctinomops macrotis</i>	big free-tailed bat	State: SSC County: Group 2	Low-lying arid areas in southern California.	<b>Moderate potential to occur.</b> The new property contains limited suitable habitat for this species; however, it is known to occur in nearby Escondido Creek.
<i>Odocoileus hemionus</i>	mule deer	County: Group 2	Mountain forests, wooded hills, desert areas, and in chaparral.	<b>Present.</b> This species was documented within the new property during AECOM surveys in 2016.
<i>Perognathus longimembris pacificus</i>	Pacific pocket mouse	Federal: Endangered State: SSC County: Group 1	Coastal areas with sandy substrates and sparse vegetation. Known populations are restricted to Dana Point, and three populations on Marine Corps Base Camp Pendleton. Only occurs along the coast and up to 3 miles inland.	<b>Not expected to occur.</b> The new property contains no suitable habitat for this species and is outside the range for the species.
<i>Puma concolor</i>	mountain lion	County: Group 2 Draft MSCP North County Plan: Watch List	Rugged mountains, forests, deserts, and swamps with abundant prey (particularly mule deer).	<b>High potential to occur.</b> The new property contains suitable habitat and abundant prey (mule deer) for this species, and mountain lion scat has historically been detected along Escondido Creek (County of San Diego 2011).
<i>Taxidea taxus</i>	American badger	State: SSC County: Group 2 Draft MSCP North County Plan: Watch List	Shrub, forest, and herbaceous habitats, with friable soils, often associated with vast tracts of grassland areas but also occurs in grassy canyons. Needs sufficient food and friable soils. Preys on burrowing rodents, especially California ground squirrels ( <i>Otospermophilus beecheyi</i> ).	<b>Low potential to occur.</b> The new property generally lacks suitable habitat for this species.

<sup>1</sup> State Status Abbreviations: CT: Candidate Threatened; FP: Fully Protected; SSC: Species of Special Concern; WL: Watch List (CDFW 2016a)

<sup>2</sup> Species potential for occurrence was based on AECOM field studies in 2015 and 2016, a 1-mile radius CNDDDB search around the new property (CDFW 2016b), and biological surveys for the existing Escondido Creek Preserve (County of San Diego 2011).

#### Literature Cited

California Department of Fish and Wildlife (CDFW). 2016a. Special Animals List. Natural Diversity Database. October, Periodic Publication. 51 pp.

California Department of Fish and Wildlife (CDFW). 2016b. California Natural Diversity Database (CNDDDB) Search for Special-Status Species within a 1-mile radius around University Heights Parcels on September 13.

County of San Diego. 2011. Department of Parks and Recreation. *Resource Management Plan for Escondido Creek Preserve, San Diego County*. June.

## **APPENDIX E**

### **INVASIVE SPECIES WITH MODERATE AND LOW OR NO PRIORITY FOR REMOVAL WITHIN THE ESCONDIDO CREEK PRESERVE**



## APPENDIX E

### INVASIVE SPECIES WITH MODERATE, LOW OR NO PRIORITY FOR REMOVAL

Species with moderate, low and no priority for removal are discussed below.

#### **Moderate Priority for Removal**

##### **Sydney Golden Wattle**

On the new property, a couple of individuals of this tree (*Acacia longifolia*) were found on the north slope at the top of Mount Whitney and should be removed. The trees were of moderate size. In some Mediterranean countries, it is invasive due to prolific seed production and fast growth. It also alters the microbial communities where it grows. Seeds are stimulated by fire. Removal involves mechanical treatment as well as herbicide treatment to ensure that the stump does not resprout. It can be treated any time but treatment would be most effective during the active growing season in spring. The tree should be cut and the stump painted with a Roundup solution. If runners are observed, their foliage should be treated with Roundup spray. The area around the stump should be monitored to ensure that additional sprouts do not emerge.

##### **Short pod mustard**

Short pod mustard (*Hirschfeldia incana*) is widespread on the new property along roads and partially disturbed areas. It is a prolific species that will not reasonably be removed. However, it may warrant treatment to reduce its population size or extent if the numbers of individuals and area of the plant increase significantly. It may be treated with herbicide while it is growing to reduce propagation.

##### **Tamarisk**

Tamarisk (*Tamarix ramosissima*) is a shrub or tree typically found along waterways, drainages and riparian areas. It is associated with dramatic changes in geomorphology, groundwater availability, soil chemistry, fire frequency, plant community composition and native wildlife diversity. Tamarisk presents the greatest risk of reducing habitat quality within riparian areas, which are limited in presence within the Preserve. Tamarisk was observed within drainages in the northern most portion of the existing property, with a footprint of approximately 80 square feet. Because tamarisk is a sizable plant, it can be controlled by mechanical methods. Application of an appropriate herbicide is recommended for remaining stumps and plant parts since root fragments can regenerate. Removed invasive plants should be properly disposed of at

off-site facilities. The area from which tamarisk would be removed is potentially appropriate for replanting with other native riparian plant species.

## **Corn**

Corn (*Zea mays*) was found on the new property growing in the wild in one location in the southern part of the main parcel set on one of the fire break locations associated with the 2014 fire. It may be that it will not spread because conditions for its growth and spread may not exist over much of the area. However, because it was found in a limited area, it seems prudent to remove it so that it does not spread. Because it is an annual, and in limited area, hand removal by pulling and bagging the plant remnants would be appropriate as well to assist in ensuring that it does not spread.

## **Planted Ornamentals**

Planted Ornamentals occur within portions of the Preserve. On the existing property, a variety of non-native pines (*Pinus* spp.) are located along Harmony Grove Road, totaling approximately 1.8 acres. On the new property, ornamental species occur along the road near Wild Willow Hollow Road turn off. These are discussed together because they are located in the same area and are the result of intentional planting. These include Tree house leek (*Aeonium arboreum*), Century Plant (*Agave americana*), Heartleaf Iceplant (*Aptenia cordifolia*), Australian bottle tree (*Brachychiton rupestris*), Hottentot fig (*Carpobrotus edulis*), Arizona cypress (*Hesperocyparis arizonica*), Old man cactus (*Lophocereus schottii*), Island Ironwood (*Lyonothamnus floribundus asplenifolius*), Olive Tree (*Olea europa*), Mission cactus (*Opuntia ficus-indica*), Geranium (*Pelargonium hortorum*), Aleppo pine (*Pinus halepensis*), Miniature jade plant (*Portulaca afra*), Organ Pipe Cactus (*Stenocereous thurberi*), and Giant Yucca (*Yucca elephantipes*). All of these plants as shrubs or trees can be manually removed. None are considered very invasive so that only a minor level of monitoring would be necessary after their removal.

## **Low Priority for Removal**

### **White Tumbleweed**

White tumbleweed (*Amaranthus albus*) is a widespread weed in grassy edges and disturbed areas and was found within the new property. It occurs throughout the region and can quickly establish into disturbed areas. If it builds up in numbers, mowing and burning at the appropriate time before seed sets may assist in reducing its cover. However, it generally is not considered a candidate for removal.

### **Italian Thistle**

Italian thistle (*Carduus pycnocephalus*) has become well established throughout the region within the past few decades. It was observed within both the new and existing properties. It is too widespread and pervasive to remove, but if stands and clusters of the plant become dense, it would be important to manage them by removal through mowing before seed sets or treatment with herbicides.

### **Tocalote**

Tocalote (*Centaurea melitensis*) is fairly widespread in grassy locations and was observed within the new property. It is a competitor with a number of native annual species but would be difficult to remove. However, mowing and burning at the appropriate time before seed sets may assist in reducing its cover, and biocontrol insects have also been used. It can be treated in early spring during its growing period.

### **Bristly ox tongue**

Bristly ox tongue (*Helminthotheca echioides*) is another species that is well established and widespread within the new property. However, like the Italian thistle and the White tumbleweed, if they build up to dense patches, they should be treated to minimize their effect on the habitats.

### **Prickly lettuce**

Prickly lettuce (*Lactuca serriola*) is another invasive weed observed within the new property that is widespread and that should be treated if it is found that its population in any portion of the Property becomes dense and too large.

### **Notch-leaf marsh rosemary**

The Notch-leaf marsh rosemary (*Limonium sinuatum*) was observed within the new property and is of low importance in concern for its spreading into the natural habitats. It is generally found along roads and obvious disturbed areas. While it is of low priority for removal, at its present level, if funds were available, it could be accomplished through use of herbicides like glyphosate or hand removal.

### **Canary Island date palm**

Canary Island date palm (*Phoenix canariensis*) is a species of palm tree commonly used for landscaping in Southern California which has the potential to establish in riparian areas and

displace native trees. It is slow growing, and establishes exclusively from seed. This species was observed within the existing property and is ranked as a low priority for removal/control due to its limited potential for additional colonization of the surrounding area, and its limited distribution. One occurrence of date palm was observed growing along the southern side of Harmony Grove Road. Control for this tree may include mechanical removal, and treatment of the stump with an appropriate herbicide. Alternatively, the palm may be drilled, and injected with an appropriate herbicide, and left in place to die if removal is not desired. Complete mechanical removal would be preferable from a fire management perspective, as this would reduce the available deadwood fuel load present.

### **English plantain**

English plantain (*Plantago lanceolata*) is mostly found in obvious disturbed areas that receive a bit more moisture from road run off or drainage areas. This species was observed within the new property. It is typically not an environmental issue, but it occurs in discrete locations that may be treatable if time and funds were available. It is a perennial that may require more extensive treatment or retreatment to ensure that it is removed. Herbicide treatment would be the most effective.

### **California sycamore**

A single California sycamore (*Platanus racemosa*) was planted along Harmony Grove Road within the new property. It is not any sort of negative habitat indicator and it is not likely to spread. However, because it does not naturally occur in that location, a decision could be made to remove it.

### **Curly dock**

Curly dock (*Rumex crispus*) occurs in low areas and drainages along roadsides and was observed within the new property. It occurs in low enough numbers that it could be treated, but it is clearly a low priority to do so.

### **Prickly Russian Thistle**

Prickly Russian-thistle (*Salsola tragus*), also known as tumbleweed, occurs in a variety of locations on the new property. It is mostly found in disturbed and grassy areas; however, it is another species that would be impossible to remove. Its population size is somewhat dependent upon the rainfall of that particular season. Seasons with fall rains or heavy rains in general may stimulate it to a greater level than normal. It should be monitored to determine if it builds up to a level where it should be treated to reduce the density of its numbers.

## **Prickly Sow Thistle**

Prickly sow thistle (*Sonchus asper* ssp. *asper*) is another species that is widespread and pervasive within the new property. It is also one that might be monitored to prevent build ups into large populations and treated with herbicide if it does.

## **No Priority for Removal**

A number of nonnative species are so widespread and prevalent in the landscape that attempts to remove or even reduce their presence would be ineffective without a great deal of expense and effort. These species are not recommended for removal at this time. These species include scarlet pimpernel (*Anagallis arvensis*), Common celery (*Apium graveolens*), Australian saltbush (*Atriplex semibaccata*), wild oats (*Avena fatua*), purple false brome (*Brachypodium distachyon*), ripgut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*), mouse-ear chickweed (*Cerastium glomeratum*), nettle-leaf goosefoot (*Chenopodium murale*), African brass buttons (*Cotula coronopifolia*), Flax-leaf fleebane (*Erigeron bonariensis*), broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), round-leaf geranium (*Geranium rotundifolium*), Crete weed (*Hedypnois cretica*), hare barley (*Hordeum murinum* ssp. *leporinum*), smooth cat's ear (*Hypochaeris glabra*), golden-top (*Lamarckia aurea*), narrow-leaf cottonrose (*Logfia gallica*), white horehound (*Marrubium vulgare*), cultivated timothy (*Phleum pratenses*), rabbitfoot grass (*Polypogon monspeliensis*), fragrant everlasting cudweed (*Pseudognaphalium luteoalbum*), common groundsel (*Senecio vulgaris*), common catchfly (*Silene gallica*), London rocket (*Sisymbrium irio*), and common chickweed (*Stellaria media*).



## **APPENDIX F**

# **FIRE BEHAVIOR MODELING RESULTS WITHIN THE ESCONDIDO CREEK PRESERVE**



## APPENDIX F

### Fire Behavior Modeling Results

---

#### FUELS CLASSIFICATION

Reliable estimates of fire behavior must consider the relationship of fuels to the fire environment and the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content and chemical properties.

All vegetation is considered fuel. All vegetation will burn; however, some species require more heat in order to ignite and propagate flame. The moisture content of vegetation is an important component; dry vegetation will ignite more rapidly, whereas green vegetation must lose its moisture before it will ignite. Consequently, shrubland vegetation with high oil content (above 6%) will burn more quickly and hotter than vegetation with high leaf moisture levels and low oil content levels. More than 90% of the flaming front of a wildfire is composed of fuel less than 0.5 inch in diameter and is consumed in minutes. Fuels larger than 1 inch in diameter are termed “residual” fuel and may require several hours to burn out. This larger fuel does not contribute to the forward rate of spread of the fire. The following factors describe the relationship between vegetation characteristics that affect fire behavior:

**Fuel loading** is defined as the oven dry weight of fuels in a given area, usually expressed in tons per acre. Natural fuel loading varies greatly by vegetative or fuel types in addition to the different size classes of fuel particles. Vegetation types can be rated as light, moderate, or heavy. Each rating is an estimate of the dead or live surface fuels that are less than 3 inches in diameter. Although specific measurements were not taken, based on the vegetation types identified in the cursory survey of the Escondido Creek Preserve (Preserve), the different vegetation types can generally be assigned a moderate to high rating.

Measuring the intensity, force, and destructive potential of wildfire is accomplished by observing flame lengths produced by burning vegetation. A direct relationship exists between the amount of energy released during burning (per second) and the length of flame generated. The standard for measuring energy release in the United States is the British Thermal Unit (BTU). One BTU is defined as the amount of energy required to increase the temperature of 1 pound of water 1°F (a standard kitchen match or candle flame is approximately one BTU).

## APPENDIX F (Continued)

---

**Size and shape** affect the surface area to volume ratio of fuels. Small fuels have a greater surface area to volume ratio than larger fuels. Dead fuels are separated into four size classes: (1) grasses, litter, or duff less than 0.25-inch diameter; (2) twigs and small stems 0.25– to 1-inch diameter; (3) branches 1- to 3-inch diameter; and (4) large stems and branches greater than 3-inch diameter. The fine fuels less than 0.25 inch in diameter are most important for fire behavior analysis because their ignition time is less, and their fuel moisture content changes rapidly. This characteristic is typical for the grasses that were identified within and adjacent to the Preserve.

The arrangement, size, and surface area of vegetative fuels play an important role in fire behavior and spread potential. Dense, concentrated biomass may burn evenly; however, when overall size decreases and surface area increases (as seen in native shrub stands), burning patterns change, resulting in faster ignition and spread. Live shrubland and grassland vegetation generally exhibit high surface to volume ratios. Standing grass, coastal sage scrub, and chaparral have high surface area to volume ratios, whereas forest litter and chipped or cut biomass exhibit very low surface to volume ratios.

**Compactness**, or spacing between fuel particles, affects the rate of combustion. For example, fuel particles that are closely compacted have less surface area exposed and less air circulation between particles and thus are slower to combust. The thick duff layer found underneath a mixed forest is an example of a tightly compacted fuel, whereas the open, dead branches on sagebrush or chaparral are considered a loosely compacted fuel. With the exception of the on-site oak woodlands, the fuels on the Preserve are loosely spaced with adequate air circulation required to carry a fire.

**Horizontal continuity** is the extent of horizontal distribution of fuels at various levels or planes. The vegetative types within various portions of the Preserve were analyzed for horizontal continuity and vertical arrangement. Fuels are either rated as uniform or patchy. Uniform fuels are evenly distributed and occur in a continuous, non-interrupted cover across the landscape. Patchy fuels are not continuous.

**Vertical arrangement** is defined as the relative heights of fuels above the ground, as well as their vertical continuity. Both of these vegetation characteristics influence the ability of fire to reach various fuel levels or strata. Vegetation of various heights that can transport fire from the low-level brush to tree canopies is called a fuel ladder and may create what is called a “crown fire.” When tall grasses and shrubs grow around trees with low hanging branches, the result is a fuel ladder. When a ground fire climbs the fuel ladder into the crowns of trees, it can spread canopy to canopy, creating higher fire intensity and firebrands.

## APPENDIX F (Continued)

---

**Fuel moisture content** is defined as the amount of water in fuels. The moisture content of plant materials plays a major role in the ignition, development, and spread of fires. Fuel moisture controls the current flammability of fuels both living and dead. During the most active growing periods of spring, the moisture content of plant foliage may be quite high. As the season progresses, a plant's moisture content declines until late summer or early fall when the plant becomes dormant or completely dies. Fine fuels, less than 0.25 inch thick, are most responsible for the spread of fire and have highly variable fuel moisture contents depending on the relative humidity of the air. Live fuel moisture content during the peak fire season (October through December) is estimated to be 60% to 80% in the drier open areas. This can potentially drop to less than 60% under extreme, dry wildfire conditions.

There are two types of fuel moisture values to consider: (1) dead fuel moisture, with measurements of 1-, 10-, 100-, and 1,000-hour time-lag; and (2) live fuel moisture.

**Dead fuel moisture** percentages are determined by temperature, aspect, time of day, relative humidity, and time of year. One-hour time-lag fuel is less than 0.5 inch thick, 10-hour time-lag fuel is between 0.5 inch and 1 inch thick, 100-hour time-lag fuel is between 1 and 3 inches thick, and 1,000-hour time-lag fuel is greater than 3 inches thick. One-hour time-lag fuel can reach equilibrium with the surrounding atmosphere in 1 hour, or within minutes when air temperature exceeds 80°F and relative humidity is below 25%. One-hour time-lag fuel moisture may be calculated using a set of tables that reference time of day, month, aspect, slope, temperature, and relative humidity. Ten-hour, 100-hour, and 1,000-hour time-lag fuel can take up to 10 hours, 100 hours, or 1,000 hours to reach equilibrium with the surrounding atmosphere, respectively. In Southern California, 1-hour, 10-hour, and 100-hour time-lag fuels are usually given equal value. One thousand hour time-lag fuel, which occurs in more heavily wooded environments (i.e., timber), is generally used in measuring drought effects. Forests are considered "critical" when 1,000-hour fuel measurements are less than 15% (as a frame of references, kiln-dried wood moisture averages 22%).

Despite variations in the topography and disturbance history of the Preserve, vegetative cover is classified into four main types: grass, chaparral, coastal sage scrub, and woodland. Frequent fires have created low-volume fuel beds throughout much of the Preserve. Although most fuels occur in the 1-hour size class, pockets of 10- and 100-hour fuels can be found, primarily in the woodland vegetation types on site.

**Live fuel moisture** is described as the moisture in leaves and woody portions of a plant. Field measurements of live fuel moistures are calculated by cutting small branches (less than 3 inches in diameter), weighing the branch, placing it in a low- temperature oven for 12 hours, removing

## APPENDIX F (Continued)

---

the branch, and weighing it again. The difference in weight is the loss of moisture in the leaves and woody portion of the branch. Consequently, live fuel moisture may exceed 100% of the dry weight of the plant. Live fuel moisture is the highest in the spring and early summer, and the lowest in late summer, fall, and early winter. This measurement is a valuable tool in predicting wildfire potential for a general area.

Chaparral and coastal sage scrub are common Southern California vegetation types found in many upland locations and generally have reduced fuel moisture levels. Conversely, riparian vegetation, including willow (*Salix* spp.), coast live oak (*Quercus agrifolia*), and mulefat (*Baccharis salicifolia*), has higher leaf moisture values than vegetation growing in drier, more xeric sites. The importance of fuel moisture in examining fire hazard is that higher moisture levels ultimately require higher BTU output to ignite or sustain ignition. Consequently, fuel arrangement, along with fuel chemical/moisture content, plays an important role in wildfire combustion, spread, and heat output. Fuel moisture is a significant component, as vegetation requires external heat and energy to reduce moisture levels before it will ignite. High winds, low relative humidity, and/or high temperatures begin the process of removing fuel moisture, thus allowing vegetation to ignite and burn more rapidly. Consequently, lower fuel moisture values, including both dead and live fuel moistures, result in increased fire intensity. Moisture-laden fuels inhibit complete combustion while simultaneously producing excessive smoke output.

***Fuel chemical properties*** include the presence of volatile substances such as oils, resins, wax, and pitch. These also affect the rate of combustion. Chaparral and sage scrub vegetation have high amounts of these volatile substances that contribute to rapid rates of spread and high fire intensities.

Oil and moisture contents vary between fuels and fluctuate depending on the time of year. For example, black sage may have an oil content approaching 20% of its weight in dry summer or autumn months, but, in the spring, when sufficient groundwater is available, moisture content values can exceed 300%. When stressed during extreme dry weather conditions, numerous chaparral and coastal sage scrub species may react explosively when moisture falls below 60%, whereas larger shrubs may require higher energy to sustain ignition.

### FUEL MODELS

All nine fuels characteristics are descriptors that help define the 13 standard fuel models (Anderson 1982), the more recently developed 40 fuel models (Scott and Burgan 2005), and five

## APPENDIX F (Continued)

custom fuel models developed for Southern California (Weise and Regelbrugge 1997). Seven fuel models (models 1, 8, 9, SCAL 18, GS2, SH7, and TU5) were used in the FlamMap analysis for the Preserve and are required inputs for the mathematical fire spread computations. Additionally, one non-burnable model (model 98) was utilized to represent non-fuel areas (e.g. roads)). Table 1 provides details of the six fuel models used in the analysis conducted for Preserve.

**Table 1**  
**Fuel Model Characteristics**

Fuel Model	Description	Tons/acre; Btu/lb	Fuel Bed Depth (Feet)
1	Short grass	0.7 tons/acre; 8,000 Btu/lb	1.0
8	Closed timber litter	5.0 tons/acre; 8,000 Btu/lb	0.2
9	Hardwood litter	3.5 tons/acre; 8,000 Btu/lb	0.2
SCAL18	Sage/buckwheat	9.7 tons/acre; 9,200 Btu/lb	3.0
GS2	Moderate load, dry climate grass-shrub	2.6 tons/acre; 8,000 Btu/lb	1.5
SH7	Very high load dry scrub	14.4 tons/acre; 8,000 Btu/lb	6.0
TU5	Very high load, dry climate timber-shrub	14.0 tons/acre; 8,000 Btu/lb	1.0

### WILDLAND FIRE BEHAVIOR MODELING

Fire behavior was analyzed for the Preserve site using FlamMap fire behavior modeling software and local topographic, fuels, and weather data. The FlamMap output data provide an indication of how vegetative fuels will burn under specific fuel, weather, and topographical conditions. The FlamMap (version 3.0) fire behavior software package (Finney 2004) is a geographic information system (GIS)-driven computer program that incorporates fuels, weather, and topography data in generating static fire behavior outputs, including values associated with flame length, rate of spread, and fireline intensity. It is a flexible system that can be adapted to a variety of specific wildland fire planning and management needs.

The calculations that result from FlamMap are based on the BehavePlus Fire Modeling System algorithms but result in a geographically distinct data set based on GIS inputs. FlamMap model outputs allow wildland resource managers to predict rate of spread, fireline intensity, and flame length, which provide important insights about the characteristics of wildfire spread within and adjacent to high-value areas, whether residential structures or preserved sensitive habitats. Each of the input variables used in FlamMap remain constant at each location, meaning that the input variables are applied consistently to each grid cell and the fire behavior at one grid cell does not impact that at a neighboring grid cell. Essentially, the model presents a “snapshot” in time and does not account for temporal changes in fire behavior or the movement of fire across the

## APPENDIX F (Continued)

---

landscape. As such, the results of the models contained herein should be utilized as valuable information sources and tools to prioritize fuel treatment options rather than an exact representation of how a fire would behave on the Preserve.

The basic assumptions and limitations of FlamMap are:

- The fire model output describes fire behavior only in the flaming front. The primary driving forces in the predictive calculations are the dead fuels less than 0.25 inch in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch in diameter have little effect to carry fire, and fuels greater than 3 inches in diameter have no effect.
- The model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- The software assumes that weather is uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel must be carefully considered to obtain useful predictions.
- The FlamMap fire behavior computer modeling system provides the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Fuel models used in the FlamMap analysis are classified into four groups based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Fuel model classifications were made during field analysis and in conjunction with available vegetation maps of the Reserve. The following list of fuel types describes the classification of fuel models based on vegetation type:

- Grasses Fuel, Models 1 through 3. These models represent the fast moving, light, flashy fuels found in grassland landscapes.
- Brush Fuel, Models 4 through 7, SCAL 14 through 18. These models are designed to represent the higher-intensity chaparral and sage scrub dominated landscapes.
- Timber Fuel, Models 8 through 10. Timber models are selected to represent the riparian woodland or ornamental forested landscapes.
- Logging Slash, Fuel Models 11 through 13. These models are used to represent slash; none were utilized for the Preserve.

## APPENDIX F (Continued)

---

### FLAMMAP FUEL MODEL INPUTS

FlamMap software requires a minimum of 5 input files that represent field conditions in the study area, including elevation, slope, aspect, fuel model, and canopy cover. Each of these files was created as a raster geographic information system (GIS) file in Arc View 9.3.1 software, exported as an ASCII grid file, then utilized in creating a FARSITE Landscape file that served as the base for the FlamMap runs. The resolution of each grid file and associated ASCII file that was used in the models described herein is 3 meters, based on available digital elevation models (DEMs). In addition to the Landscape file, wind and weather data are incorporated into the model inputs. The output files chosen for each of the modeling runs included flame length (feet) and fireline intensity (BTU/ft/sec). Figures F-1 through F-4 depict the results of each of the four modeling runs and exhibit each of these output variables.

The following provides a description of the input and output variables used in processing the FlamMap models. In addition, data sources are cited and any assumptions made during the modeling process are described.

1. **Elevation.** Elevation data were derived from a 3 meter resolution Interferometric Synthetic Aperture Radar (IfSAR) measurement for coastal Southern California, acquired from the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. This data were utilized to create an elevation grid file, using units of feet above mean sea level. The elevation data are a necessary input file for FlamMap runs and are necessary for adiabatic (i.e., a process that happens without loss or gain of heat) adjustment of temperature and humidity and for conversion of fire spread between horizontal and slope distances (Finney 2004).
2. **Slope.** Using Spatial Analyst tools, a slope grid file was generated from the elevation grid file. Slope measurements are represented in percent of inclination from horizontal. The slope input file is necessary for computing slope effects on fire spread and solar radiance (Finney 2004).
3. **Aspect.** Using Spatial Analyst tools, an aspect grid file was generated from the elevation grid. Aspect values are presented in azimuth degrees and are important in determining solar exposure.
4. **Fuel Model.** Vegetation coverage data in the form of a GIS shapefile were used in this analysis to create a fuel model file. Derived from Dudek's vegetation mapping data (Dudek 2011), the vegetation types were classified according to existing National Forest Fire Laboratory (NFFL) and BehavePlus fuel models, and the data file was converted to a grid file for inclusion in FlamMap modeling. Table 2 presents the vegetation and associated fuel type classifications for the Preserve.

## APPENDIX F (Continued)

5. **Canopy Cover.** Canopy cover is a required file for FlamMap operations. It is necessary for computing shading and wind reduction factors for all fuel models. Canopy cover is the horizontal percentage of the ground surface that is covered by tree crowns. Canopy cover is measured as the horizontal fraction of the ground that is covered directly overhead by tree canopy. Crown closure refers to the ecological condition of relative tree crown density. Stands can be said to be "closed" to recruitment of canopy trees but still only have 40% or 50% canopy cover (Finney 2004). Coverage units can be categories (0–4) or percentage values (0–100). Table 2 presents canopy cover assignments for each vegetation type/fuel model

**Table 2**  
**Fuel Models and Associated Canopy Cover Values**

Vegetation Community/Land Cover	Fuel Model	Canopy Cover Value
Coast Live Oak Woodland	9	3
Diegan Coastal Sage Scrub	SCAL18	0
Disturbed Habitat	1	0
Eucalyptus Woodland	TU5	3
Non-native Grassland	1	0
Non-native Vegetation	GS2	0
Orchard	9	2
Southern Coast Live Oak Riparian Forest	8	3
Southern Mixed Chaparral	SH7	0
Southern Riparian Woodland	8	2
Southern Willow Scrub	8	2
Urban/Developed	98	0
Valley Needlegrass Grassland	1	0

### Weather

In order to utilize weather and fuel moisture variables for the Preserve, data from the Ammo Dump Remote Automated Weather Station (RAWS) was analyzed. While data from the Sweetwater weather station was used to evaluate temperature and precipitation for the Preserve, utilization of RAWS data is necessary for fire behavior modeling as it includes data for fuel moisture conditions (unavailable from the Sweetwater weather station). As of the date of this report, no RAWS are located on the Preserve property. The Ammo Dump RAWS is located approximately 22 miles to the north-northwest of the Preserve and is located in a similar inland position as the Preserve. While the Valley Center RAWS is located closer to the Preserve, it is more than 10 miles further inland, and is placed at an elevation approximately 400 feet higher than the Preserve. The following summarizes the location and available data ranges for the Ammo Dump RAWS:

## APPENDIX F (Continued)

- Latitude: 33.381389
- Longitude: -117.285556
- Elevation: 1,068 feet
- Data years: 2001 to 2010.

Wind and weather data are a required component to fire behavior modeling efforts. The Ammo Dump RAWS data was processed with the FireFamily Plus v. 4.0.2 (FireFamily Plus 2007) software package to determine summer (50th percentile) and fall (97th percentile) weather conditions to be incorporated into the Initial Fuel Moisture file used as an input in FlamMap. Wind direction and wind speed values for the two FlamMap runs were manually entered during the data input phase. All other weather data were held constant for each of the FlamMap runs. Table 3 summarizes weather and fuel moisture data inputs used for both summer and fall weather conditions.

**Table 3**  
**FlamMap Weather Input Variables**

Model Variable	50th Percentile Weather	97th Percentile Weather (w/ Max. Wind)
1 h fuel moisture	7%	2%
10 h fuel moisture	9%	3%
100 h fuel moisture	16%	8%
Live herbaceous moisture	60%	30%
Live woody moisture	90%	60%
20 ft wind speed (mph)	10 mph	50 mph (maximum observed Fall wind speed)
Wind direction	225 degrees	45 degrees
Slope steepness	Variable by location	Variable by location

mph = miles per hour

### FlamMap Fuel Model Outputs

Two output grid files were generated for each of the two FlamMap runs, and include representations of flame length (feet) and fireline intensity (BTU/feet/second), as shown in Figures F-1 through F-4. The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2004). It is a somewhat subjective and non-scientific measure of fire behavior, but is extremely important to fireline personnel in evaluating fireline intensity and is worth considering as an important fire variable (Rothermel 1991). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire and is another important variable in initial attack and fire suppression efforts. The

## APPENDIX F (Continued)

information in Table 4 presents an interpretation of these fire behavior variables as related to fire suppression efforts.

**Table 4**  
**Fire Suppression Interpretation**

Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4	Under 100	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8	100 to 500	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11	500 to 1000	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11	Over 1000	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: BehavePlus 3.0.2 fire behavior modeling program (Andrews, Bevins, and Seli 2004)

The fire behavior analysis results for the Preserve vary depending on fuel type. As FlamMap utilizes site-specific digital terrain data (including slope, vegetation, aspect, and elevation data) slight variations in predicted flame length and fireline intensity values can be observed based on fluctuations of these attributes across the landscape. As presented, wildfire behavior in each of the fuel types varies depending on weather conditions. Given the climatic, vegetation, and topographic characteristics along with the fire history and fire behavior modeling results discussed in this VMP, the Preserve is determined to be vulnerable to wildfire starting in, burning onto, or spotting onto the site. Based on this information, adjacent residential development, and the fire history of the area, it is expected that wildfires will occur on the Preserve in the future.

Under extreme fall weather conditions (97th percentile fuel moistures and maximum recorded wind speeds of 50 miles per hour), fire can move rapidly through the site's fuels. Worst-case flame lengths were calculated at approximately 48 feet in chaparral vegetation types and approximately 41 feet in sage scrub vegetation on slopes exceeding 50% throughout the Preserve. Spread rates on site may exceed 8 miles per hour in dry flashy fuels (grasses and scrub) under extreme weather and slope conditions. Finally, under extreme weather and wind conditions, fireline intensity values may exceed 24,000 Btu/feet/second limiting the options for fire response personnel and emphasizing the importance of fuel modification and defensible space for adjacent residences.

It should be noted that the modeling results depict values based on inputs to the FlamMap system. Variations in weather or pockets of different fuel types are not accounted for in this

## APPENDIX F (Continued)

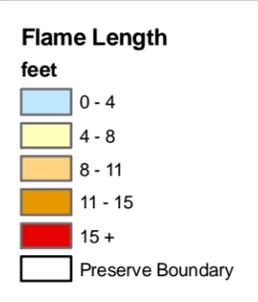
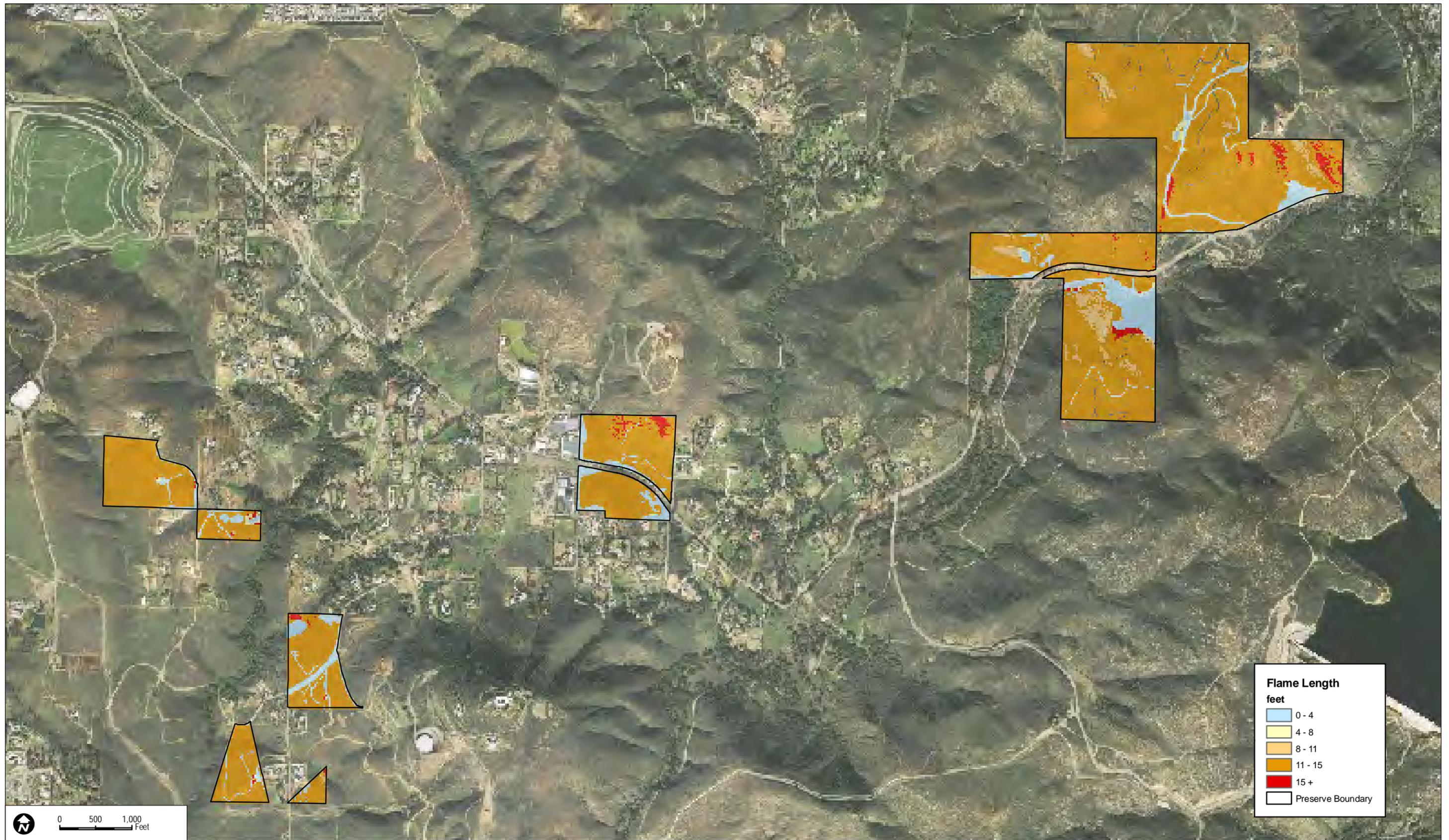
---

analysis. Additionally, the scale of analysis (3 square meters) limits fine-scale analysis and interpretation. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns that could not be obtained for this analysis.

### REFERENCES

- Anderson, H.E. 1982. *Aids to Determining Fuel Models for Estimating Fire Behavior*. U.S. Department of Agriculture (USDA), Forest Service, General Technical Report INT-122. Intermountain Forest and Range Experiment Station: Ogden, UT.
- Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2004. BehavePlus fire modeling system, version 3.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106 Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.
- Finney, M.A. 2004. FlamMap 3.0. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory: Missoula, MT.
- Rothermel, Richard C. 1991. Predicting behavior and size of crown fires in the northern Rocky Mountains. Research Paper INT-438. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.
- SanGIS (San Diego Geographic Information System). 2007. Graphical data for Figures F-1 through F-4.
- Scott, J.H. and R.E. Burgan. 2005. *Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model*. USDA, Forest Service, General Technical Report RMRS-GTR-153. Rocky Mountain Research Station: Fort Collins, CO. 72 p.
- Weise, D.R. and J. Regelbrugge. 1997. *Recent chaparral fuel modeling efforts*. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5 p.





**DUDEK**

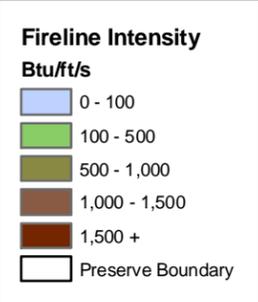
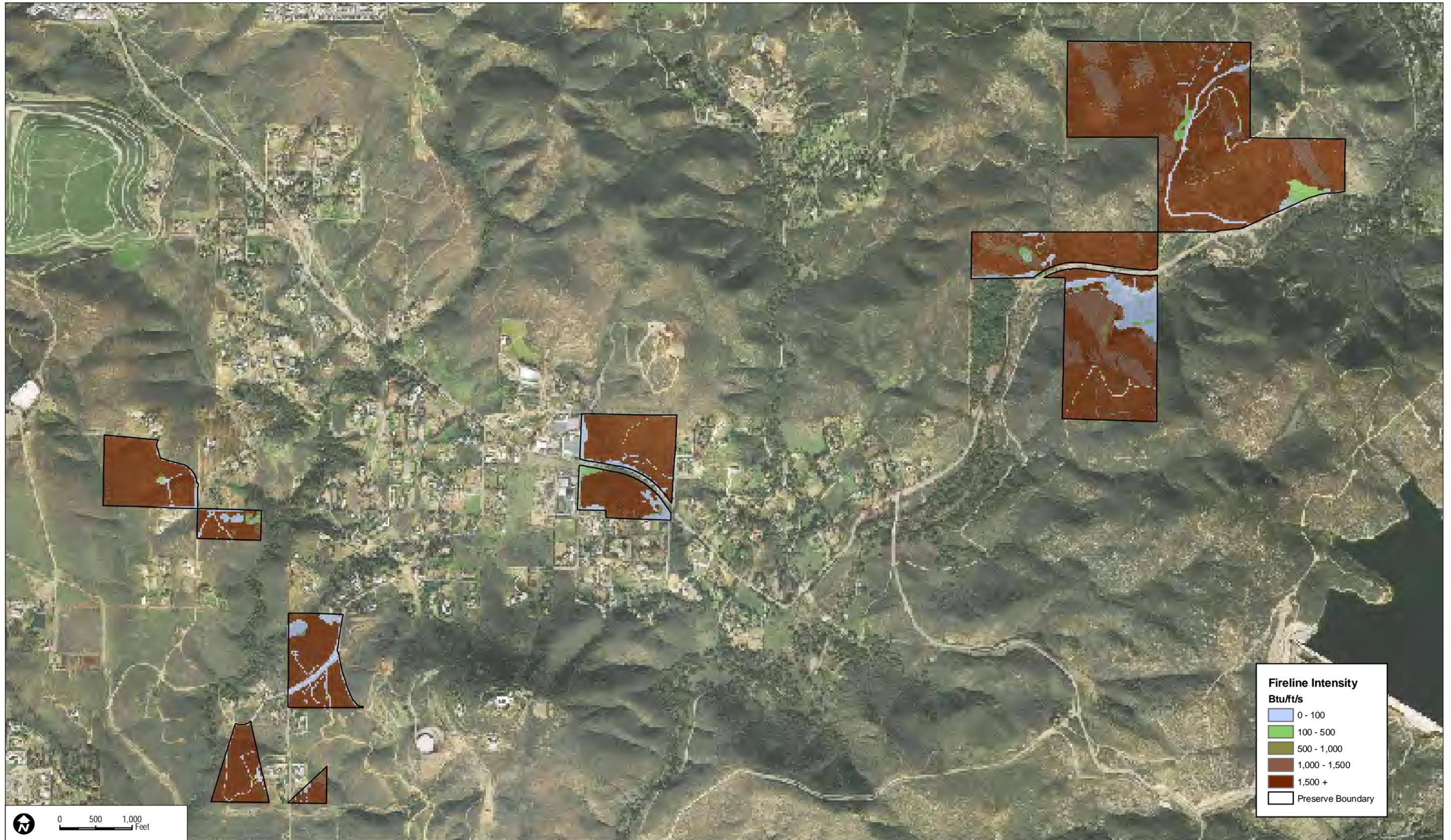
SOURCE: Digital Globe 2008

6680-2D

Final Escondido Creek Preserve - Vegetation Management Plan

**APPENDIX F-1**  
**Flame Length, Summer Fire**

INTENTIONALLY LEFT BLANK



**DUDEK**

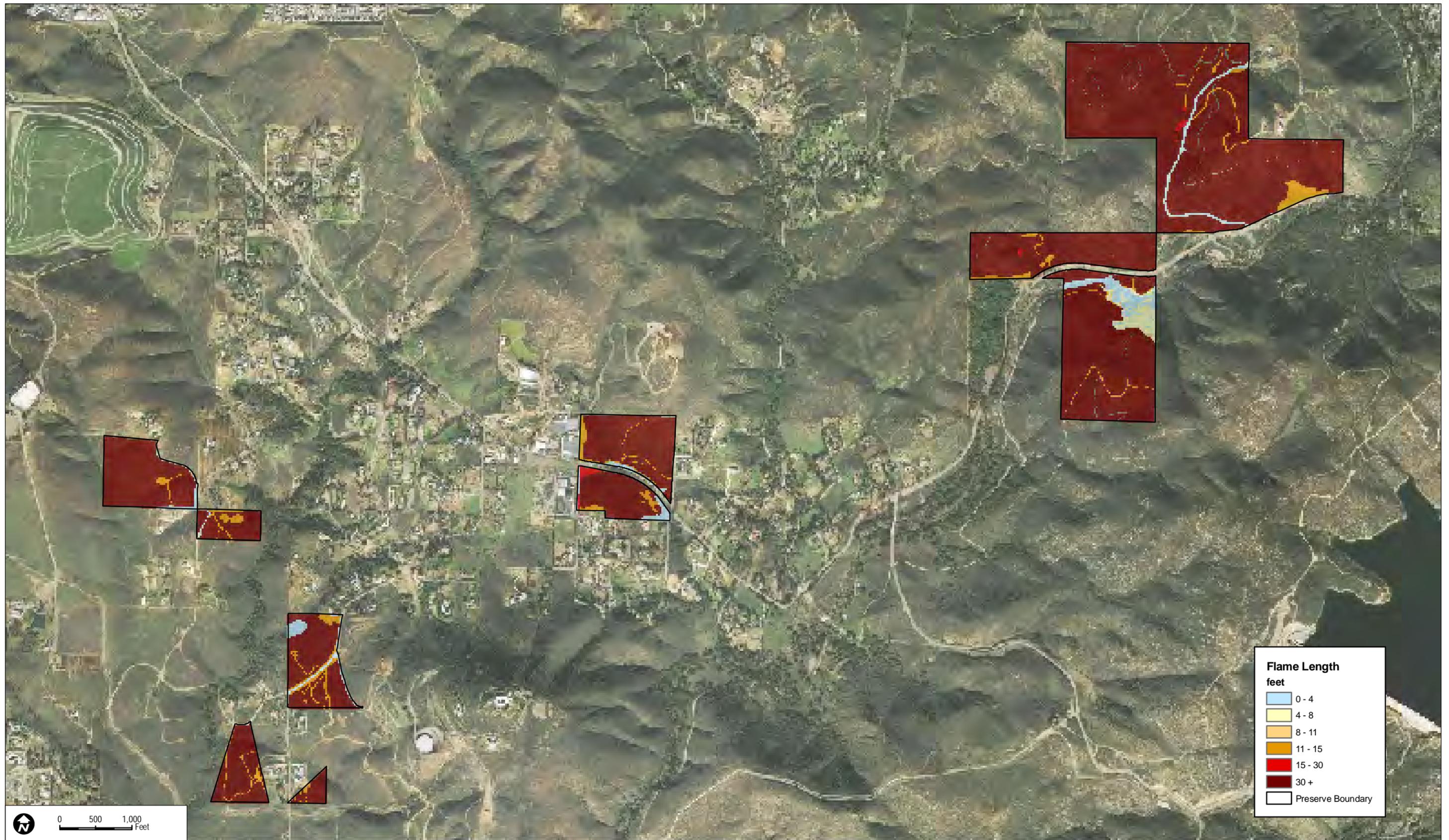
SOURCE: Digital Globe 2008

6680-2D

Final Escondido Creek Preserve - Vegetation Management Plan

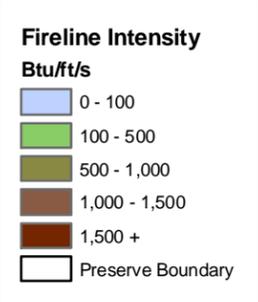
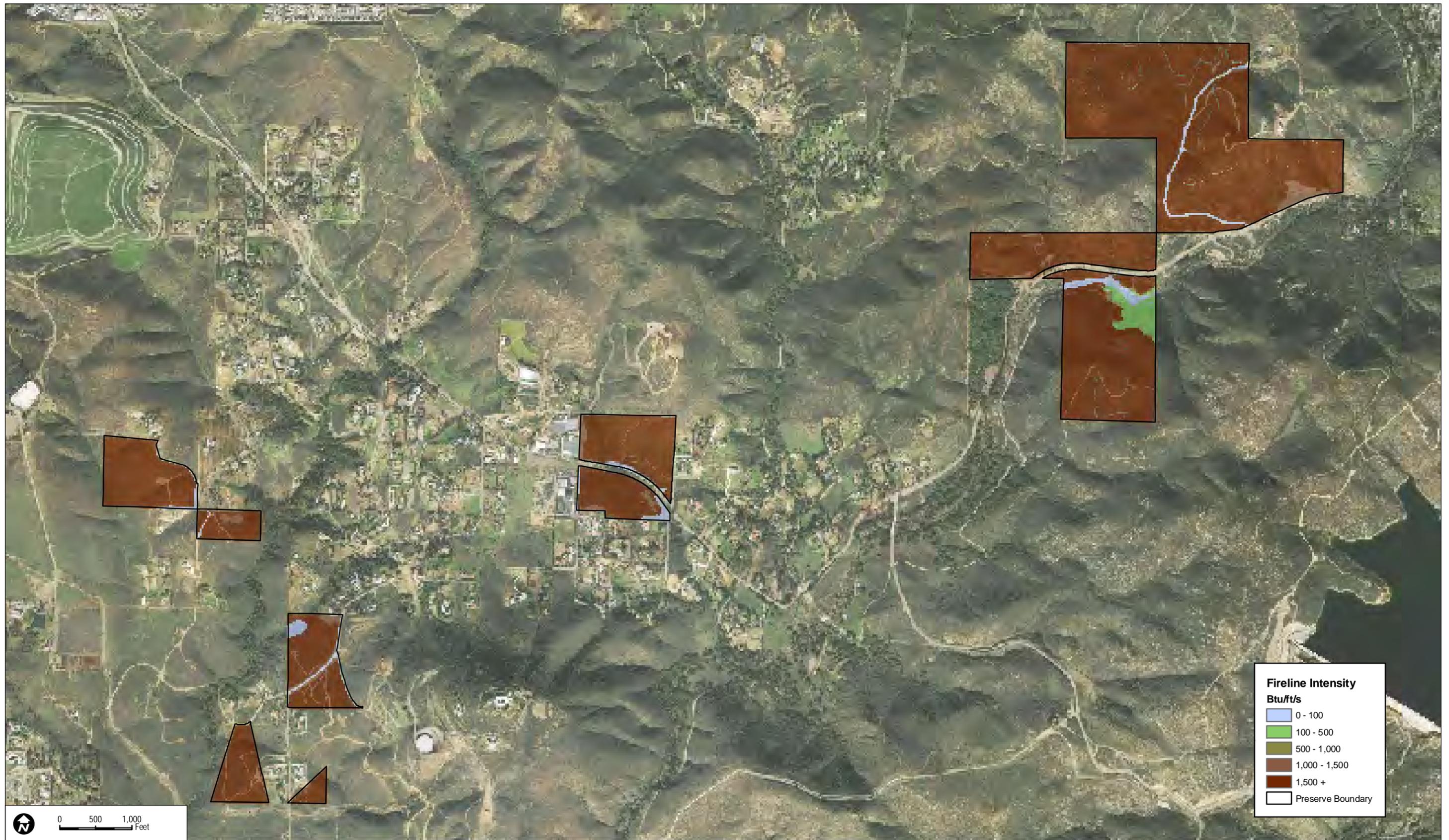
**APPENDIX F-2**  
**Fireline Intensity, Summer Fire**

INTENTIONALLY LEFT BLANK



Flame Length feet	
<span style="color: lightblue;">■</span>	0 - 4
<span style="color: yellow;">■</span>	4 - 8
<span style="color: orange;">■</span>	8 - 11
<span style="color: redorange;">■</span>	11 - 15
<span style="color: red;">■</span>	15 - 30
<span style="color: darkred;">■</span>	30 +
<span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Preserve Boundary

INTENTIONALLY LEFT BLANK



**DUDEK**

SOURCE: Digital Globe 2008

6680-2D

Final Escondido Creek Preserve - Vegetation Management Plan

**APPENDIX F-4**  
**Fireline Intensity, Fall Fire**

INTENTIONALLY LEFT BLANK

## **Appendix F-2**

### **Fire Behavior Modeling Results on the New property**

The fire effects on the new property and the behavior of fire in relation to the vegetation that exists on the new property is an important consideration for a VMP for the new property. Information for the behavior of fire on the new property was generated utilizing the standardized model results information in the *County of San Diego Report Format and Content Requirements, Wildland Fire and Fire Protection* (2010). The following are excerpts from these report format and content requirements.

Analysis of 44 years of weather data (1961–2005) from the USDA Forest Service’s Weather Information Management System (WIMS) provides a sampling of weather patterns across San Diego County. San Diego County is divided into five climate zones from the coast to the desert: Climates of San Diego County, Agricultural Relationships, University of California, Agricultural Extension Service, and U.S. Weather Bureau. Daily afternoon weather observations were manually taken at selected fire stations across the county between 1961 and the early 1990s. Remote Automated Weather Stations (RAWS) replaced manual observations beginning in 1992. (<http://famweb.nwcg.gov/weatherfirecd/>).

Fire Family Plus software (USDA Forest Service) was used to summarize and analyze historical daily fire weather observations and to compute fire danger indices based on the National Fire Danger Rating System (NFDRS).

Weather data from April 15 through December 31 were chosen to represent the general limits of the fire season. Fires have occurred between January 1 and April 14; while dangerous fire weather conditions occur during this period, they typically are not as severe as September and October weather conditions. Including winter weather records would dilute the data and add numerous winter storms that require manual interpretation. Summer fire conditions were derived from records beginning June 15 and ending September 15.

Maximum wind speed data were checked for reasonableness by comparing speed with surrounding stations. Winds associated with winter storms were identified by cross checking with precipitation and relative humidity observations and then excluded. The Santa Ana wind season is assumed to start on September 15. Wind speed is measured at 20 feet above the ground and averaged for at least 10 minutes.

Maximum wind speed was calculated by taking the difference between the maximum recorded wind speed and the 99th percentile wind speed, adding this difference to the 99th percentile wind, adding 10% for a safety margin, and rounding the answer up. This had the effect of throwing out the outliers while including the highest reasonable winds. A table showing days with winds over the 99th percentile is included for each zone. Peak wind for each zone is the highest recorded wind by a RAWS during the Cedar fire (October 26, 2003).

The program for calculating fire behavior and spread requires temperature and relative humidity ranges as inputs. Temperature ranges of 90°–109°F and relative humidities of 5%–9% are reasonable for most areas of the county under Santa Ana conditions. The Burning Index represents the relative difficulty of controlling a wildfire and is calculated from temperature, wind, relative humidity, fuel (vegetation), moisture, and wind.

Utilizing the information described above, the County of San Diego prepared zone level analysis of the behavior of fire utilizing the BEHAVE Plus fire behavior model. New property are located within the transitional zone as shown in the following Table 1 and Table 2.

**Table 1  
BEHAVE Plus 5.0.1**

**Worst-case Sustained Winds (10-minute average and peak) Fuel Model 1 at 50% Slope**

Zone	Period	Temperature	Relative Humidity	Sustained Wind Speed	Burning Index (99%)	Rate of Spread Feet/min	Flame Length
Transitional	Summer	90-109°F	10-14%	19 mph	119	430	9
	Santa Ana	90-109°F	5-9%	28 mph	145	730	13
	Peak	90-109°F	5-9%	41 mph	-	730	13

**Table 2  
BEHAVE Plus 5.0.1**

**Worst-case Sustained Winds (10-minute average and peak) Fuel Model 4 at 50% Slope**

Zone	Period	Temperature	Relative Humidity	Sustained Wind Speed	Burning Index (99%)	Rate of Spread Feet/min	Flame Length
Transitional	Summer	90-109°F	10-14%	19 mph	119	615	54
	Santa Ana	90-109°F	5-9%	28 mph	145	1100	73
	Peak	90-109°F	5-9%	41 mph	-	1600	87

Under extreme fire conditions, worst-case scenario modeled using BEHAVE Plus 5.0.1 indicates that the rate of spread of a fire through a transitional zone location such as the new property will reach 1,600 feet or more than a quarter-mile per minute with 87-foot flame length. However, under more normal conditions, the spread rate would be 730 feet per minute with flame lengths of 13 feet.

**References:**

County of San Diego. 2010. *County Of San Diego Report Format and Content Requirements Wildland Fire and Fire Protection*. Land Use Environment Group, Department of Planning and Land Use, Department of Public Works. 18pp.